EEA-33 Industrial Pollution Country Profiles

Methodology report

October 2018

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1   Introduction

Industrial pollution puts pressure on all environmental media (i.e. air, water, land and biota). These pressures are caused by different types of pollutants originating from a variety of industrial processes.

In order to better describe environmental pressures from industry, the European Environment Agency (EEA), together with the European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM), has developed country profiles on industrial pollution in Europe. This report provides an overview of the methodology behind the profiles and how the different pressures are quantified.

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 can also be used to inform the research and scientific communities on data issues that prevent analysis and clear decision making. The profiles aim to monitor the progress of, and present findings on the state of industrial pollution. The addition of EEA-33 and EU-28 profiles enables a broader overview of industrial pollution in Europe.

2   Scope

This chapter outlines 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.

2.2   Definition of industry

There are different definitions of industry depending on the use of particular data sources and perspectives of interest. 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.

First, however, it is useful to consider the different data sources available. These include the European Pollutant Release and Transfer Register (E-PRTR), Eurostat, and greenhouse gas (GHG) and air pollutant emission 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 of this section is therefore 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 that result from the activities covered.

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. Greenhouse gas emissions are reported under the Monitoring Mechanism Regulation (MMR) to the EEA using Common Reporting Format (CRF) categories.

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 was performed by consolidating two pre-existing mapping tables: one created by Finnish and Estonian emission experts ([1]) for NACE, NFR and E-PRTR; and one of NACE and E-PRTR codes ([2]). 'Gap filling' was then performed using expert judgement. For the 2018 country profiles the mapping has been adjusted as part of EEA efforts to apply consistent mapping across wider sectors. The mapping table of the data sources is available on the European Environment Information and Observation Network (Eionet) Forum ([3]). Since the previous submissions there have been changes to the mapping and a summary of these changes can be found in Annex 1. The list of codes for these reporting systems included in the profiles is presented in Annex 1. A summary of what is included in the profiles is given in Box 2.1. An overview of the data sources used is provided in Table 2.2.

Box 2.1 Thematic scope of the profiles

The scope of the country profiles spans multiple data sources, each with differing activity scope and coding systems. The activities included in the profiles are those falling into the categories of energy supply, extractive industry, waste (including waste management and wastewater treatment) and industry (including iron and steel, non-ferrous metals, non-metallic minerals, chemicals, pulp, paper and wood, food and drink and other manufacturing). A mapping of the categories and overview of how this has changed from the previous mapping is available in Annex 1 table A1.9. Some profiles also include the grouping "Non industry" (comprising all other activities) to provide context.

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 often 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 (except E36)
- NFR14 categories 1A1, 1A2, 1B, 2 (except 2A5b) and 5
- CRF 2006 categories 1A1, 1A2, 1B, 1C, 2 and 5 (except 5F)
- E-PRTR sectors: all except 7a, 7b

Data for all 33 EEA member countries (the 28 EU Member States (EU-28) together with Iceland, Liechtenstein, Norway, Switzerland and Turkey, known collectively as the EEA-33) are not always available from these data sources. Alternative data sources such as the International Energy Agency and the World Bank were used in such instances where possible (see Chapter 2 'Gap filling' and 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 3 — 'Agriculture' — has been excluded. The reasons for this exclusion are as follows: for specific substances (especially nutrients), agricultural discharges will be difficult to quantify, and relatively difficult to compare among the countries because of local conditions, monitoring efforts and different quantification methods.
- CRF sector 5F – "Long-term C storage". This is a memo item, and is not consistently reported across countries.
- NFR14 activity 2A5b – "Construction and demolition". This is categorised as a Residential & Commercial activity under the latest EEA mapping[3].
- NACE activity E36 – "Water collection, treatment and supply". This is categorised as a Residential & Commercial activity under the latest EEA mapping[3].

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(1) http://www.ceip.at/fileadmin/inhalte/emep/xls/ConversionTableReportingCodes_October2015.xlsx

(2) ETC/ACM, 2011, Annex E: Correlation of the Eurostat and E-PRTR economic activities' classification (http://acm.eionet.europa.eu/docs/ETCACM_TP_2011_6_Annex_E_E-PRTR2011.pdf) accessed 3 August 2015.

(3) https://forum.eionet.europa.eu/etc-acm-consortium/library/subvention-2018/task-deliveries-ap2018/task-1221-industrial-pollution-country-profiles/b.-final-drafts-approval-eea/draft-acc-data-mapping_eionet_v2

- 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 constitute activities which, e.g. in the NFR classification, are attributed to a sector different from the industry sector.

Table 2.2   Data sources used for the country profiles

Data source	Use	Reporting updates	Reference
Eurostat	Economy (GVA)	Annual	Eurostat (2018a)
Eurostat	Energy consumption	Annual	Eurostat (2018b)
Eurostat	Water use	Annual	Eurostat (2018c)
Eurostat	Waste generation	Biennial	Eurostat (2018d)
EEA	Emissions to air (CLRTAP)	Annual	EEA (2018a)
EEA	Industry emissions to water and air (E-PRTR)	Annual	EEA (2018b)
EEA	GHG emissions (MMR)	Annual	EEA (2018c)
International Energy Agency (IEA)	Industry energy consumption (gap-filling data)	Annual	IEA (2018)
World Bank	Industry GVA (gap-filling data)	Annual	World Bank (2018a, 2018b)

2.3   Pollutants considered

The overall focus is on pollutants under specific industrial legislation. The profiles therefore do not track emerging pollutants. The pollutants included in this analysis have been determined based on multiple criteria, and are presented in Tables 2.3 for air, 2.4 for greenhouse gases and 2.5 for water.

2.3.1   Air pollutants

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 (it must be included in a relevant piece of legislation). It must then meet at least one of the subsequent pressures and impacts criteria which relate to specific challenges posed by a pollutant. Finally, the quality of the data on the pollutant must be acceptable. In summary, for inclusion in the profiles:

Policy criteria

P1:   the pollutant must be covered by the Industrial Emissions Directive (IED) (EC, 2010)([4])

and

Pressures/Impacts criteria

P/I1:   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

P/I2:   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

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(4) EC, 2010, Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:en:PDF) accessed 26 June 2018.

P/I3: 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*) ([5]).

