Industrial emissions policy country profile – Latvia

Report for European Commission
070201/2016/741491/SFRA/ENV.C.4

ED 62698 | Issue Number 2 | Date 09/02/2018

Customer:

European Commission – DG Environment

Customer reference:

070201/2016/741491/SFRA/ENV.C.4

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Date:

09 February 2018

Ricardo Energy & Environment reference:

Ref: ED62698- Issue Number 2

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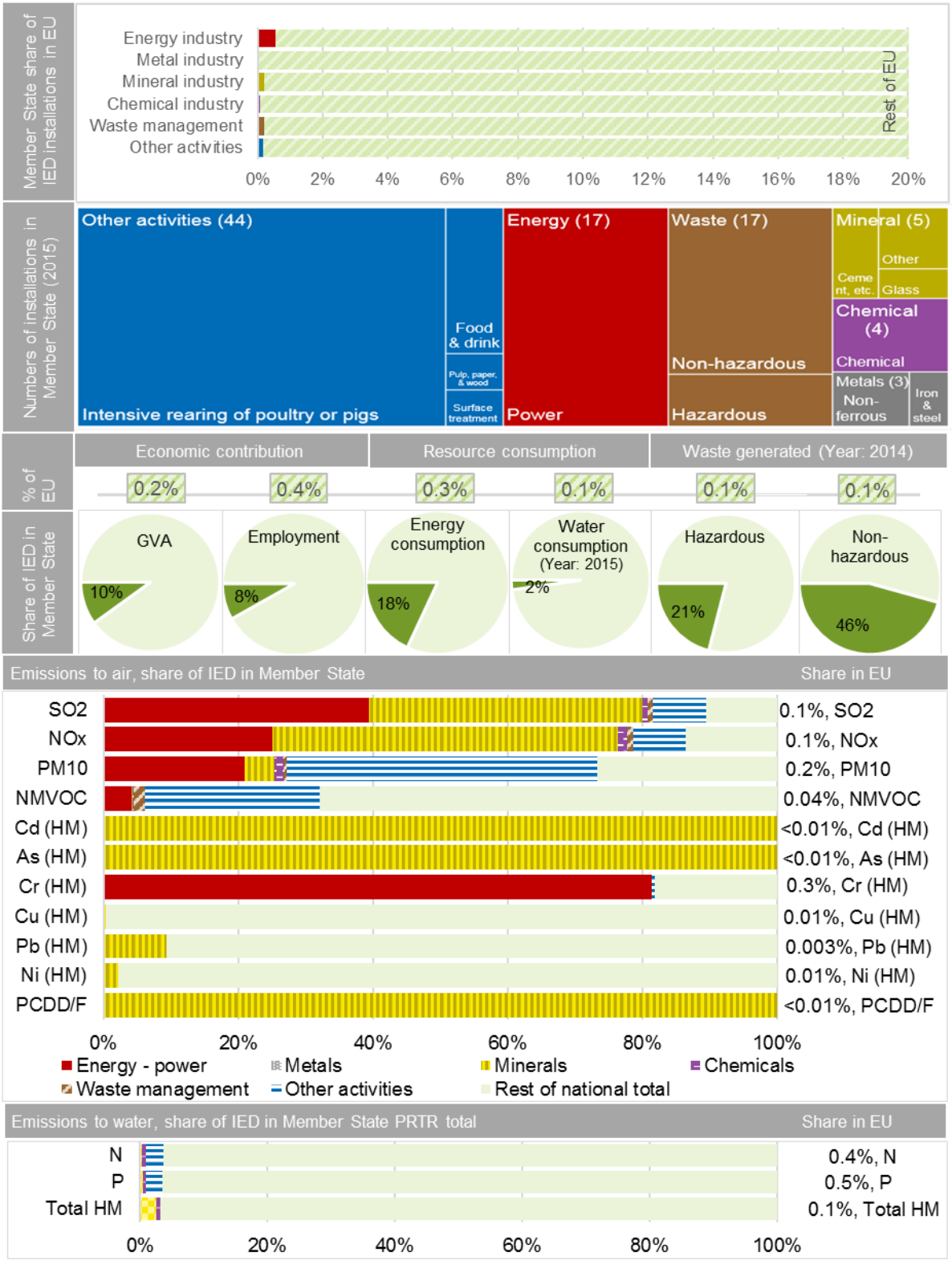
Abbreviations and units

AOX	Adsorbable Organic Halides
As	Arsenic
Cd	Cadmium
CLRTAP	Convention on Long-range Transboundary Air Pollution
CO_2	Carbon Dioxide
Cr	Chromium
Cu	Copper
DG	Directorate-General
EEA	European Environment Agency
E-PRTR	European Pollutant Release and Transfer Register
EU	European Union
EUR	Euros
GVA	Gross Value Added
HCBs	Hexachlorobenzenes
Hg	Mercury
HM	Heavy Metals
IED	Industrial Emissions Directive
IPPCD	Integrated Pollution Prevention and Control Directive
kg	Kilogram
ktoe	Kilotonne of oil equivalent
MW	Megawatts
N	Nitrogen
NACE	General Classification of Economic Activities within the European Communities
NFR	Nomenclature For Reporting
NH_3	Ammonia
Ni	Nickel
NMVOC	Non-Methane Volatile Organic Compound
NO_x	Oxides of Nitrogen
P	Phosphorus
PAH	Polycyclic Aromatic Hydrocarbon
Pb	Lead
PCBs	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzodioxins
PCDF	Polychlorinated Dibenzofurans
PJ	Petajoules
PM	Particulate Matter
SO_x	Oxides of Sulphur
TOC	Total Organic Carbon
Zn	Zinc

Summary of industrial statistics for Latvia



1 Introduction and summary of methodology

1.1 The industrial emissions policy country profiles

Industrial activities play an important role in the economic welfare and development of countries contributing to their economic growth. They can also have a significant impact on their environment. Directive 2010/75/EC on Industrial Emissions (IED) aims to prevent and reduce harmful industrial emissions across the EU while promoting the use of techniques that reduce pollutant emissions and that are energy and resource efficient.

This document is part of a series of industrial emissions policy profiles that provide an overview of industrial activities regulated by the IED for each Member State. This profile covers Latvia.

The profiles show the economic significance of activities regulated by the IED in terms of the number of IED installations, their economic contribution (measured by gross value added and employment), and resources consumed (measured by energy and water consumed) – sections 2 and 3 respectively. The profiles also show the environmental impacts in terms of emissions to air and water (section 4) and waste generated (section 5).

The significance is shown both for the latest year of available data (typically 2015), as well as assessing the trends over time of key metrics. The data shown in the profiles is accompanied by descriptive analysis to bring together the various assessments made and draw out the salient messages. EU data sources used for each metric are described in a separate methodology paper together with their data limitations. The specific data sources used in this profile are summarised in Appendix 1. Each of the sections 2, 3, 4 and 5 consider the gaps in these data sources specific for Latvia and how they have been addressed.

The profile also identifies the impact of industrial sectors or activities in Latvia, within the scope of the IED policy, and the importance and political attention paid to this (section 6).

1.2 Definition of industrial sectors

The approach taken in the country profiles identifies data and trends wherever possible for a set of industrial sectors. However, in the data sources used to develop the profiles, there are several different approaches to sectoral classification. Since the definition of an 'industrial sector' differs across data sources, an approach has been taken to try to consistently report 'sectors' as much as possible. This has been aligned with the grouping of activities in Annex I of the IED where possible, but in practice the available datasets limit this.

The sectors defined in these profiles are referred to as 'industrial sectors'. Together these industrial sectors represent activity regulated by the IED, albeit subject to certain limitations as described here. The grouping for the industrial sectors has been chosen to reflect the level of granularity most commonly reported from EU data sources across the different metrics assessed while trying not to lose detail where it is available. The industrial sectors used in the profiles are shown in Table 1. A consistent colour scheme – also illustrated in Table 1 – is used throughout the profile.

Where available, the industrial sectors split out the energy, metal, mineral and waste management sectors into subsectors. Where this split is not possible, we refer to the respective IED sector group, e.g. metal in the case of the IED activities iron and steel and non-ferrous metals. Due to the large number and wide variety of activity within the IED sector 'other activities', these have also been grouped as 'other activities' in this profile, but split out into constituent industries when they are important sectors in the Member State in their own right, and where data are available.

Table 1: Industrial sectors used in the profiles with their corresponding IED Annex I activities

Industrial sectors used in the profiles		Corresponding IED Annex I activities
Energy industries, split where possible into:	Energy: power	Combustion of fuels (activity 1.1)
	Energy: refining, gasification and liquefaction, coke ovens	Refining, gasification and liquefaction, coke ovens (activities 1.2, 1.3, 1.4)
Production and processing of metals, split where possible into:	Metals: iron and steel	Iron and steel manufacturing (activities 2.1, 2.2, 2.3, 2.4)
	Metals: non-ferrous	Non-ferrous metal production (activity 2.5)
Mineral industry, split where possible into:	Mineral: Cement, lime and magnesium oxide	Production of cement, lime and magnesium oxide (activity 3.1)
	Mineral: Glass	Manufacture of glass (activity 3.3)
	Mineral: Other	Other mineral industries (activities 3.2, 3.4, 3.5)
Chemical industry	Chemical	Chemical industry (activities 4.1, 4.2, 4.3, 4.4, 4.5, 4.6)
Waste management, split where possible into:	Waste: hazardous	Hazardous waste (activities 5.1, 5.2(b), 5.5, 5.6)
	Waste: non-hazardous	Non-hazardous waste (activities 5.2(a), 5.3, 5.4, 6.5, 6.11)
Other activities, split when constituent activities are important:	Other activities	Pulp, paper and wood production (activity 6.1) Pre-treatment or dyeing of textile fibres or textiles (activity 6.2) Tanning of hides and skins (activity 6.3) Food and drink (activity 6.4) Intensive rearing of poultry and pigs (activity 6.6) Surface treatment (activities 2.6, 6.7) Production of carbon (activity 6.8)

Note: No installations operated with IED activity 6.9 in 2015 or before. The limited data available for activity 6.10 means it is excluded from the analysis.

2 Economic significance of industrial sectors

2.1 Economic contribution

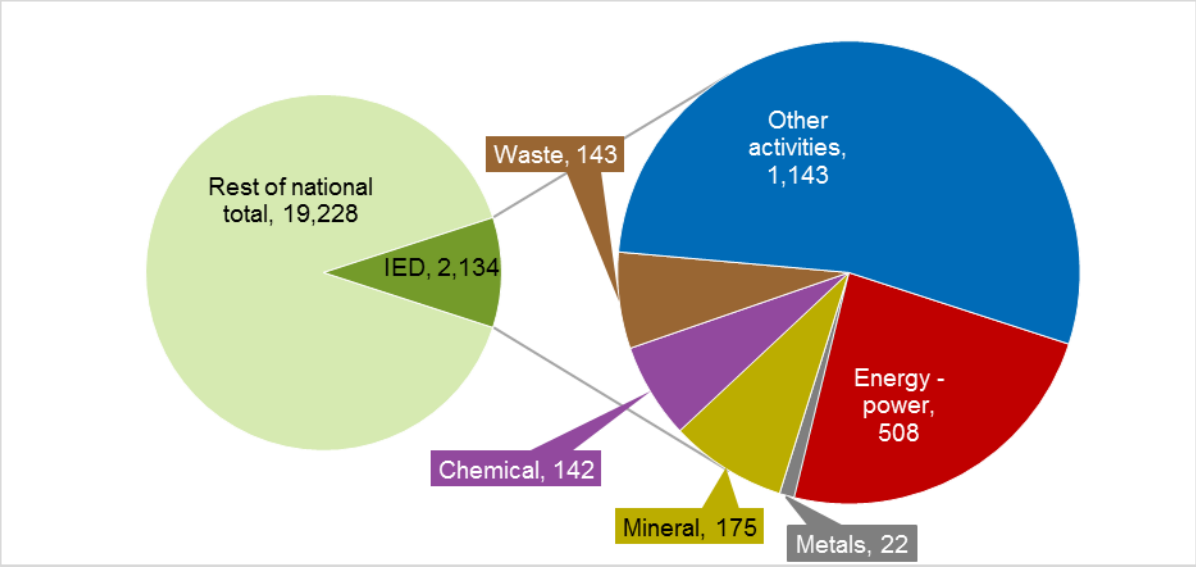
Gross value added (GVA) and employment are the indicators used to denote the economic contribution of IED activities.