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	Pressures/Impacts criteria met
Nitrous oxides	NO_x	Air pollutant	P/I2, P/I3
Non-methane volatile organic compounds	NMVOCs	Air pollutant	P/I2, P/I3
Particulate matter	PM_{10}	Air pollutant	P/I1
Sulphur dioxide	SO_2	Air pollutant	P/I1, P/I3
Cadmium	Cd	Heavy Metal	P/I2
Lead	Pb	Heavy metal	P/I2
Mercury	Hg	Heavy metal	P/I1

Data sources
P1 = EC (2010)
P/I1, P/I2 = EEA (2017a and 2017b)
P/I3 = EEA (2014)

2.3.2   Greenhouse gases

Three factors were considered with regard to the inclusion of greenhouse gases (GHGs). To be included in the profiles, GHGs must first meet the policy-related criteria (it must be included in a relevant piece of legislation). It must then meet at least one of the subsequent pressures and impacts criteria which relate to specific challenges posed by a GHG. Finally, the quality of the data on the GHG must be acceptable. In summary, for inclusion in the profiles:

Policy criteria

P1: the pollutant must be covered by EU Emissions Trading Directive (EC, 2003) ([6]) and the Monitoring Mechanism Regulation (EC, 2013) ([7]);

and

Pressures/Impacts criteria

P/I1: more than half of the emissions of the GHG must have occurred within industry for at least one year between 1990 and the year for which the latest data are available, calculated via industry emission data reported under the MMR, as a percentage of total emissions in EEA-33 national inventories;

and

([5]) EEA, 2014, *Costs of air pollution from European industrial facilities 2008–2012*. EEA Technical report No 20/2014, European Environment Agency (http://www.eea.europa.eu/publications/costs-of-air-pollution-2008–2012) accessed 26 June 2018.

([6]) EC, 2003, Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32003L0087) accessed 26 June 2018.

([7]) EC, 2013, Regulation No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R0525) accessed 26 June 2018.

P/I2: the emission of the GHG must have contributed more than 5% to total CO_2e emissions from Annex I countries for at least one year between 1990 and the year for which the latest data are available;

F-gases are not included in the profiles because of the reduced number of countries which report complete time series of emissions. Table 2.4 summarises the GHGs that are included in the country profiles.

Table 2.4   GHGs included in the industrial country profiles

GHG	Abbreviation	Group	Pressures/Impacts criteria met
Carbon dioxide	CO_2	Greenhouse gas	P/I1, P/I2

Data sources
P1 = EC (2003 and 2013)
P/I1 = EEA (2018c[8])
P/I2 = EEA (2018c)

2.3.3   Water pollutants

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:

Policy criteria

P1: the pollutant must be covered by the IED (EC, 2010) ([9]), the Water Framework Directive (WFD) (EC, 2000) ([10]) or the OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) list of chemicals for priority action;

and

Pressures/Impacts criteria

P/I1: the pollutant must be highlighted as having a potentially significant impact on health in water (determined through the toxicity, bioavailability and bioaccumulation potential);

or

P/I2: the pollutant must have significant eutrophication impacts on water and ecosystems;

or

P/I3: 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) ([11]). In 2018 there have been several activities to review and discuss the Water Framework Directive, including a two year initiative to support exchange between experts and Competent Authorities for the improvement of the Water Framework Directive ([12]). Although the E-PRTR covers the WFD priority substances, 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

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(8) EEA, 2018c, 'National emissions reported to the UNFCCC and to the EU greenhouse gas monitoring mechanism', European Environment Agency (https://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-unfccc-and-to-the-eu-greenhouse-gas-monitoring-mechanism-14) accessed 26 June 2018.
(9) ibid
(10) EC, 2000, Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32000L0060) accessed 26 June 2018.
(11) ibid

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 2.5 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 2.5   Water pollutants included in the industrial country profiles

Pollutant	Abbreviation	Group	Reason for inclusion
Cadmium	Cd	Heavy metal	P1, P/I1
Lead	Pb	Heavy metal	P1, P/I1
Mercury	Hg	Heavy metal	P1, P/I1
Nickel	Ni	Heavy metal	P1, P/I1
Total nitrogen	Tot-N	Inorganic substances	P1, P/I2
Total phosphorus	Tot-P	Inorganic substances	P1, P/I2
Total organic carbon	TOC	Organic substances	P1, P/I3

Data sources
P1 = EC (2010); OSPAR (2014); EC (2000),
P/I1 = WHO (2010); OSPAR (2014)
P/I2, P/I3 = EC (2000)

2.3.4   Waste
Waste can be seen as any substance or object which the holder discards or intends / is required to discard. As per the Waste Directive adopted in 2018, it can also be seen as a resource through reuse and recycling. The Directive therefore dictates that waste management should be transformed into sustainable material management ([12]). The country profiles cover all waste generated by the relevant sectors, which is treated in a variety of ways including recovery, incineration and landfill (among others). Although the quantity of waste undergoing different end-of-life treatments is an important issue, the profiles do not distinguish between these different treatment types because the focus is on level of waste generation by different sectors.

However, the profiles do group waste materials into two hazard levels: hazardous waste and non-hazardous waste. Materials classified as non-hazardous are easier to re-use, recycle and treat than hazardous waste. Hazardous waste include those materials and products that contain hazardous substances and can pose a risk to health or the environment if not managed and disposed of correctly. The Waste Directive states that measures to reduce the contents of hazardous substances in materials and products should be promoted ([13]). The properties of waste that render it hazardous are defined in Annex III of the Waste Directive and include, inter alia, explosive, flammable, toxic and carcinogenic properties.

2.3.5   Soil pollutants
In many cases, pollutants are introduced into soils after being emitted into the air. The direct introduction of pollutants into soils from industrial activities is less common. E.g. under E-PRTR, releases to soils are reported in few cases only. Soil pollutants may 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 EEA-33 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,

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(12) http://ec.europa.eu/environment/water/index_en.htm
(13) EC, 2018, Directive 2018/851/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives
 (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1530001632550&uri=CELEX:32018L0851) accessed 28 September 2018.
(13) ibid

Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. A profile for the EEA-33 and EU-28 is also provided. 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 ([14]) 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 the profiles by showing only the allocation to 'Industry (no detail)' and 'Non industry'.

Water use by sector

For almost all countries, the time-series data for water use in industrial sectors and total water use are incomplete or missing. If there were not 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. No data were available for Liechtenstein.