Combined, the industrial sectors comprise a relatively small share of the total GVA across all economic activities in Latvia (11%) (Figure 1). Of this share, 'other activities' and the energy – power industrial sector account for the largest contribution (6% and 3%, respectively). The GVA reported in Figure 1 for 'other activities' relates to industrial sectors for food and drink products, and pulp, paper, and wood-based products. *Of the IED permitted installations within 'other activities', the majority carry out intensive rearing of poultry or pigs* (section 2.2). However, no GVA for intensive rearing of poultry and pigs could be included for the reasons discussed in the accompanying methodology report. Despite the relatively large number of permitted installations, intensive rearing of poultry or pigs accounts for less than 0.1% of the national total of farm holdings (based on the average monetary value of the agricultural output); and expressed as the number of holdings per 1,000 hectare utilised agricultural area, 0.02% of agricultural activity in Latvia is regulated by the IED (CCB, 2013). Thus, the economic significance of intensive rearing of poultry or pigs to the agricultural sector as a whole may be low.

The waste management, mineral and chemical sectors make relatively small contributions to the national GVA (Figure 1). No employment data was reported to Eurostat for either the waste management or chemical sector owing to low reliability of reporting (Figure 2). No data is included for the energy – refining, gasification and liquefaction and coke sector as no IED installations have permits issued for this sector in Latvia.

The GVA of the metal sector is the smallest compared to the other industrial sectors. The GVA for the metals sector declined sharply from 2011 to 2013 (Figure 4). This trend corresponds to production output for the sector which fell considerably between 2012 and 2013. While the sector is still operational, and production output increased slightly between 2014 and 2015, its economic activity is marginal (MASOC, 2016). While employment data is not reported to Eurostat (owing to low reliability in earlier years and reasons of confidentiality since 2012), national data indicates that employment in the metals sector fell from ~4,000 people prior to 2014 to ~1,000 in 2014 and 2015 (MASOC, 2016).

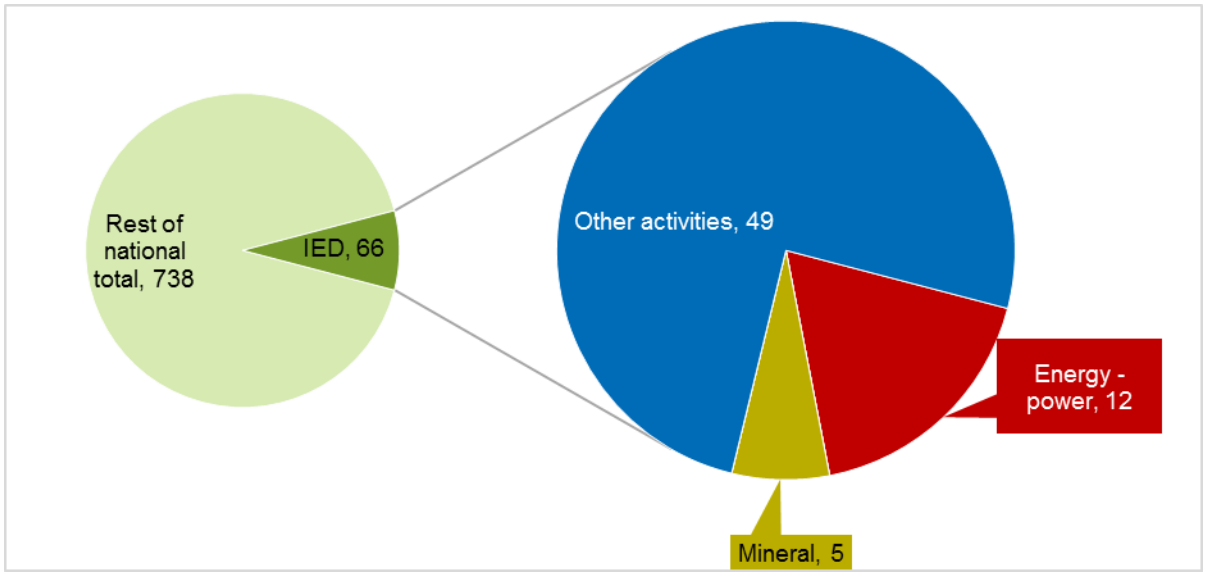
Figure 1: Gross value added of industrial sectors in 2015 (Current prices, million EUR)



Note: Rest of national total means all NACE activities minus industrial sectors shown here.

Source: Eurostat (2017a)

Figure 2: Employment within industrial sectors in 2015 (thousands, aged 15 to 64 years)

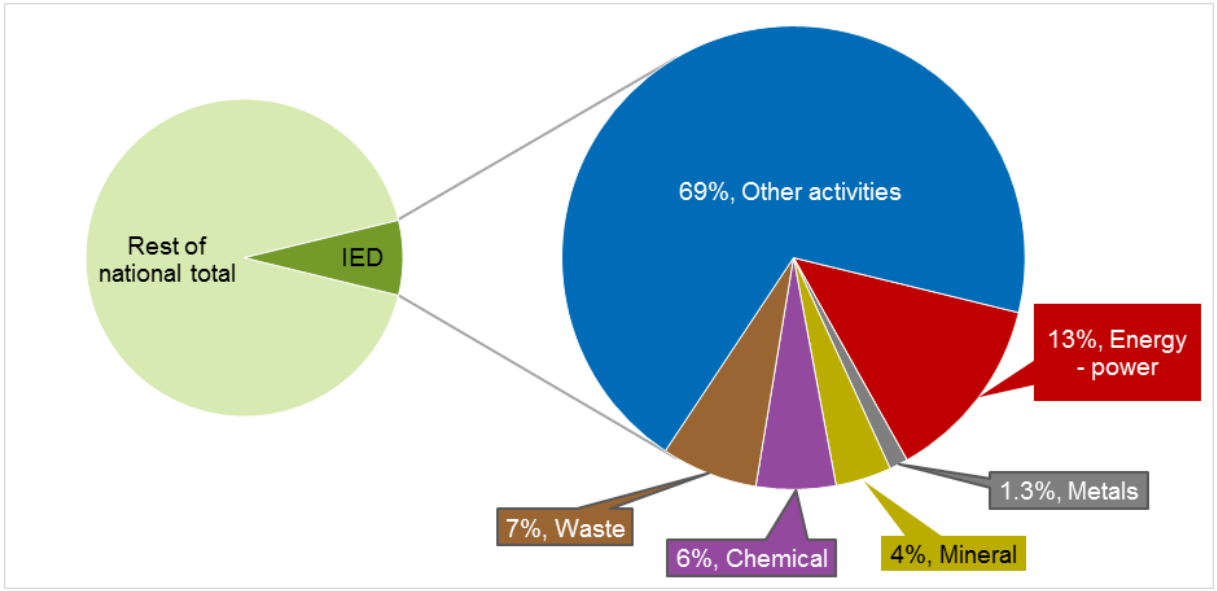


Note: Rest of national total means all NACE activities minus industrial sectors shown here. No employment data is reported in 2015 for the waste management, metal and chemical sectors. Data for energy – refining, gasification and liquefaction and coke, and textiles and tanning [of leather] within 'other activities' excluded as not operational under the IED in Latvia.

Source: Eurostat (2017b)

Owing to the gaps identified in the Eurostat data, national data on employment is also included (Figure 3). The national dataset is published by the Latvian Central Statistical Bureau and reports the average number of jobs for the most common job types by sector. While it cannot be compared to the absolute numbers reported to Eurostat due to scope differences, the relative contributions provide an indication of the split by industrial sector for Latvia, including some industrial sectors not presented in Figure 2. Together, the waste management, chemical and metals sectors (not available in Figure 2) account for a similar level of employment as the energy – power sector.

Figure 3 Share of employment by industrial sectors in 2015 according to the most common job types (share of industrial sectors of total for IED)



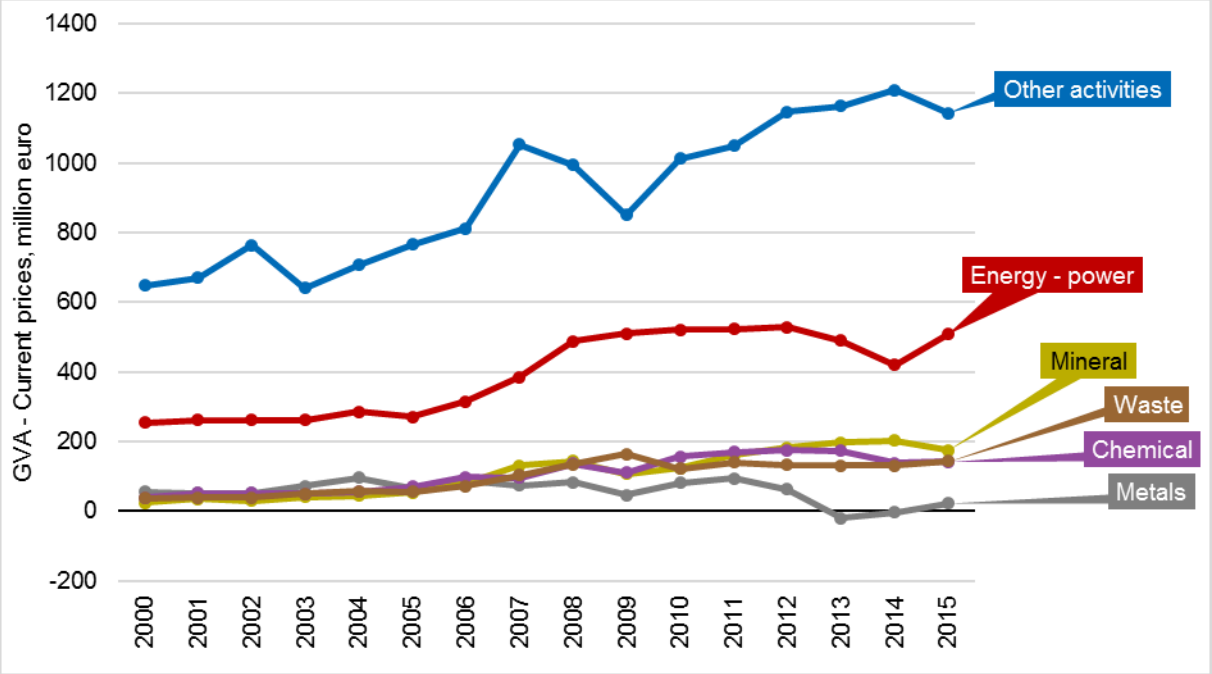
Source: Central Statistical Bureau (2016)

The main areas of economic growth in Latvia, as measured by growth in GVA, are pulp, paper and wood-based products and energy - power (Figure 4 – the former is grouped within 'other activities' in this figure). The GVA for these industrial sectors more than doubled in the period 2000 to 2015, although since 2010 the GVA has remained relatively constant for both sectors. The GVA for the energy – power sector declined slightly between 2012 and 2013 but it is too early to note if this is part of a longer term trend.

Excluding the metal sector, changes across the other industrial sectors in Latvia are more stable over the time series. The metal sector followed the same broad trend as other industrial sectors in Latvia until 2012 – as discussed previously in this section.

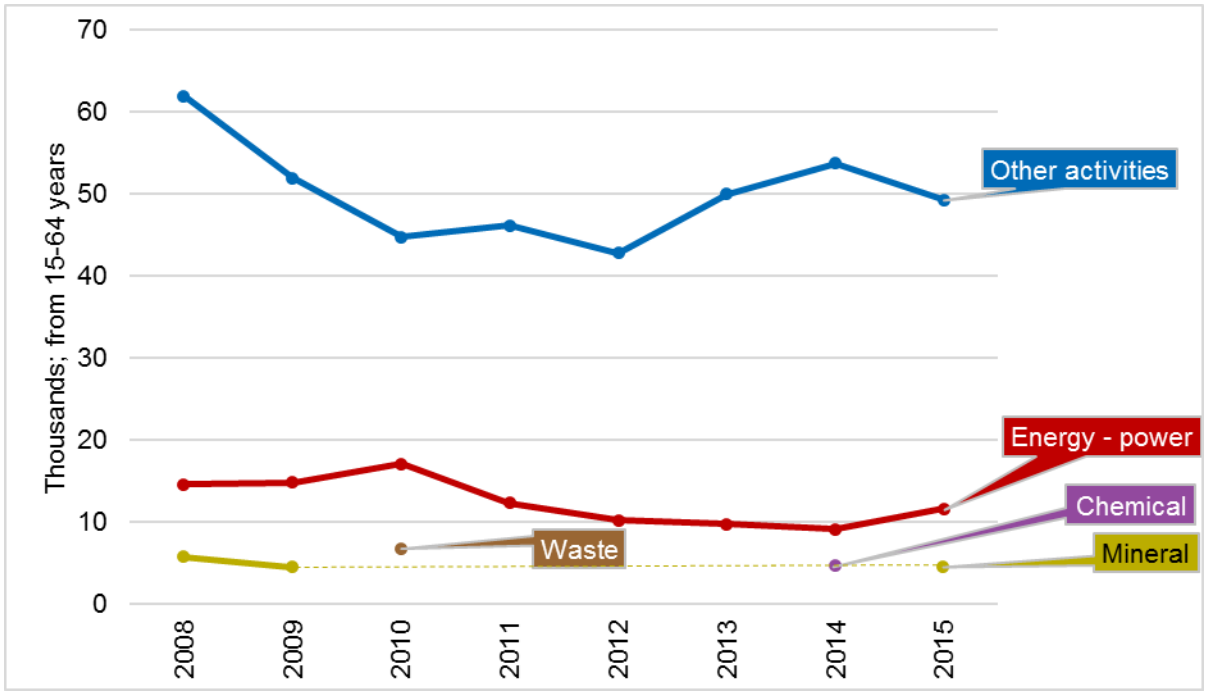
The limited data available for employment by the industrial sector in Latvia makes it difficult to identify trends at an industry level. Timeseries are only available for the energy – power sector and 'other activities'. Both show a decline in employment between 2000 and 2015 (Figure 5). Based on the national dataset for the metal sector, it would appear that employment for the sector was similar to the mineral sector until 2014 when it fell by three-fold (MASOC, 2016).

Figure 4: Gross value added of industrial sectors (2000-2015)



Source: Eurostat (2017a)

Figure 5: Employment in industrial sectors (2008-2015)



Note: Data for energy – refining, gasification and liquefaction and coke, and textiles and tanning [of leather] within 'other activities' excluded as not operational under the IED in Latvia. Limited employment data is reported for the waste management, mineral and chemical sectors. Dashed line used for the mineral sector to identify hypothetical trend for years with no data. No employment data is reported for the metal sector.

Source: Eurostat (2017b)

Limitations

The use of NACE classifications for reporting has generally led to overreporting for both GVA and employment data against each industrial sector compared to a scope strictly limited to the IED. Overreporting is expected to be greatest for the waste management GVA data because it not only includes waste management, but also water supply, sewerage and waste remediation. No data could be included within 'other activities' to reflect the IED activity intensive rearing of poultry or pigs as reporting was not at the appropriate level of NACE classification.

Table 2: Gaps in GVA data for Latvia

Missing data	Description	Conclusion and actions taken
Data gaps	Large data gaps were observed in the first data download.	Data was updated by Eurostat to include complete dataset for GVA for the year 2015. Updated dataset used (downloaded 23 November 2017)
Negative GVA data	A negative GVA was reported for the metal sector for 2013 – 2015 in the first data download	Data was updated by Eurostat reporting a positive GVA for the sector in the year 2015. Updated dataset used (downloaded 23 November 2017).

Table 3: Gaps in employment data for Latvia

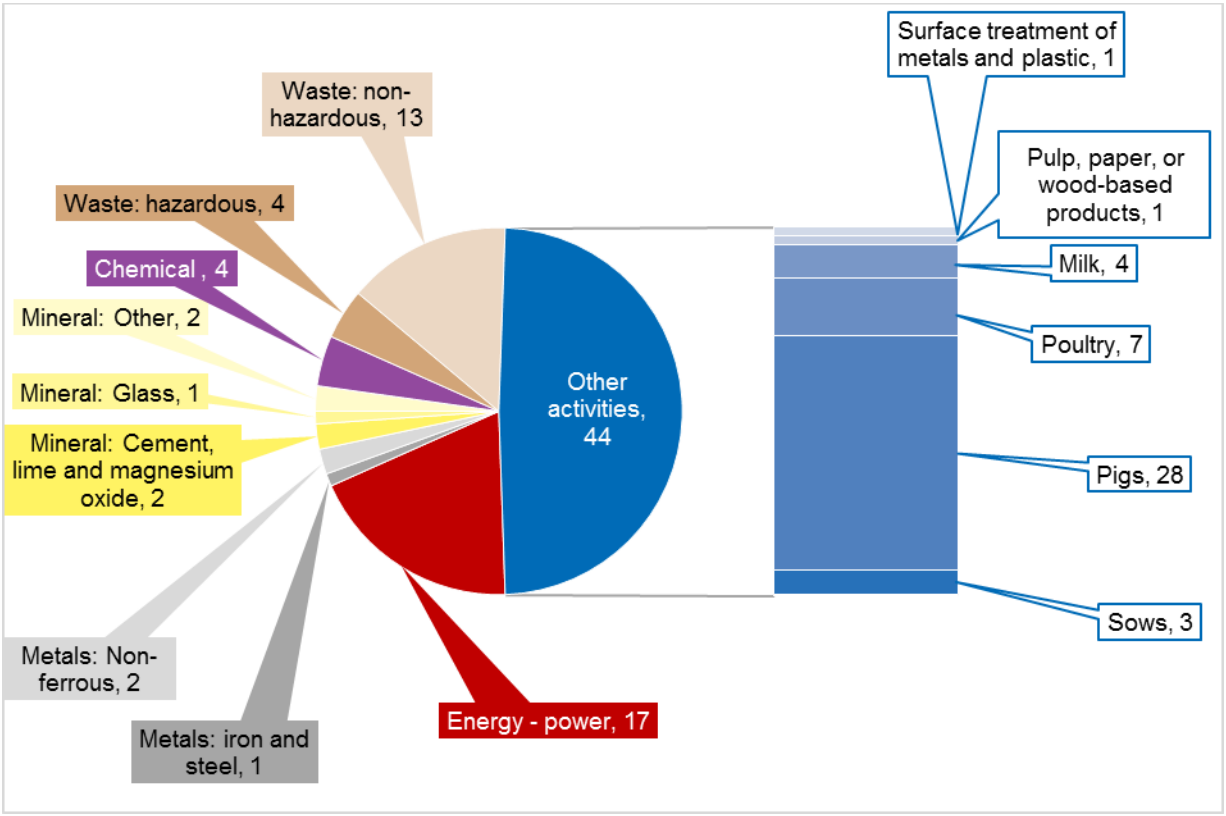
Missing data	Description	Conclusion and actions taken
No data	No data is reported for the metal sector.	No action.
Limited data	Incomplete time series for the mineral, chemical and waste management sectors, including no data for the year 2015.	National dataset also included. Although the absolute data in the national dataset are not directly comparable to the Eurostat data due to scope differences, the national dataset provides a good indication of the share of employment of the industrial sectors missing from the Eurostat data.

2.2 Number of IED installations

The main industrial sector in Latvia, according to the permitted number of IED installations reported, is intensive rearing of poultry or pigs, comprising 42% of total IED installations in 2015 (Figure 6, Table 4). This is followed by the energy - power sector (19%).

According to this same dataset, there are limited IED activities carried out in Latvia, with relatively few installations permitted in the metal, mineral, and chemical sectors, and none in the energy - refining, gasification and liquefaction and coke sector. Within 'other activities', only a narrow scope of IED activity is reported. No installations were reported as permitted for textiles (IED activity 6.2), tanning (IED activity 6.3), part of the surface treatment industry (surface treatment using organic solvents, IED activity 6.7), and certain food and drink industries (IED activities 6.4 (a) and (b)).

Figure 6: Number of installations by industrial sector in 2015, with 'other activities' split by IED activity



Source: IPPCD and IED reporting / DG Environment, Personal Communication

Table 4 presents the number of permits by IED activity. National reporting for the total number of permitted installations indicates a slightly higher number of total permits issued, compared to the European Commission dataset, with a total of 97 permits in 2017. The additional permits issued since 2015 relate to non-ferrous metal production, fertiliser production, disposal of non-hazardous waste and intensive rearing of poultry or pigs (IED activities 2.5, 4.3, 5.3 and 6.6). Of the total permits reported in 2017, 28 covered multiple (two or more) IED activities, and so the sum of the sector totals in Table 4 is more than 97. The national dataset in the right-hand column indicates slightly different IED activity in relation to the production of iron and steel and chemical sectors, and a greater number of IED permits for the waste management sector and 'other activities'.