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 ([15], [16]) and converted into millions of euros using average annual USD to EUR exchange rates from AMECO (2018). 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 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

Waste generation data from Eurostat is updated every two years, the last update including 2016 data. However, at the time of writing this report the 2016 data is incomplete, being missing for 7 countries. As such, for consistency 2014 is the latest year presented for all countries.

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 and now report emissions for 2014 to 2016. No data were available for Liechtenstein.

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(14) IEA, 2018, Sankey, 'Final energy consumption' (http://www.iea.org/Sankey/index.html) accessed 14 August 2018.
(15) World Bank, 2018a, 'Industry, value added (% of GDP)', (http://goo.gl/k23F3g) accessed 26 June 2018.
(16) World Bank, 2018b, 'GDP at market prices (current US$)', (http://goo.gl/Bme8GU) accessed 26 June 2018.

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, quality-checks the E-PRTR data set. While the E-PRTR provides comprehensive information on emissions from large industrial sources, the completeness and consistency of reporting across countries varies. The overall accuracy can be compromised by a small number of significant outliers. Further improvements in the data quality would increase the robustness of the fact sheet data.

Moreover, only industrial operators meeting certain activity and emissions thresholds are captured in E-PRTR 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 ([17]) 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.

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(17) EC, 2000, Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32000L0060) accessed 26 June 2018.

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 use.

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

Percentage of total energy consumption

The percentages that the countries' industrial energy consumption contribute to the EEA-33 total energy consumption, for each industry sector, are summed for all sectors. This aggregation of percentages provides an overview of the significance of industrial energy consumption across all sectors.

Percentage of country energy consumption

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

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

Data extraction 1: Gross value added (Eurostat, 2018a[18])
- 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 (2000–2016)
- country (EU-28 countries plus Norway and Turkey).

The GVA values for NACE sectors B, C, D and E cover 'industrial GVA'. The GVA values for NACE sectors B, C, D and E are then subtracted from total GVA for each country and year to obtain 'Non-industry GVA'. Total GVA covers all economic activity.
Data for Iceland, Liechtenstein, Malta and Turkey, were not available from Eurostat (2018a). Alternative data were obtained from the World Bank (2018) and converted into millions of euros using the annual average USD to EUR exchange rates from AMECO (2018). 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. (For definitions of World Bank and IEA metrics please refer to Chapter 3.)

Data extraction 2: Final energy consumption — industry (Eurostat, 2018b[19])
- 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 (1990–2016)
- country (EU-28 countries plus Norway).

Data for Iceland, Liechtenstein and Switzerland were not available from Eurostat (2018b). An alternative data source, the International Energy Agency's energy balances (2018), was used for Switzerland and Iceland. No alternative data source was identified for Liechtenstein.

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(18) Eurostat, 2018a, 'National Accounts aggregates by industry (up to NACE a*64)' (https://goo.gl/pz4oML) accessed 26 June 2018.

(19) Eurostat, 2018b, 'Complete energy balances - annual data' (https://goo.gl/GDtvAZ) accessed 26 June 2018.

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

Energy group	Sector
Iron and steel	Metal industry
Non-ferrous metals	Metal industry
Chemical and petrochemical	Chemical industry
Non-metallic minerals	Non-metallic minerals
Mining and quarrying	Extractive industry
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 use (Eurostat, 2018c[20])
- NACE (B, C, 'D2511_D3513' and 'TOTAL_HH')
- Indicator ('Wat_Proc' (Public water supply, self and other supply))
- unit (million cubic metres)
- period (1990–2016)
- country (EU-28 countries plus Norway, Turkey, Switzerland and Iceland).

The water use data within NACE sectors B, C and 'D2511_D3513' cover water use in extractive industry, manufacturing and production and distribution of electricity respectively. These are the only NACE aggregations available in the relevant Eurostat table matching the scope of the profiles. The use of water for cooling purposes in production and distribution of electricity (D2511_D3513_CL) is included within D2511_D3513. Water use for B, C and D are then subtracted from total water use for each country and year to obtain 'Non-industry water use'. The water use data set is heavily gap filled due to a lack of comprehensive time series. No data were available for Liechtenstein.

5.3   Graphs available in the Tableau story
Tab 1: Energy consumption, GVA and water use of industry as a percentage of the EEA-33 total, and as a percentage of the country's total
Energy consumption
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 EEA-33 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 EEA-33 energy consumption for that year. The data obtained should be presented as described below:

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(20) Eurostat, 2018c, 'Water use by supply category and economical sector' (https://goo.gl/oOixj2) accessed 26 June 2018.

- present the data as a stacked bar graph
- show the country names on the Y axis
- show the 'percentage of total EEA-33 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.

EU-28 profile
This will be displayed as per the method described above, however the x-axis would display percentage of total EU-28 energy consumption. The energy consumption will be presented as a stacked bar for each EU-28 country, coloured by sector. Sum the total energy consumption by sector for the latest year for all EU-28 countries. Divide the sector energy consumption by total EU-28 energy consumption. Present in a pie chart as per the bullet points above.

EEA-33 profile
This will be displayed as per the method described above. The energy consumption will be presented as a stacked bar for each EEA-33 country, coloured by sector. Sum the total energy consumption by sector for the latest year for all EEA-33 countries. Divide the sector energy consumption by total EEA-33 energy consumption. Present in a pie chart as per the bullet points above.

GVA
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 EEA-33 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 EEA-33 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.

EU-28 profile
This will be displayed as per the method described above, however the x-axis would display percentage of total EU-28 GVA. The GVA will be presented as a stacked bar for each EU-28 country, coloured by NACE division. Sum the total GVA by NACE division for the latest year for all EU-28 countries. Divide the NACE division GVA by total EU-28 GVA. Present in a pie chart as per the bullet points above.

EEA-33 profile
This will be displayed as per the method described above. The GVA will be presented as a stacked bar for each EEA-33 country, coloured by NACE division. Sum the total GVA by NACE division for the latest year for all EEA-33 countries. Divide the NACE division GVA by total EEA-33 GVA. Present in a pie chart as per the bullet points above.

Water use
Developing the figure (Data extraction 3)
Part 1
Sum 'All NACE activities plus households minus water use for cooling purposes in the production of electricity' across countries, per year, to obtain EEA-33 'total water use'.

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

For each NACE division, country and year, divide water use by the total EEA-33 water use 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 EEA-33 water use' 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 use by country 'total' water use. 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 use
- 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.

EU-28 profile
This will be displayed as per the method described above, however the x-axis would display percentage of total EU-28 water use. The water use will be presented as a stacked bar for each EU-28 country, coloured by NACE division. Sum the total water use by NACE division for the latest year for all EU-28 countries. Divide the NACE division water use by total EU-28 water use. Present in a pie chart as per the bullet points above.

EEA-33 profile
This will be displayed as per the method described above. The water use will be presented as a stacked bar for each EEA-33 country, coloured by NACE division. Sum the total water use by NACE division for the latest year for all EEA-33 countries. Divide the NACE division water use by total EEA-33 water use. Present in a pie chart as per the bullet points above.

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.

6.2 Air emissions
The graphs in this section present industry emissions, by sector, as a percentage of total country emissions for that pollutant.

6.2.1 Data sources
The data sources related to air emissions in this chapter are the EEA databases for emissions reported under the CLRTAP ([21]), the E-PRTR ([22]) and the MMR ([23]). Trends for industry emissions to air are extracted from the E-

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(21) EEA, 2018a, 'National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)', European Environment Agency (http://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-convention-on-long-range-transboundary-air-pollution-lrtap-convention-10) accessed 26 June 2018.
(22) EEA, 2018b, 'The European Pollutant Release and Transfer Register (E-PRTR), Member States reporting under Article 7 of Regulation (EC) No 166/2006', European Environment Agency (http://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-12) accessed 26 June 2018.

PRTR. The EEA-33 countries' total air emissions, and industrial emissions from the latest year, are extracted from the CLRTAP database. The EEA-33 countries' GHG emissions are extracted from the MMR database for all available years.

Data extraction 4: Carbon dioxide emissions
The following data are selected from the MMR database (EEA, 2018c[24]):
- country (all EEA 33 countries)
- CRF code (all at most detailed level available, excluding national totals, memo items, and LULUCF)
- year (all available)
- GHG name (of those listed in Table 2.4)
- emissions
- unit.

Emissions from extraction 4 are grouped into industry sectors as per the mapping document (summarised in Table A1.3 of Annex 1 of this methodology report). Non-industry activities are grouped together, as detailed in Table A1.6.

Data extraction 5: industrial air emissions
The following data are selected from the E-PRTR database (EEA, 2018b[25]):
- 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 EU-28 countries plus Iceland, Norway, Switzerland and Liechtenstein).

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.The query sums these emissions by country, year and pollutant.

Turkey does not report data to the E-PRTR.

Data extraction 6: air pollutant emissions
The following data are selected from the CLRTAP database (EEA, 2018a[26]):
- country (all EEA-33 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.

The data from data extraction 6 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 ([27]).

Emissions from data extraction 6 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 A1.5.

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(23) EEA, 2018c, 'National emissions reported to the UNFCCC and to the EU greenhouse gas monitoring mechanism', European Environment Agency (https://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-unfccc-and-to-the-eu-greenhouse-gas-monitoring-mechanism-14) accessed 26 June 2018.
(24) ibid
(25) ibid
(26) ibid
(27) http://www.ceip.at/reporting_instructions

6.2.2 Graphs available in the Tableau story

Industrial air emissions (including carbon dioxide) 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 4, 5 and 6). The data obtained should be presented as described below:

- present the data as a bar chart of the latest year
- show the pollutant 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.

EU-28 profile

For the latest year, sum emissions in EU-28 countries for each pollutant and sector group. Divide this by total EU-28 industrial emissions for that pollutant. Follow the steps outlined above to create the bar graph.

EEA-33 profile

For the latest year, sum emissions for each pollutant and sector group. Divide this by total EEA-33 industrial emissions for that pollutant. Follow the steps outlined above to create the bar graph.

Trends in industrial air pollution in the relevant country

Developing the figures

Sum the industry pollutant emissions in by year and country to get total industry emissions for each country by pollutant per year, combining the data on CO_2 emissions and other air pollutants (Data extractions 4 and 5).

Divide the industry emissions in each year by the latest year's emissions, for each pollutant and country, to normalise the trends.

The data obtained should be presented as described below:

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

EU-28 profile

Sum industry air emissions by year for all EU-28 countries to get total air industry emissions by pollutant per year. Then follow the steps outlined above to produce the line graph.

EEA-33 profile

Sum industry air emissions by year for all countries to get total air industry emissions by pollutant per year. Then follow the steps outlined above to produce the line graph.

6.3   Emissions to water

6.3.1 Data sources

Data extraction 7: Industrial water emissions

The following data are selected from the E-PRTR database (EEA, 2018a[28]):

- MainIAActivityCode
- year (2007–latest available)
- pollutant name (of those listed in Table 2.5)
- emissions
- unit
- medium (i.e. 'Water' in this case)
- country (of the EU-28 countries plus Iceland, Norway, Switzerland and Liechtenstein).

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' and [FacilityID_Changes] from [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 2.5. Only the NACE activities included in the industry definition in the mapping document are included. The query maps and aggregates emissions to industrial sectors (as per the mapping document summarised in Table A1.4 of Annex 1 of this methodology report), by country, year and pollutant.

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(28) ibid

Turkey does not report data to the E-PRTR.

6.3.2   Graphs available in the Tableau story

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 industry sector, divide the industry emissions by country total industrial emissions for that pollutant (Data extraction 7). 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 industry sector; non-industry data should be represented in grey

EU-28 profile
For the latest year for all EU-28 countries, pollutant and NACE activity, divide industry emissions by total EU-28 industrial emissions for that pollutant. Follow the steps outlined above to create the line graph.

EEA-33 profile
For the latest year for all countries, pollutant and NACE activity, divide industry emissions by total EEA-33 industrial emissions for that pollutant. Follow the steps outlined above to create the line graph.

Trends in industrial water pollution (E-PRTR)
Developing the figures
Sum the emissions by year and country to get total water industry emissions for each country by pollutant per year (Data extraction 7).
Divide the industry emissions in each year by the latest year's emissions, for each pollutant and country, to normalise the trends.
The data obtained should be presented as described below:

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

EU-28 profile
Sum the emissions in each NACE division by year for all EU-28 countries to get total water industry emissions by pollutant per year. Then follow the steps outlined above to produce the line graph.