Table 4: Number of installations in 2011, 2015 and 2017 by industrial sector, with IED activity detail

Industrial sector, with IED activity detail		European Commission dataset		National dataset
		2011	2015	2017
Energy: power	*1.1 Combustion*	**19**	**17**	**17**
Metals: iron and steel		**1**	**1**	**1**
	2.2 Iron or steel	*1*	*1*	*0*
	2.3 Ferrous metals	*0*	*0*	*1*
Metals: Non-ferrous	*2.5 Processing non-ferrous metals*	**2**	**2**	***2***
Mineral: Cement, lime and magnesium oxide	*3.1 Cement, lime and magnesium oxide*	3	2	1
Mineral: Glass	*3.3 Glass*	1	1	1
Mineral: Other	*3.5 Ceramic*	3	2	2
Chemical		**4**	**4**	**6**
	4.1 Organic chemicals	*1*	*1*	*1*
	4.2 Inorganic	*0*	*0*	*1*
	4.3 Fertilisers	*0*	*0*	*1*
	4.4 Plant protection products	*0*	*0*	*1*
	4.5 Pharmaceutical products	*3*	*3*	*2*
Waste: hazardous	*5.1 Disposal / recovery*	**3**	**4**	**6**
Waste: non-hazardous		**12**	**13**	**24**
	5.2 Co-/ incineration of non-hazardous and hazardous waste	*0*	*0*	*2*
	5.3 Disposal of non-hazardous waste			
	5.4 Landfills	*0*	*1*	*5*
	6.5 Disposal of animal carcases	*11*	*11*	*16*
		1	*1*	*1*
Other activities		**45**	**44**	**59**
	6.1 Pulp, paper, or wood-based products	*1*	*1*	-
	2.6 Surface treatment of metals and plastic	*1*	*1*	*1*
	6.7 Surface treatment using organic solvents	*0*	*0*	*1*
	6.4 (a) Slaughterhouses	*0*	*0*	*1*
	6.4 (c) Milk	*3*	*4*	*5*
	6.6 (a) Poultry	*7*	*7*	*6*
	6.6 (b) Pigs	*30*	*28*	*27*
	6.6 (c) Sows	*3*	*3*	*18*
Total		**93**	**90**	**-**

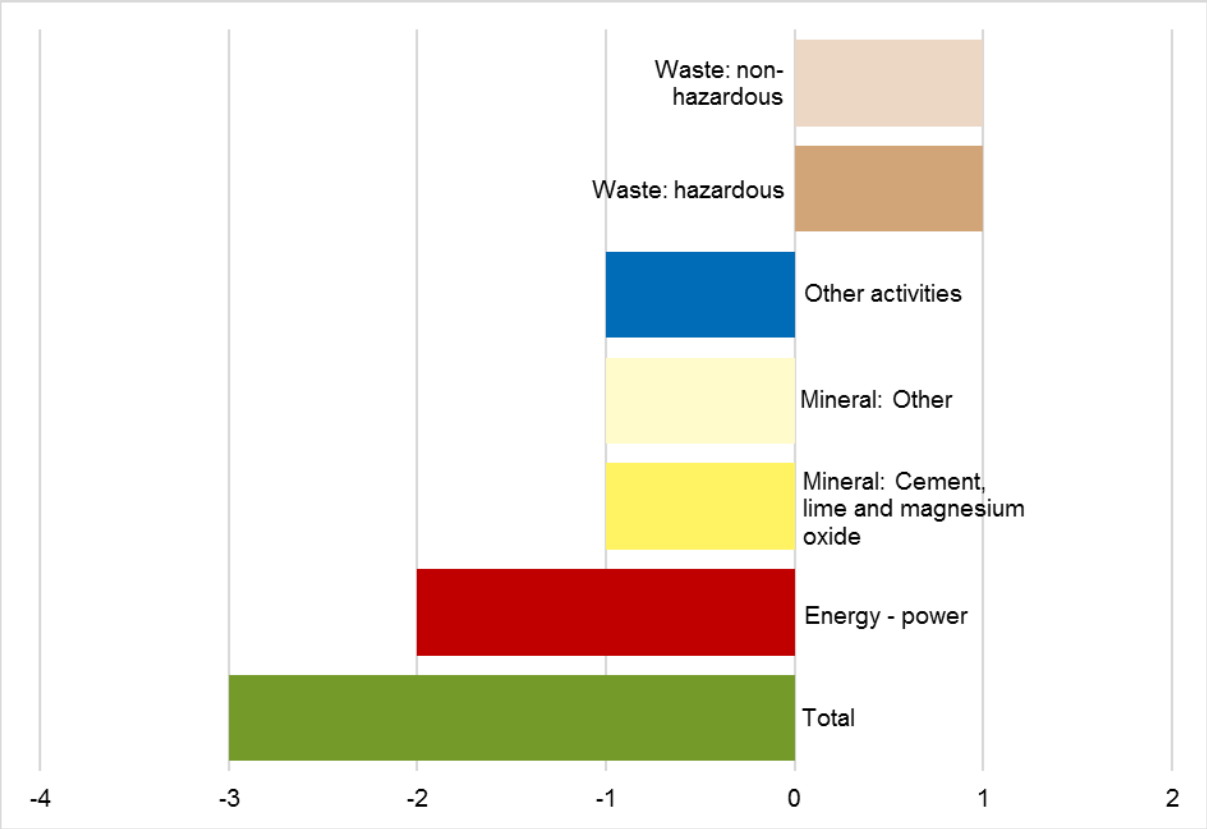
Note: IED activities are in italics. The IED activity 5.2 (Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants) relates to non-hazardous waste (5.2(a)) and hazardous waste (5.2(b)). Owing to the generally small number of installations reported within this category across the EU, these installations have been categorised as non-hazardous waste management. Data for permitted installations carrying out IED activity 6.11 is not included in the reported data and therefore not included in this table. No IED installations were permitted for the following IED activities comprising industrial sectors: Energy: refining, gasification and liquefaction, coke (IED activities 1.2-1.4); Iron and steel (IED activities 2.1, 2.3-2.4); Mineral fibres (IED activity 3.4); Chemicals (IED activities 4.2-4.4, 4.6); Waste management (IED activities 5.3); and within 'other activities (IED activities 6.2, 6.3, 6.4 (a & b), 6.7).

Additional national data is included in the table above to show the number of IED permits by IED activity in the year 2017. Data is reported by the Regional Environmental Boards. In a few cases one permit is issued for multiple IED activities - these are duplicated to show coverage of IED activity rather than absolute number of permits (97).

Source: IPPCD and IED reporting / DG Environment, Personal Communication; Regional Environmental Boards

Between 2011 and 2015, there was a small decrease in the reported number of permitted IED installations in Latvia (comparing IPPCD installations to IED installations in this timeframe) (Figure 7). This decline occurred across the energy – power sector together with declines in the mineral and 'other activities' sectors. The waste management sector reported a small growth in the number of permitted installations; although in light of the national dataset, the data presented here may be underreporting and so the extent of this growth could be greater (see Table 4). No changes were reported for the metal (both iron and steel and non-ferrous), mineral glass and chemical sectors.

Figure 7: Change in number of installations per industrial sector 2011 to 2015



Notes: No changes reported for the metal sectors (both iron and steel and non-ferrous), glass production and chemical sector.

Source: IED reporting / DG Environment, Personal Communication

Limitations

The dataset used to reflect IED activity in Member States has a limited timeseries inherent to the reporting requirement and thus the number of permitted installations is only reported for the years 2011, 2013 and 2015.

Table 5: Gaps in installation data for Latvia

Missing data	Description	Conclusion and actions taken
Inconsistent reporting	Emissions were reported to the E-PRTR for IED activity 2.3 (within the iron and steel sector) despite no IED permit reported by the European Commission dataset.	Permitting data was cross checked with a national data source which shows that an IED permit was operational for IED activity 2.3. The national data is included in Table 4 to illustrate the discrepancy. The provided National data does not include a timeseries which is why it is not used alone.

3 Resource use in industrial sectors

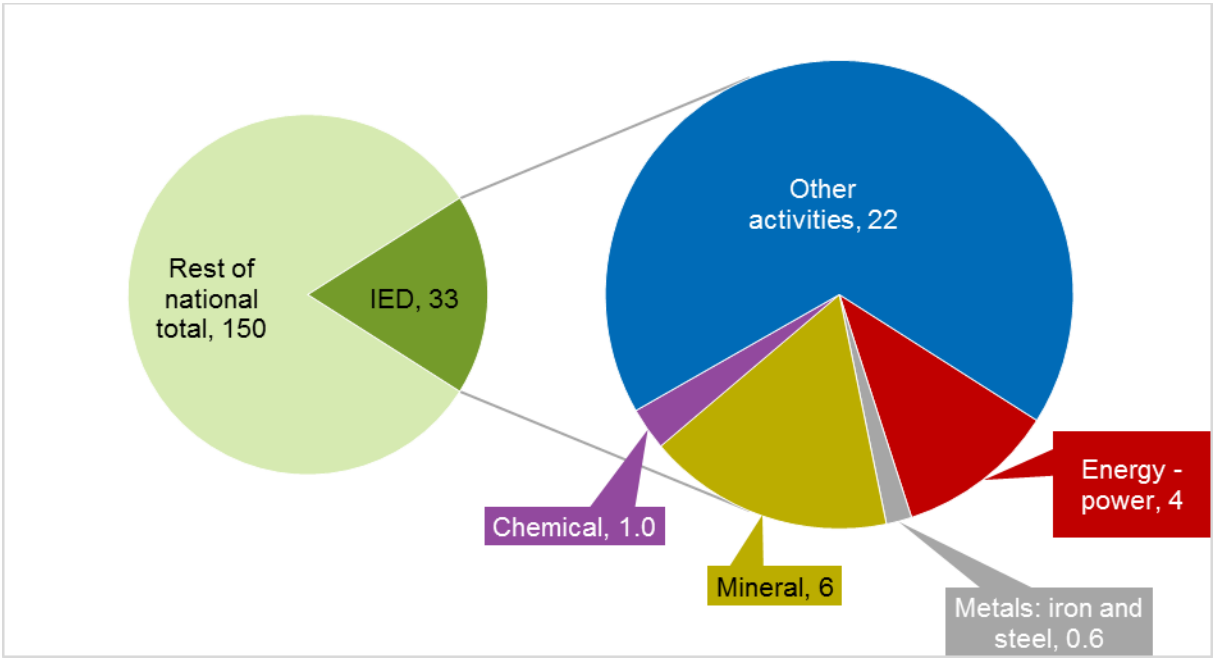
3.1 Energy consumption

'Other activities' consumes the largest share of energy compared to other industrial sectors (Figure 8). This consumption is mainly for the manufacturing of pulp, paper and wood-based products. This sector does represent a key industry with respect to national GVA and employment, although only a single permitted IED installation is reported for this sector.

No data was reported for the waste management industrial sector. As a general limitation of the energy consumption data used, only one energy balance indicator was identified for the waste management sector in relation to energy consumed by biogas installations (Table 6). This is considered a significant data gap for Latvia in light of the number of IED installations permitted for this sector (17; accounting for 18%, see section 2.2). Further, the lack of data reported for the biogas installation energy balance indicator is considered a data gap in the case of Latvia as 53 biogas facilities with a total capacity of 55.42 MW were reported to be operational in 2014 (Zēverte-Rivža, 2014). Despite this relatively large number of facilities, only one installation was reported as permitted in 2015 (Table 4), indicating that the size of the operational facilities in Latvia falls below the activity threshold of 100 tonne/ day for anaerobic digestion waste treatment. Thus, the data gap is considered minor.

Furthermore, the lack of energy consumption data for the intensive rearing of poultry or pigs within 'other activities' is a particular data gap in light of the large number of IED installations permitted for this sector. CCB (2013) highlight that record keeping of energy usage by installations carrying out intensive rearing of poultry or pigs form part of BAT for the sector. While farm holdings may hold such records, this level of detail is not reflected by the energy balance indicators.

Figure 8: Energy consumption by industrial sector in 2015 (PJ)



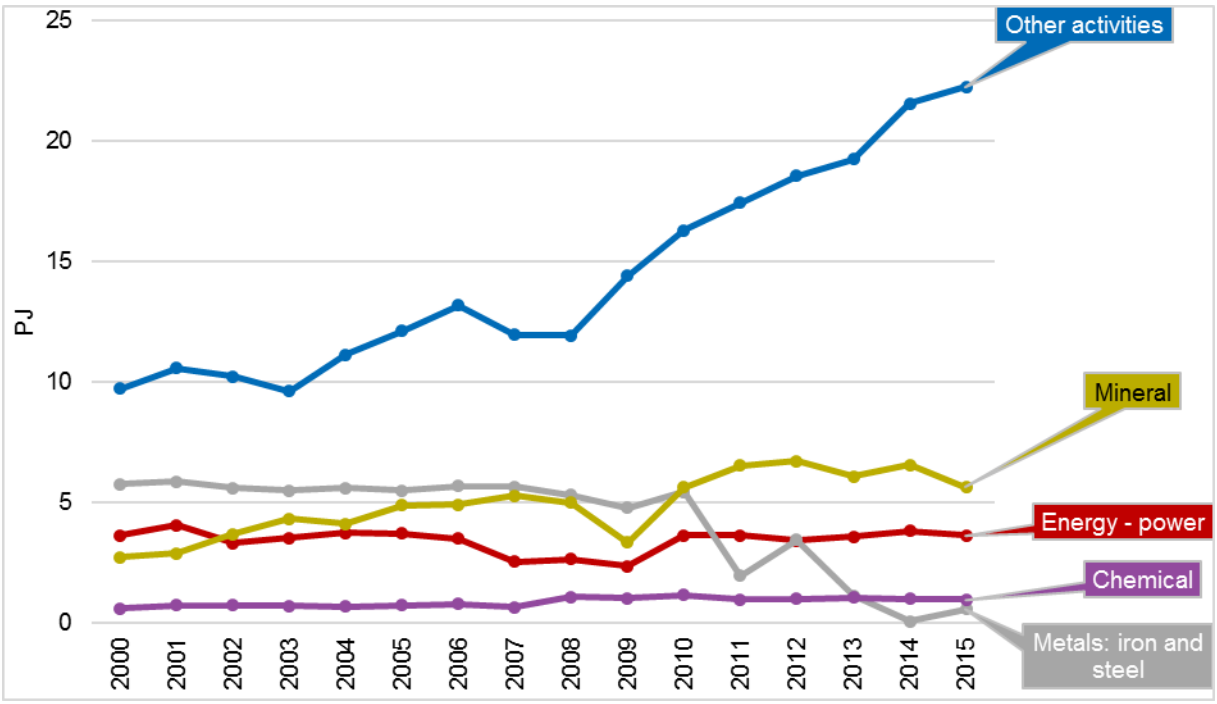
Note: Rest of national total relates to gross inland consumption minus industrial sectors shown here. No data for the waste management industrial sector.

Source: Eurostat (2017c)

The time series in Figure 9 shows that energy consumption across industrial sectors has generally been quite static except for the metal and mineral sectors and 'other activities'. The decline in energy consumed by the metal sector is consistent with the economic data reported in section 2.1; since 2013 the sector is operating at a significantly reduced rate. Conversely, for the mineral sector and 'other activities', there has been an increase in energy consumed by more than two-fold since 2000. For the mineral sector, the increase has been constant over time. For 'other activities', the sharpest increases

occurred after 2008. Within 'other activities', energy consumption of the pulp, paper and wood-based products sector has increased while the energy consumption of the food and drink sector has decreased slightly. As discussed in section 2.1, the GVA for the pulp, paper and wood-based products sector has also grown in this time, suggesting that the increased energy consumption correlates to growth in the sector. However, it is unclear if this growth is specific to industry regulated by the IED, as the number of installations permitted has remained static in this time and both GVA and energy data are broader than IED activity (see accompanying methodology paper).

Figure 9: Energy consumption (in PJ) of industrial sectors (2000-2015)



Note: No data for the waste management sector.

Source: Eurostat (2017c)

Limitations

Generally, the use of energy balance indicators is expected to lead to overreporting against IED activities as no thresholds apply to the economic activities reported against (similar to NACE classifications). The energy consumption data that have been used has only limited coverage of the waste management sector. Data for this sector is therefore expected to be underreported as only one energy balance indicator was identified as relevant to this industrial sector: the energy consumed by gasification plants for biogas. Thus, where no data for the waste management sector is identified, this is rather a limitation that the energy consumption dataset has poor representation of the waste management sector.

Table 6: Gaps in energy consumption data for Latvia

Missing data	Description	Conclusion and actions
Non-hazardous waste management.	No data reported for the indicator for the waste management sector.	No action

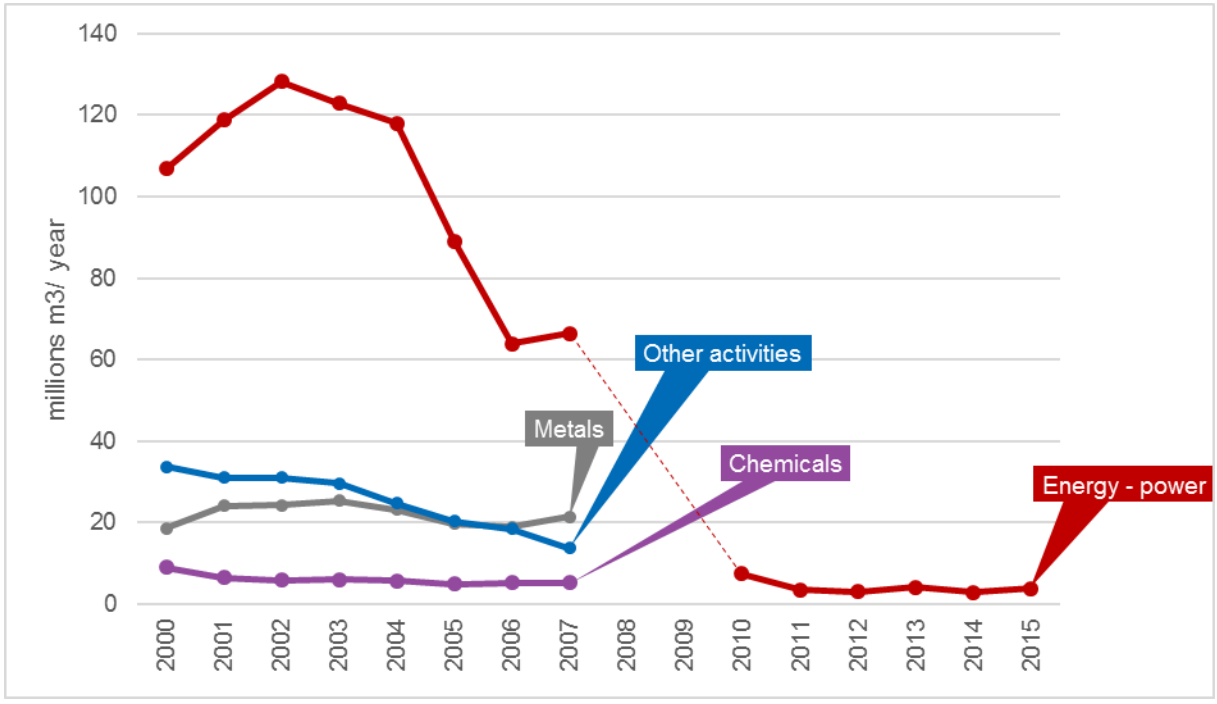
3.2 Water consumption

There is limited data available on water consumption by industrial sectors in Latvia. Data for the year 2015 is only available for the energy – power sector, which consumed 3.9 million m^3 in 2015 (accounting for 2% of the national total used for that year) (Eurostat, 2017d). Previously, data was reported for between 2000 and 2007; however, reporting stopped in 2008 and 2009 (Figure 10). For the metal sector, it is expected that water consumption will be marginal owing to the reduced activity by the sector since 2013. The lack of data for 'other activities' and the remaining industrial sectors is a considered to be a gap.

It is difficult to discern a trend in water consumed by the energy – power sector before 2010; between 2000 and 2007, only public supply data is reported (and not self-supply of water) and the volumes reported are much greater compared to the data reported for between 2010 and 2015 (Figure 10). It is unclear if the decrease is real, or if it reflects a change in reporting.

Note that reporting of water consumption by the chemical sector is – according to the data source – grouped together with the energy-refining industry. However, based on the number of permitted IED installations it is expected that for Latvia, the chemical sector is the only consumer within this grouping and it is labelled as such in Figure 10.

Figure 10: Water consumption (million m^3) for selected industrial sectors (2000-2015)



Note: No data was reported for the mineral sector and the waste management sector. Dashed line to show hypothetical trend for missing data.

Source: Eurostat (2017d)

Limitations

Limitations have arisen from the mapping owing to combined reporting of NACE classifications for energy (refining, gasification and liquefaction, coke) and chemical sectors. Water consumption by the mineral sector is combined with many other NACE activities and could not be used without significant overreporting. An additional category is reported by Eurostat to show water used for cooling; however, the data is also reported within other NACE classifications and so could not be included in the charts without double counting.

Table 7: Data gaps in water consumption data for Latvia

Missing data	Description	Conclusion and actions taken
No data	No data is reported for the waste management sector	No action
Limited time series	For the metal and chemical sectors, and 'other activities' data is only reported for 2000-2007	No action
Limited data	No data reported for the energy – power sector for 2008 - 2009	Insufficient data reported to interpolate so a reduced time series is shown.

4 Emissions from industrial sectors

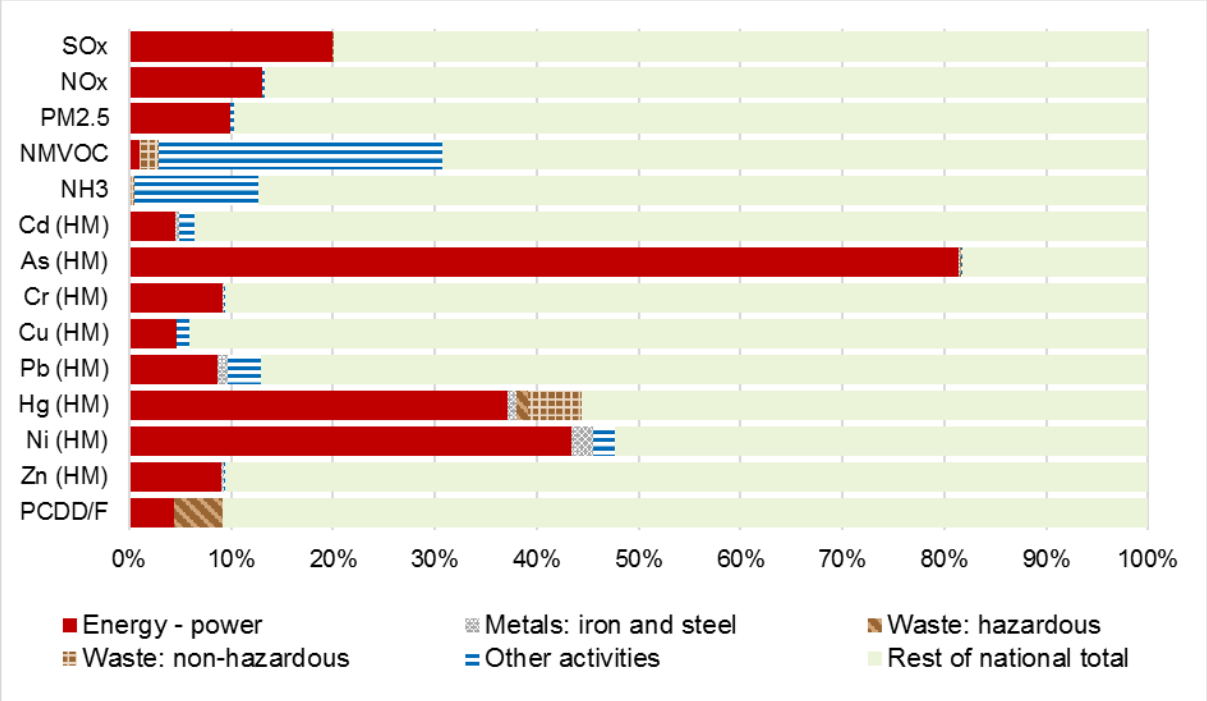
4.1 Emissions to air

Data were taken from inventories submitted by Latvia under the CLRTAP (EEA, 2017a). Emissions are not reported for the mineral or chemical industrial sectors, and pollutant coverage is limited for many sectors (Figure 11, with the detail more clearly shown in Figure 12).