EEA-33 profile
Sum the emissions in each NACE division by year for all countries to get total water industry emissions by pollutant per year. Then follow the steps outlined above to produce the line graph.

6.4   Waste

6.4.1   Data sources
Data are retrieved from the Eurostat statistics database.

Data extraction 8: Generation of waste (env_wasgen) (Eurostat, 2018d[29])
- waste type (total)
- NACE Rev. 2 codes (all categories except for 'C', to avoid duplication as data for subcategories of C are also provided in this table)
- time (all)
- unit (tonnes)
- hazard (Hazardous waste; Non-hazardous waste).

The waste data is mapped from NACE codes to industry sectors (as per the mapping document summarised in Table A1.10 in Annex 1 of this report), then aggregated up by country, year and industry sector.

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(29) Eurostat, 2018d, 'Generation of waste' (https://goo.gl/MAHg3i) accessed 26 June 2018.

6.4.2   Graphs available in the Tableau story

Industrial waste as a percentage of total EEA waste and percentage of country-specific waste generation for hazardous and non-hazardous waste

Developing the figures

Part 1.

Sum the industrial waste by sector, country and year, for each hazard type (Data extraction 8).

Sum total waste for all countries by year, for each hazard type (Data extraction 8).

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 EEA-33 waste generation for each year.

The sector 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 EEA-33 waste generation' on the *x*-axis
- colour by sector (grouped by type, non-industry is grey).

Part 2.

For each country, year, hazard type and category (sectors 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 category in the specific country
- colour each section of the pie chart by category.

EU-28 profile

Follow the steps above to produce the bar graphs of waste generated and waste intensity by EU-28 country. To create the pie chart, sum the waste generation by year, hazard type and category for all EU-28 countries. Divide this by the total EU-28 waste generation. Display this as a pie chart showing the percentage of waste from each NACE division for a given year for all EU-28 countries.

EEA-33 profile

Follow the steps above to produce the bar graphs of waste generated and waste intensity by country. To create the pie chart, sum the waste generation by year, hazard type and category for all countries. Divide this by the total EEA-33 waste generation. Display this as a pie chart showing the percentage of waste from each NACE division for a given year for all EEA-33 countries.

Trends in industrial waste generation for hazardous and non-hazardous waste

Developing the figure

Divide the industry waste generation for each year by that of the latest year for each category, hazard type and country, to normalise the trends (Data extraction 8).

The data obtained should be presented as described below:

- present the data as a line graph
- show industrial waste generation (relative to the latest year) on the Y axis
- show the year on the *x*-axis
- colour the lines by category.

EU-28 profile

Divide the total EU-28 industry waste generation for each year by that of the latest year's waste for each category and hazard type. Follow the steps outlined above to create the line graph.

EEA-33 profile

Divide the total EEA-33 industry waste generation for each year by that of the latest year's waste for each category and hazard type. Follow the steps outlined above to create the line graph.

6.5 Soil

Industry is a major contributor to soil contamination in Europe, in many cases via emissions to air. There is a lack of good-quality and comparable quantifiable soil data for countries within the EEA-33, which limits the analysis of soil pollution trends ([30]). The inclusion of soil pollution data may be developed in future versions of the country profiles.

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(30) EEA, 2015, The European environment: state and outlook 2015, European Environment Agency (http://www.eea.europa.eu/soer) accessed 26 June 2018.

References

AMECO, 2018, 'Annual macro-economic database: Monetary variables — exchange rate and purchasing power parities interest rates' (http://ec.europa.eu/economy_finance/db_indicators/ameco/zipped_en.htm) accessed 26 June 2018.

EC, 2000, Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32000L0060) accessed 25 May 2017.

EC, 2003, Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32003L0087) accessed 25 May 2017.

EC, 2006, Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC — Statement by the European Parliament, the Council and the Commission (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0021) accessed 25 May 2017.

EC, 2008, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF) accessed 25 May 2017.

EC, 2010, Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:en:PDF) accessed 25 May 2017.

EC, 2011, Proposal for a directive of the European Parliament and of the Council amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (COM/2011/0876 final - 2011/0429 (COD)) (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011PC0876) accessed 25 May 2017.

EC, 2013, Regulation No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R0525) accessed 25 May 2017.

EEA, 2014, *Costs of air pollution from European industrial facilities 2008–2012*. EEA Technical report No 20/2014, European Environment Agency (http://www.eea.europa.eu/publications/costs-of-air-pollution-2008–2012) accessed 25 May 2017.

EEA, 2015, *The European environment: state and outlook 2015*, European Environment Agency (http://www.eea.europa.eu/soer) accessed 25 May 2017.

EEA, 2018a, 'National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)', European Environment Agency (https://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-convention-on-long-range-transboundary-air-pollution-lrtap-convention-12) accessed 12 August 2018.

EEA, 2018b, 'The European Pollutant Release and Transfer Register (E-PRTR), Member States reporting under Article 7 of Regulation (EC) No 166/2006', European Environment Agency (https://www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-21) accessed 01 September 2018.

EEA, 2018c, 'National emissions reported to the UNFCCC and to the EU greenhouse gas monitoring mechanism', European Environment Agency (https://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-unfccc-and-to-the-eu-greenhouse-gas-monitoring-mechanism-14) accessed 26 June 2018.

Eurostat, 2018a, 'National Accounts aggregates by industry (up to NACE a*64)' (https://goo.gl/pz4oML) accessed 26 June 2018.

Eurostat, 2018b, 'Complete energy balances - annual data' (https://goo.gl/GDtvAZ) accessed 26 June 2018.

Eurostat, 2018c, 'Water use by supply category and economical sector' (https://goo.gl/oOixj2) accessed 26 June 2018.

Eurostat, 2018d, 'Generation of waste' (https://goo.gl/MAHg3i) accessed 26 June 2018.

ETC/ACM, 2011, *Annex E: Correlation of the Eurostat and E-PRTR economic activities' classification* (http://acm.eionet.europa.eu/docs/ETCACM_TP_2011_6_Annex_E_E-PRTR2011.pdf) accessed 25 May 2017.

IEA, 2018, Sankey, 'Final energy consumption' (http://www.iea.org/Sankey/index.html) accessed 14 August 2018.