Reporting under CLRTAP shows that, for many pollutants of the pollutants considered in this profile, industrial sectors are responsible for between 5 and 15% of national emissions (for NO_X, $PM_{2.5}$, NH_3, Cd, Cr, Cu, Pb, Zn and PCDD/F). The contribution of industrial sectors' emissions to the national total is higher for SO_2 (20%), NMVOC (30%), Hg and Ni (~45%) and As (~80%).

Among the industrial sectors, the energy – power sector is responsible for the greatest share of emissions to air for most pollutants presented here except NMVOC and NH_3 (Figure 11). For both NMVOC and NH_3, the main industrial sector source is 'other activities'. NMVOC emissions primarily can be attributed to surface treatments (IED activities 2.6 and 6.7) and NH_3 to intensive rearing of poultry or pigs (IED activity 6.6). The main source of PCDD/F is hazardous waste management; although energy – power is also a key source.

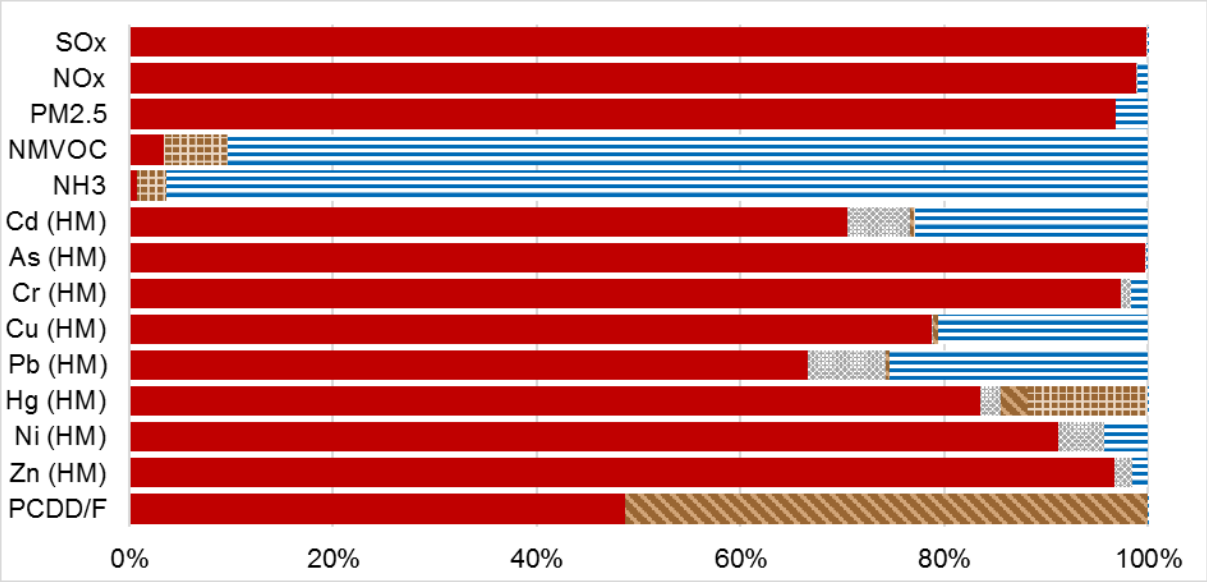
Figure 11: Emissions to air from industrial sectors and rest of national total (2015)



Note: Rest of national total relates to the national total for the entire territory (based on fuel sold) minus the industrial sector emissions shown here.

Source: EEA (2017a)

Figure 12: Emissions to air from industrial sectors (2015)



Note: The key for this chart is shown in Figure 11.

Source: EEA (2017a)

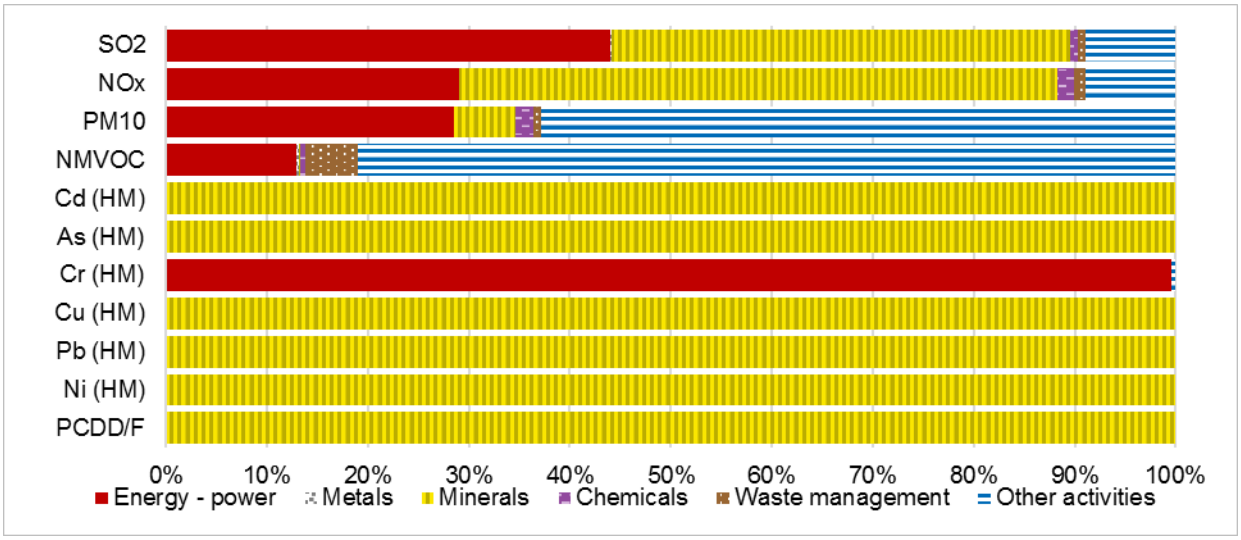
In addition to the emissions data reported under CLRTAP, a national emissions to air dataset (State Enterprise Latvia Environment, Geology and Meteorology Centre, 2017a) is included here to address the gaps in sector and pollutant coverage (Figure 13). Data from CLRTAP and the national dataset have not been combined and are presented separately as the latter uses NACE reporting classifications while CLRTAP uses Nomenclature For Reporting (NFR) classifications. Overall, the sector split in CLRTAP in Figure 11 does not look similar to the split in the national dataset in Figure 13. The most apparent difference as a result of these two reporting classifications is that the national dataset does not distinguish between hazardous and non-hazardous waste management, and the sectors within the mineral industrial sector are grouped together. The national dataset also covers a narrower scope of pollutants compared to the CLRTAP, with no data available for NH_3 or Hg.

For sectors without emissions reported to CLRTAP, the national dataset shows that the chemical sector is a comparatively small contributor to total emissions to air (for SO2, NOx and PM10) and that the mineral sector is responsible for the majority of emissions to air from industrial sectors in Latvia for SO2, NOx, Cd, As, Cu, Pb, Ni and PCDD/F (Figure 13 and Appendix 3 for the detail of pollutant emissions).

Similar to reporting under CLRTAP, the metal and waste management sectors comprise small shares of the emissions reported in 2015, and the energy – power sector and 'other activities' are key sources of emissions.

Heavy metals are reported to a lesser extent in the national dataset, according to which the energy – power sector only emitted Cr in 2015 whereas under CLRTAP all heavy metals are reported as emitted by the sector. The mineral sector is the main sector emitting heavy metals according to the national dataset.

Figure 13: Emissions to air from industrial sectors and rest of national total (2015), national dataset



Notes: No data reported for NH_3, Hg or Zn.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre, 2017a

The following sections discuss the emission trends between 2000 and 2015 by industrial sector using the CLRTAP dataset for all sectors except the chemical sector (the CLRTAP dataset is the more complete dataset in terms of the timeseries and the pollutant coverage). In the following subsections, emissions data are shown in indexed charts by sector. This was done to compare the development of pollutant emissions with the GVA in specific sectors in the time period 2000 to 2015. Emissions from many pollutants across all sectors have increased over time, and at a faster rate than the GVA has grown.

Energy industry

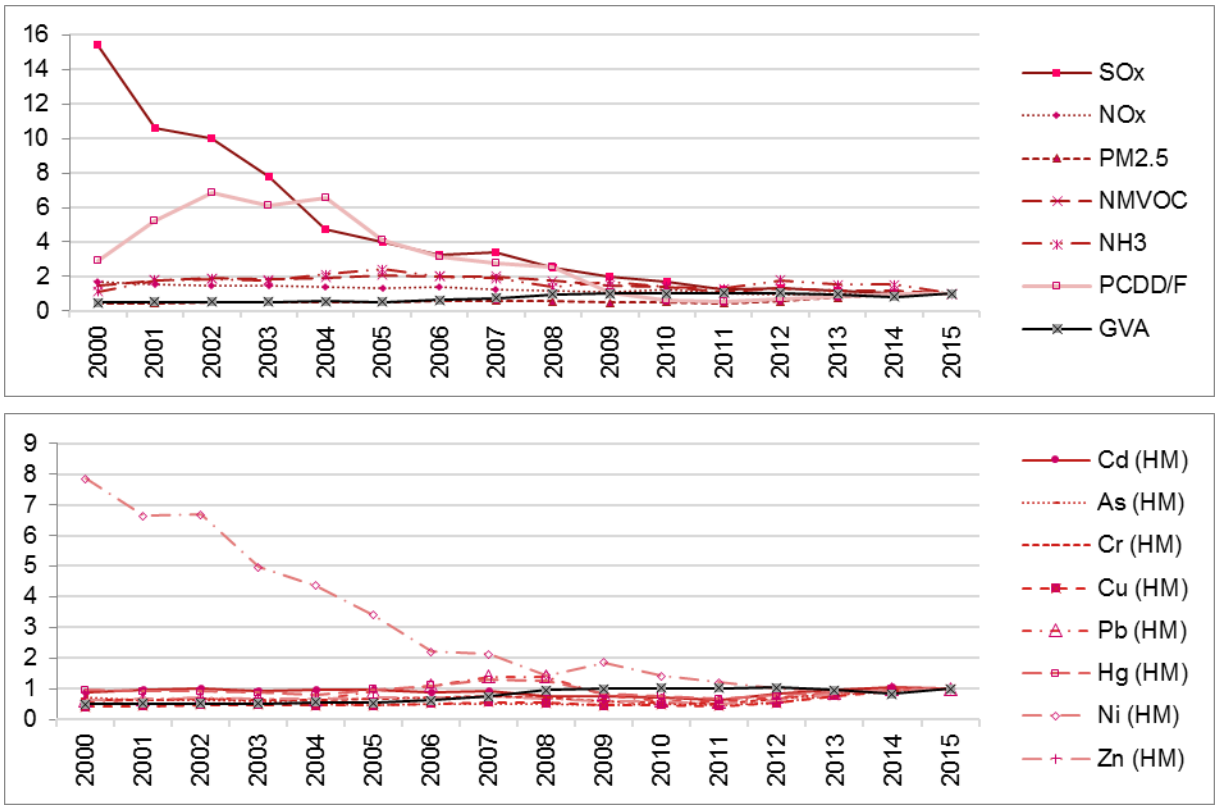
Emissions data were reported under CLRTAP for all pollutants in this profile across the complete time series shown here for the energy – power sector.

Generally, the trends for non-heavy metal pollutants show that emissions to air have declined over time, while GVA for the sector has increased. However, this is not the case for $PM_{2.5}$. Figure 14 illustrates that emissions of this pollutant have increased over time, peaking in 2015 (from 0.78 kt in 2000 to 1.75 kt in 2015). It is not clear from the available data why this increase has occurred. The trend is more visible in Figure 15 with SO_x and PCDD/F removed.

Heavy metal emissions decreased until 2011, after which they increased and in 2015, the values reported were greater than the year 2000 values reported for all pollutants except Ni (values reported in Appendix 2). This growth is at a similar rate to the GVA growth reported for the sector which suggests that increased production from the sector could be the cause of increased emissions.

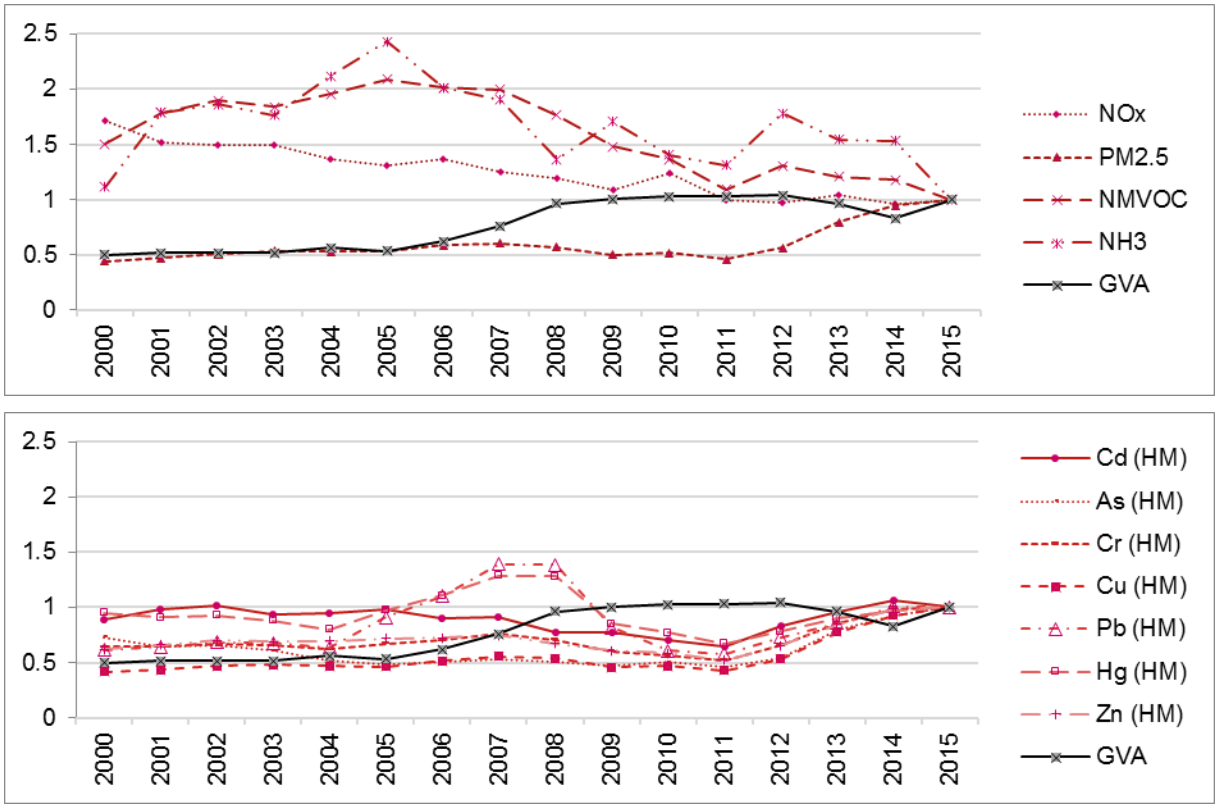
The most significant declines reported for emissions to air by the energy – power sector is between 2000 and 2006 of SO_x and Ni emissions (Figure 14). The emission reductions are due to reductions in combustion of liquid and solid fuels, and an increase in biomass (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017). The reductions in SO_x are expected to emanate from compliance with the Large Combustion Plant Directive which had a significant impact on SO_x emissions across the EU in that time period.

Figure 14: Indexed emissions to air from the energy - power industrial sector (indexed to 2015=1)



Source: EEA (2017a), Eurostat (2017a)

Figure 15: Indexed emissions to air from the energy - power industrial sector (indexed to 2015=1)



Notes: SO_x and Ni removed as outliers from the charts above to show the detail.

Source: EEA (2017a), Eurostat (2017a)

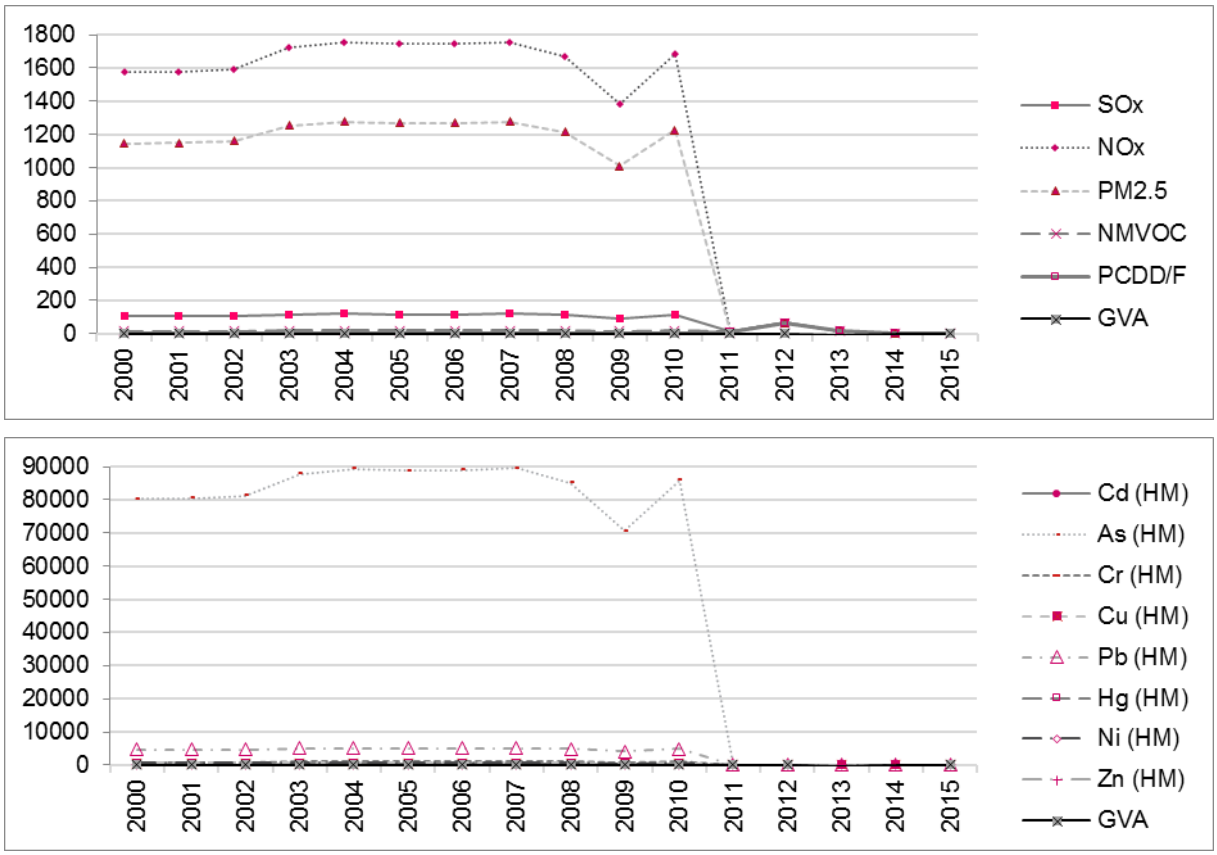
No data is included here for the energy – refining, gasification and liquefaction and coke sector to reflect the fact that there are no IED installations reported for this sector.

Metal industry

Emissions to air from the iron and steel industrial sector show a sudden decrease in 2011. This decrease occurred as a result of technical improvements, in which the one installation permitted for this sector switched from an Open Hearth Furnace to an Electric Arc Furnace (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017).

Note that prior to 2011, emissions were fairly constant and particularly large for NO_x (2.7 kt in 2010) and Pb (160 t in 2010). Moreover, emissions of NMVOC and PCDD/F increased up to 2012 (see Figure 17 with outliers removed to make these trends visible).

Figure 16: Indexed emissions to air from iron and steel sector (indexed to 2015=1)



Notes: No NH_3 reported in the first chart. No emissions reported for Hg between 2000 and 2010. Values not plotted to avoid misrepresenting the trend.

Source: EEA (2017a), Eurostat (2017a)

Figure 17: Indexed emissions to air from iron and steel sector (indexed to 2015=1), with outliers removed

Note: NO_x and $PM_{2.5}$ removed in the first chart as outliers to make detail visible for other pollutants. Pb and As removed from the second chart as outliers to make detail visible for other pollutants. No emissions reported for Hg between 2000 and 2010. Values not plotted to avoid misrepresenting the trend. Indexed GVA is negative 2013-4.

Source: EEA (2017a), Eurostat (2017a)

No emissions to air are reported for the non-ferrous metal sector under CRTAP as these emissions are reported as not occurring. The national dataset reports emissions to air for the metal sector, combining the iron and steel sector with non-ferrous metals. This data is not presented here as it has limited pollutant coverage and reduced timescale in comparison to the data presented above for the iron and steel sector and does not relate specifically to the non-ferrous metal sector.

Mineral industry

Although Figure 13 shows that the mineral industry is responsible for the majority of emissions to air reported by the national dataset (for SO2, NOx, Cd, As, Cu, Pb, Ni and PCDD/F), the emissions data reported to CLRTAP shows that the sector is responsible for a minor share of emissions to air (Figure 12). For the following analysis, the CLRTAP data has been used as it has a more consistent and complete timeseries across the pollutants reported. Furthermore, in light of the few IED installations reported for this sector, its emissions to air are expected to be more aligned with CLTRAP data than the national dataset.

The greatest emissions to air from the mineral sector are reported by the glass industry (in terms of quantities – see Appendix 2).

The indexed charts for cement, lime and magnesium oxide industry emissions show a significant decline in emissions for SO_x, NMVOC and $PM_{2.5}$ between 2009 and 2010 while GVA has grown (Figure 18). This has occurred as a result of a switch from wet cement production technology to dry cement production technology (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017). However, emissions of NO_x and Hg have increased gradually overtime.