OSPAR, 2014, *Establishment of a list of Predicted No Effect Concentrations (PNECs) for naturally occurring substances in produced water (OSPAR Agreement 2014–05)*, OSPAR Commission (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/361476/OSPAR_RBA_Predicted_No_Effect_Concentrations__PNECs__Background_Document.pdf) accessed 25 May 2017.

WHO, 2010, *Exposure to dioxins and dioxin-like substances: a major public health concern*, World Health Organization (http://www.who.int/ipcs/features/dioxins.pdf?ua=1) accessed 25 May 2017.

World Bank, 2018a, 'Industry, value added (% of GDP)', (http://goo.gl/k23F3g) accessed 14 September 2017.

World Bank, 2018b, 'GDP at market prices (current US$)', (http://goo.gl/Bme8GU) accessed 14 September 2017.

Units, abbreviations and acronyms

Cd	Cadmium
CLRTAP	Convention on Long-range Transboundary Air Pollution
CO_2	Carbon dioxide
CRF	Common Reporting Format
EEA	European Environment Agency
EEA-33	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
EU-28	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
MMR	Monitoring Mechanism Regulation
NACE	Statistical classification of economic activities in the European Community
NFR	Nomenclature for Reporting
Ni	Nickel
NMVOC	Non-methane volatile organic compound
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
Pb	Lead
PNEC	Predicted no effect concentration
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
TOC	Total organic carbon
Tot-N	Total nitrogen
Ton-P	Total phosphorous
UWWTP	Urban wastewater treatment plant
WFD	Water Framework Directive

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, the CLRTAP (NFR codes) and the CRF.

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.

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

Eurostat NACE name	
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

NFR14	
1A1a	Public electricity and heat production
1A1b	Petroleum refining
1A1c	Manufacture of solid fuels and other energy industries
1A2a	Stationary combustion in manufacturing industries and construction: Iron and steel
1A2b	Stationary combustion in manufacturing industries and construction: Non-ferrous metals
1A2c	Stationary combustion in manufacturing industries and construction: Chemicals
1A2d	Stationary combustion in manufacturing industries and construction: Pulp, Paper and Print
1A2e	Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco
1A2f	Stationary combustion in manufacturing industries and construction: Non-metalic minerals
1A2gviii	Stationary combustion in manufacturing industries and construction: Other (Please specify in your IIR)
1A3ei	Pipeline transport
1B1a	Fugitive emission from solid fuels: Coal mining and handling
1B1b	Fugitive emission from solid fuels: Solid fuel transformation
1B1c	Other fugitive emissions from solid fuels
1B2ai	Fugitive emissions oil: Exploration, production, transport
1B2aiv	Fugitive emissions oil: Refining / storage
1B2av	Distribution of oil products
1B2b	Natural gas (exploration, production, processing, transmission, storage, distribution and other)
1B2c	Venting and flaring (oil, gas, combined)
1B2d	Other fugitive emissions from energy production
2A1	Cement production

2A2	Lime production
2A3	Glass production
2A5a	Quarrying and mining of minerals other than coal
2A5c	Storage, handling and transport of mineral products
2A6	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)
2B1	Ammonia production
2B10a	Chemical industry: Other
2B10b	Storage, handling and transport of chemical products
2B2	Nitric acid production
2B3	Adipic acid production
2B5	Carbide production
2B6	Titanium dioxide production
2B7	Soda ash production
2C1	Iron and steel production
2C2	Ferroalloys production
2C3	Aluminum production
2C4	Magnesium Production
2C5	Lead production
2C6	Zinc production
2C7a	Copper production
2C7b	Nickel production
2C7c	Other metal production (Please specify the sources included/excluded in the notes column to the right)
2C7d	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)
2D3b	Road paving with asphalt
2D3c	Asphalt roofing
2D3d	Coating application
2D3e	Degreasing
2D3f	Dry cleaning
2D3g	Chemical products
2D3h	Printing
2D3i	Other solvent use
2G	Other product use
2H1	Pulp and paper industry
2H2	Food and beverages industry
2H3	Other industrial processes
2I	Wood processing
2J	Production of POPs
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)
2L	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)
5A	Biological treatment of waste - Solid waste disposal on land
5B1	Biological treatment of waste - Composting
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities
5C1a	Municipal waste incineration
5C1bi	Industrial waste incineration
5C1bii	Hazardous waste incineration

5C1biii	Clinical waste incineration
5C1biv	Sewage sludge incineration
5C1bv	Cremation
5C1bvi	Other Waste incineration
5C2	Open Burning of Waste
5D2	Industrial wastewater handling
5D3	Other wastewater handling
5E	Other waste handling (Please specify in IIR)
CRF (IPCC 2006)	
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	Iron and Steel
1.A.2.b	Non-Ferrous Metals
1.A.2.c	Chemicals
1.A.2.d	Pulp, Paper and Print
1.A.2.e	Food Processing, Beverages and Tobacco
1.A.2.f	Non-metallic minerals
1.A.2.g	Other Manufacturing Industries and Constructions
1.A.3.e.i	Pipeline transport
1.B.1.a	Mining
1.B.1.b	Solid Fuel Transformation
1.B.2	Oil and Natural Gas and Other Emissions from Energy Production
2.A.1	Cement Production
2.A.2	Lime Production
2.A.3	Glass production
2.A.4	Other Process Uses of Carbonates
2.B.1	Ammonia Production
2.B.10	Other chemical industry
2.B.3	Adipic Acid Production
2.B.4	Caprolactam, Glyoxal and Glyoxylic Acid Production
2.B.5	Carbide Production
2.B.6	Titanium Dioxide Production
2.B.7	Soda Ash Production
2.B.8	Petrochemical and Carbon Black 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	Other Metal Industry
2.D.1	Lubricant Use
2.D.2	Paraffin Wax Use
2.D.3	Other non energy products
2.E	Electronics industry

2.F	Product uses as ODS substitutes
2.G	Other Product Manufacture and Use
2.H	Other Industrial Process and Product Use
5.A	Solid Waste Disposal
5.B	Biological treatment of solid waste
5.C	Incineration and Open Burning of Waste
5.D.2	Industrial wastewater treatment and discharge
5.E	Other Disposal

Table A1.2 presents the list of codes used in each grouping of air emissions data from the CLRTAP (EEA, 2018a).

Table A1.2   Industry groupings — CLRTAP

NFR14 (emissions to air, CLRTAP)	Industry sector group
1A1a	Energy supply
1A1b	Energy supply
1A1c	Energy supply
1A2a	Iron and steel
1A2b	Non-ferrous metal
1A2c	Chemicals
1A2d	Pulp, paper and wood
1A2e	Food and drink
1A2f	Non-metallic minerals
1A2gvii	Other manufacturing
1A2gviii	Other manufacturing
1B1a	Energy supply
1B1b	Energy supply
1B1c	Energy supply
1B2ai	Energy supply
1B2aiv	Energy supply
1B2av	Energy supply
1B2b	Energy supply
1B2c	Energy supply
1B2d	Energy supply
2A1	Non-metallic minerals
2A2	Non-metallic minerals
2A3	Non-metallic minerals
2A5a	Extractive industry
2A5c	Non-metallic minerals
2A6	Non-metallic minerals
2B1	Chemicals
2B2	Chemicals
2B3	Chemicals
2B5	Chemicals
2B6	Chemicals
2B7	Chemicals

2B10a	Chemicals
2B10b	Chemicals
2C1	Iron and steel
2C2	Iron and steel
2C3	Non-ferrous metal
2C4	Non-ferrous metal
2C5	Non-ferrous metal
2C6	Non-ferrous metal
2C7a	Non-ferrous metal
2C7b	Non-ferrous metal
2C7c	Non-ferrous metal
2C7d	Non-ferrous metal
2D3a	Other manufacturing
2D3b	Other manufacturing
2D3c	Other manufacturing
2D3d	Other manufacturing
2D3e	Other manufacturing
2D3f	Other manufacturing
2D3g	Other manufacturing
2D3h	Other manufacturing
2D3i	Other manufacturing
2G	Other manufacturing
2H1	Pulp, paper and wood
2H2	Food and drink
2H3	Other manufacturing
2I	Pulp, paper and wood
2J	Other manufacturing
2K	Other manufacturing
2L	Other manufacturing
5A	Waste management
5B1	Waste management
5B2	Waste management
5C1a	Waste management
5C1bi	Waste management
5C1bii	Waste management
5C1biii	Waste management
5C1biv	Waste management
5C1bv	Waste management
5C1bvi	Waste management
5C2	Waste management
5D1	Wastewater treatment
5D2	Wastewater treatment
5D3	Wastewater treatment
5E	Waste management

Table A1.3 presents the list of codes used in each grouping of GHG emissions data from the CRF (EEA, 2018c).

Table A1.3   Industry groupings — CRF

CRF 2006 (GHG emissions)	Industry sector group
1.A.1.a	Energy supply
1.A.1.b	Energy supply
1.A.1.c	Energy supply
1.A.2.a	Iron and steel
1.A.2.b	Non-ferrous metal
1.A.2.c	Chemicals
1.A.2.d	Pulp, paper and wood
1.A.2.e	Food and drink
1.A.2.f	Non-metallic minerals
1.A.2.g	Other manufacturing
1.B.1	Energy supply
1.B.2	Energy supply
1.C	Energy supply
2.A.1	Non-metallic minerals
2.A.2	Non-metallic minerals
2.A.3	Non-metallic minerals
2.A.4	Non-metallic minerals
2.B.1	Chemicals
2.B.10	Chemicals
2.B.2	Chemicals
2.B.3	Chemicals
2.B.4	Chemicals
2.B.5	Chemicals
2.B.6	Chemicals
2.B.7	Chemicals
2.B.8	Chemicals
2.B.9	Chemicals
2.C.1	Iron and steel
2.C.2	Iron and steel
2.C.3	Non-ferrous metal
2.C.4	Non-ferrous metal
2.C.5	Non-ferrous metal
2.C.6	Non-ferrous metal
2.C.7	Non-ferrous metal
2.D.1	Other manufacturing
2.D.2	Other manufacturing
2.D.3	Other manufacturing
2.E.1	Other manufacturing
2.E.2	Other manufacturing
2.E.3	Other manufacturing
2.E.4	Other manufacturing
2.E.5	Other manufacturing
2.F.1	Other manufacturing
2.F.2	Other manufacturing

2.F.3	Other manufacturing
2.F.4	Other manufacturing
2.F.5	Other manufacturing
2.F.6	Other manufacturing
2.G	Other manufacturing
2.H	Other manufacturing
5.A.1	Waste management
5.A.2	Waste management
5.A.3	Waste management
5.B.1	Waste management
5.B.2	Waste management
5.C.1	Waste management
5.C.2	Waste management
5.D.1	Wastewater treatment
5.D.2	Wastewater treatment
5.D.3	Wastewater treatment
5.E	Waste management

Table A1.4 presents the mapping between the list of codes used in each grouping of air pollutant emissions data from the E-PRTR (EEA, 2018b).

Table A1.4   Industry groupings — E-PRTR

E-PRTR code	Industry sector group
1.(a)	Energy supply
1.(b)	Energy supply
1.(c)	Energy supply
1.(d)	Energy supply
1.(e)	Energy supply
1.(f)	Energy supply
2.(a)	Iron and steel
2.(b)	Iron and steel
2.(c)	Iron and steel
2.(d)	Iron and steel
2.(e)	Non-ferrous metal
2.(f)	Other manufacturing
3.(a)	Extractive industry
3.(b)	Extractive industry
3.(c)	Non-metallic minerals
3.(d)	Non-metallic minerals
3.(e)	Non-metallic minerals
3.(f)	Non-metallic minerals
3.(g)	Non-metallic minerals
4.(a)	Chemicals
4.(b)	Chemicals
4.(c)	Chemicals
4.(d)	Chemicals

4.(e)	Chemicals
4.(f)	Chemicals
5.(a)	Waste management
5.(b)	Waste management
5.(c)	Waste management
5.(d)	Waste management
5.(e)	Waste management
5.(f)	Wastewater treatment
5.(g)	Wastewater treatment
6.(a)	Pulp, paper and wood
6.(b)	Pulp, paper and wood
6.(c)	Pulp, paper and wood
8.(a)	Food and drink
8.(b)	Food and drink
8.(c)	Food and drink
9.(a)	Other manufacturing
9.(b)	Other manufacturing
9.(c)	Other manufacturing
9.(d)	Other manufacturing
9.(e)	Other manufacturing

Table A1.5 show the list of activities included in the "Non-industry" category of air pollutant emissions from the CLRTAP (EEA, 2018a).

Table A1.5   Non-industry groupings — CLRTAP

NFR14	Non-industry sector name
1A3ai(i)	International aviation LTO (civil)
1A3aii(i)	Domestic aviation LTO (civil)
1A3bi	Road transport: Passenger cars
1A3bii	Road transport: Light duty vehicles
1A3biii	Road transport: Heavy duty vehicles and buses
1A3biv	Road transport: Mopeds and 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)
1A3ei	Pipeline transport
1A3eii	Other
1A4ai	Commercial/institutional: Stationary
1A4aii	Commercial/institutional: Mobile
1A4bi	Residential: Stationary
1A4bii	Residential: Household and gardening (mobile)
1A4ci	Agriculture/forestry/fishing: Stationary
1A4cii	Agriculture/forestry/fishing: Off-road vehicles and other machinery
1A4ciii	Agriculture/forestry/fishing: National fishing
1A5a	Other stationary (including military)
1A5b	Other, mobile (including military, land-based and recreational boats)

NFR14	Non-industry sector name
2A5b	Construction and demolition
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
3B4gi	Manure management — Laying hens
3B4gii	Manure management — Broilers
3B4giii	Manure management — Turkeys
3B4giv	Manure management — Other poultry
3B4h	Manure management — Other animals
3Da1	Inorganic N-fertilisers (includes also urea application)
3Da2a	Animal manure applied to soils
3Da2b	Sewage sludge applied to soils
3Da2c	Other organic fertilisers applied to soils (including compost)
3Da3	Urine and dung deposited by grazing animals
3Da4	Crop residues applied to soils
3Db	Indirect emissions from managed soils
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products
3Dd	Off-farm storage, handling and transport of bulk agricultural products
3De	Cultivated crops
3Df	Use of pesticides
3F	Field burning of agricultural residues
3I	Agriculture other
6A	Other (included in national total for entire territory)

Table A1.6 presents the list of codes included in 'Non-industry' GHG emissions from the CRF (EEA, 2018c).

Table A1.6   Non-industry groupings — CRF

CRF2006	Non-industry sector name
1.A.3.a	1.A.3.a - Domestic Aviation
1.A.3.b.i	1.A.3.b.i - Cars
1.A.3.b.ii	1.A.3.b.ii - Light duty trucks
1.A.3.b.iii	1.A.3.b.iii - Heavy duty trucks and buses
1.A.3.b.iv	1.A.3.b.iv - Motorcycles
1.A.3.b.v	1.A.3.b.v - Other Road Transportation
1.A.3.c	1.A.3.c - Railways
1.A.3.d	1.A.3.d - Domestic Navigation
1.A.3.e	1.A.3.e - Other Transportation
1.A.4.a	1.A.4.a - Commercial/Institutional
1.A.4.b	1.A.4.b - Residential
1.A.4.c	1.A.4.c - Agriculture/Forestry/Fishing
1.A.5.a	1.A.5.a - Stationary
1.A.5.b	1.A.5.b - Mobile
3.A.1	3.A.1 - Enteric Fermentation - Cattle
3.A.2	3.A.2 - Enteric Fermentation - Sheep

3.A.3	3.A.3 - Enteric Fermentation - Swine
3.A.4	3.A.4 - Enteric Fermentation - Other livestock
3.B.1	3.B.1 - Manure Management - Cattle
3.B.2	3.B.2 - Manure Management - Sheep
3.B.3	3.B.3 - Manure Management - Swine
3.B.4	3.B.4 - Manure Management - Other livestock
3.B.5	3.B.5 - Manure Management - Indirect N2O Emissions
3.C.1	3.C.1 - Irrigated
3.C.2	3.C.2 - Rainfed
3.C.3	3.C.3 - Deep Water
3.C.4	3.C.4 - Other Rice Cultivation
3.D.1	3.D.1 - Direct N2O emissions from managed soils
3.D.2	3.D.2 - Indirect N2O emissions from managed soils
3.E	3.E - Prescribed Burning of Savannas
3.F.1	3.F.1 - Cereals
3.F.2	3.F.2 - Pulses
3.F.3	3.F.3 - Tubers and roots
3.F.4	3.F.4 - Sugar cane
3.F.5	3.F.5 - Other Agricultural residues
3.G	3.G - Liming
3.H	3.H - Urea Application
3.I	3.I - Other Carbon-containing Fertilizers
6	6 - Other Sector

Table A1.7 presents the list of energy consumption sectors from Eurostat (2018b) and the groups they are aggregated to.

Table A1.7   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	Extractive industry
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 A1.8 presents the list of GVA activities and their NACE code from Eurostat (2018a) and the NACE divisions they are aggregated to.

Table A1.8   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

Table A1.9   Changes to the mapping since the previous version

Previous category	Previous sub-category	New category	New sub-category
Industry	Energy industry	Energy supply	-
	Mining and quarrying	Extractive industry	-
	Iron and steel manufacturing	Industry	Iron and steel
	Non-ferrous metal production		Non-ferrous metals
	Cement and lime production		Non-metallic minerals
	Chemical industry		Chemicals
	Pulp, paper and wood production		Pulp, paper and wood
	Food and drink		Food and drink
	Other manufacturing		Other manufacturing
	Waste industry	Waste	Waste management
			Wastewater treatment

Table A1.10 presents the list of detailed NACE codes used in each grouping of waste generation data from the Eurostat table (Eurostat, 2018d).

Table A1.10   Industry groupings — Waste data

NACE code aggregate	Grouping
D	Energy supply
C19	Energy supply
C23	Non-metallic minerals
C24_C25	Metal production and manufacturing
B	Extractive industry
C20-C22	Chemicals
E36_E37_E39	Waste management and wastewater treatment
E38	Waste management and wastewater treatment
C16	Pulp, paper, wood
C17_C18	Pulp, paper, wood
C10-C12	Food and drink
C13-C15	Other manufacturing
C26-C30	Other manufacturing
C31-C33	Other manufacturing
A	Non-industry
F	Non-industry
G-U_X_G4677	Non-industry
G4677	Non-industry
EP_HH	Non-industry

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.

The European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM) is a consortium of European institutes under contract of the European Environment Agency.

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