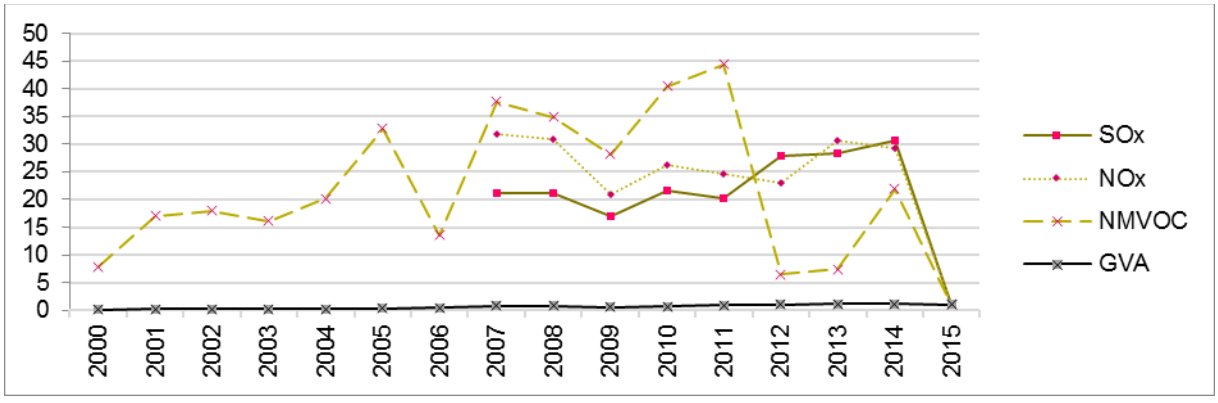
Figure 18: Indexed emissions to air from cement, lime and magnesium oxide production (mineral industrial sector) (indexed to 2015=1)

Note: Only SO_x, NO_x, $PM_{2.5}$, NMVOC and Hg are reported. No emissions are reported for Hg between 2000 and 2009. Values are not plotted for this pollutant in this year to avoid misrepresenting the trend.

Source: EEA (2017a), Eurostat (2017a)

NMVOC emissions to air from glass production have decreased over time, subject to a number of fluctuations over this period (peaking in 2011 and reporting particular lows in 2006, 2012 and 2013). A reduced time series is presented for NO_x, and SO_x as no data was reported for these pollutants between 2000 and 2006.

Figure 19: Indexed emissions to air from glass production (mineral industrial sector) (indexed to 2015=1)



Note: Only SO_x, NO_x and NMVOC reported. No emissions were reported for SO_x and NO_x between 2000 and 2006. Values not plotted to avoid misrepresenting the trends.

Source: EEA (2017a), Eurostat (2017a)

No emissions to air were reported for the ceramic sector (within mineral – other). This is not considered a gap as it is reported in the dataset that while the activity is occurring, they do not result in emissions. No emissions are reported for this sector in the national dataset either.

Emissions to air reported by the national dataset are reported for the mineral sector as a whole and cover a similar range of pollutants except in the case of heavy metals where no Hg emissions were reported in the national dataset. The national dataset shows a different trend for SO_2, NO_x, NMVOC and PM_{10} (no $PM_{2.5}$ reported) from the sector, showing a significant increase over time (Table 8). The difference in trends can be explained by the fact that the national dataset incorporates emissions from combustion by the mineral sector within this sector reporting whereas combustion emissions are grouped within the energy – power sector in the presentation of CLRTAP data in this profile (see Appendix 1 for the various categorisations).

Table 8: National dataset reporting emissions to air from the mineral sector (2005-2015)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Unit: kg											
SO_2	189	166	173	183	164	365	1,261	1,341	687	645	580
NO_x	774	1,185	1,183	1,244	1,021	1,777	3,055	4,560	4,621	5,389	5,597
PM_{10}	80.18	40.75	23.61	17.69	15.42	16.44	72.43	82.14	121.85	129.69	120.79
NMVOC	80	41	24	18	15	16	72	82	122	130	121
Unit: g											
Cd (HM)	-	0.46	0.28	3.40	3.68	-	-	-	-	0.02	0.08
As (HM)	604	940	-	-	-	-	-	-	-	1.04	0.64
Cr (HM)	-	-	121.13	-	2.48	4.02	-	-	0.002	0.56	0.002
Cu (HM)	-	-	-	-	134	-	-	-	-	0.94	1.47
Pb (HM)	-	-	-	-	-	-	-	-	-	4.08	5.80
Ni (HM)	-	-	-	-	-	-	-	-	-	0.80	1.19
Zn (HM)	59	93	-	-	-	-	-	-	-	-	-
Unit: mg											
PCDD/F	-	-	-	-	-	-	0.062	0.006	-	-	0.0001

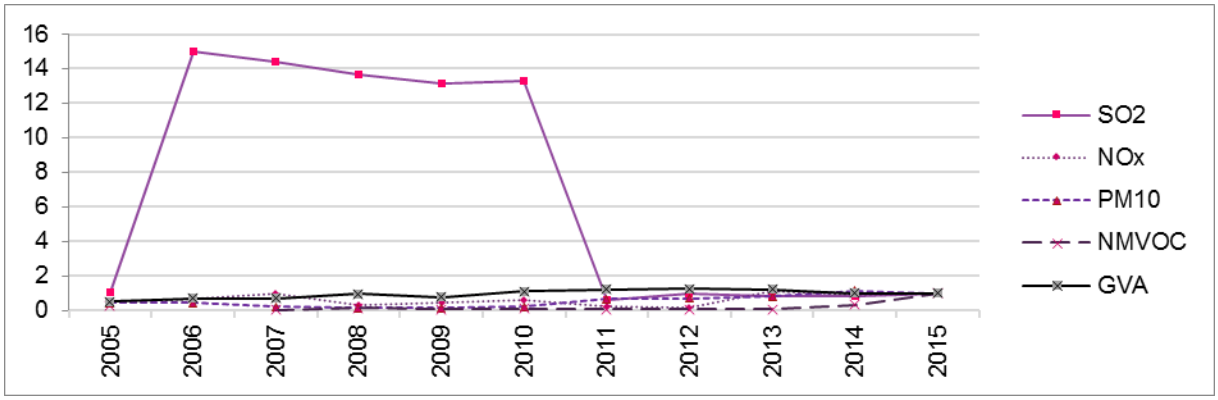
Notes: No data reported for NH_3 or Hg.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017a), Eurostat (2017a)

Chemical industry

According to the CLRTAP inventory, $PM_{2.5}$ is emitted by the chemical sector but is not reported, while the other emissions to air from the chemical sector are reported as not applicable or not occurring (meaning they should not be considered a data gap) (EEA, 2017a). The national dataset reports emissions data for SO_2, NO_x, PM_{10} and NMVOC (Figure 20). The trend shows a considerable drop in SO_2 emissions between 2010 and 2011 (after an increase of the same magnitude reported between 2005 and 2006); excluding this fluctuation, emissions have remained fairly constant between 2005 and 2015. For NO_x, PM_{10} and NMVOC the trend shows an increase in emissions over time, at a faster rate than the GVA growth for the sector.

Figure 20: Indexed emissions to air from the chemical industrial sector (indexed to 2015=1)



Notes: Only SO_2, NO_x, PM_{10} and NMVOC reported.

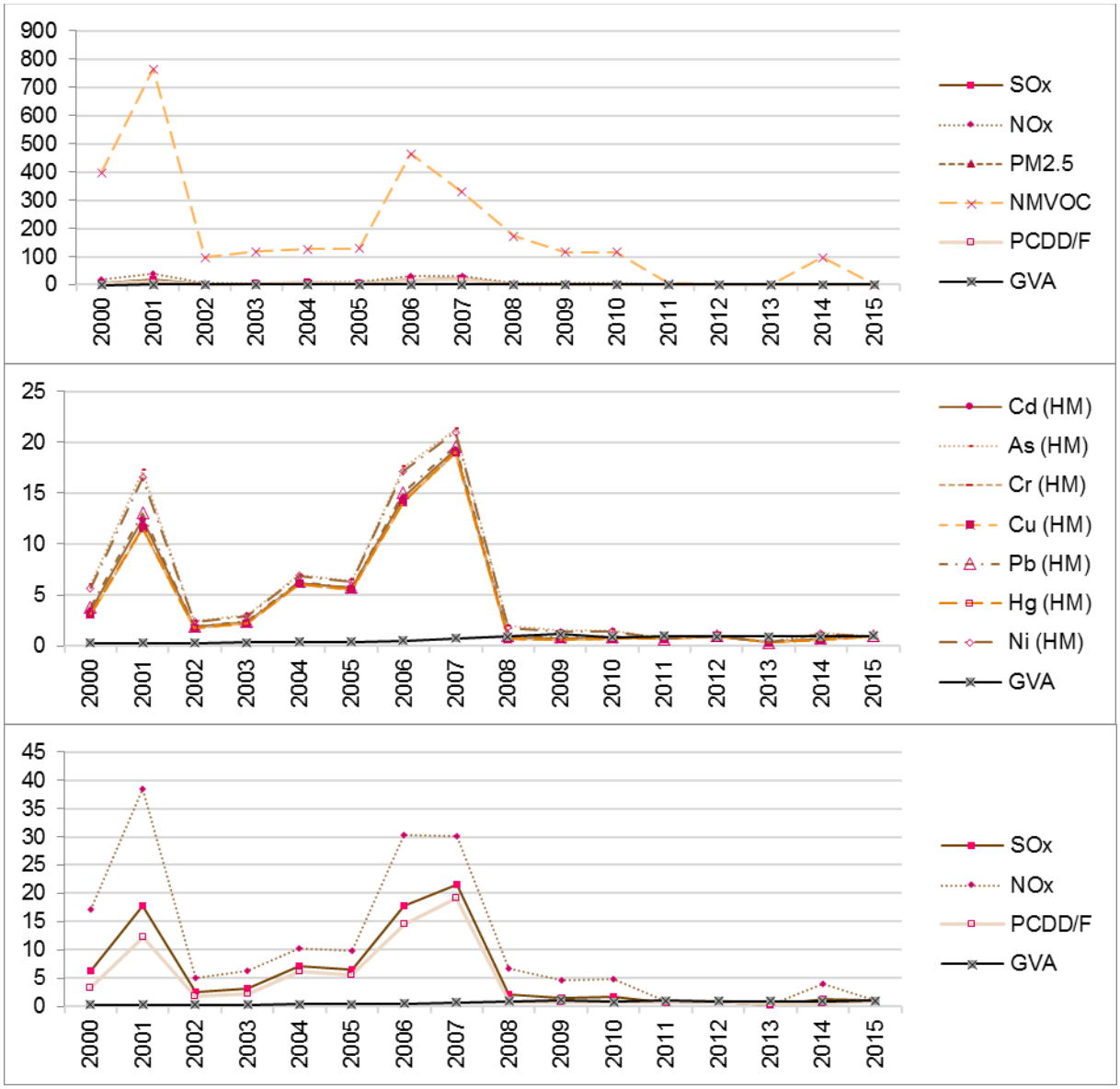
Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017a)

Waste management industry

Emissions to air from the **hazardous waste management sector** are reported across the complete time series presented in this profile. Emissions of all pollutants follow approximately the same trend line over time, indicating that emission factors change little over time, with changes in emissions driven by activity changes. Despite showing a fairly significant decline over the time series, the quantity of emitted pollutants has remained low. In terms of quantity, emissions from the sector are the lowest reported compared to other industrial sectors – except for PCDD/F where emissions in 2015 are the highest across all industrial sectors in Latvia (followed closely by the energy – power sector) (see Appendix 2).

The source of PCDD/F is primarily from incineration processes. PCDD/F emissions peaked in 2001 (owing to one installation reporting a large amount of incinerated waste for this year). Emissions increased again in 2006, which is again linked to incineration of waste with large quantities of clinical waste incinerated in 2006 and 2007; the facility was closed from 2008 (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017). Similar trends are apparent for heavy metal pollutants, although their significance in relation to national emissions is less so.

Figure 21: Indexed emissions to air from the hazardous waste management sector (indexed to 2015=1)

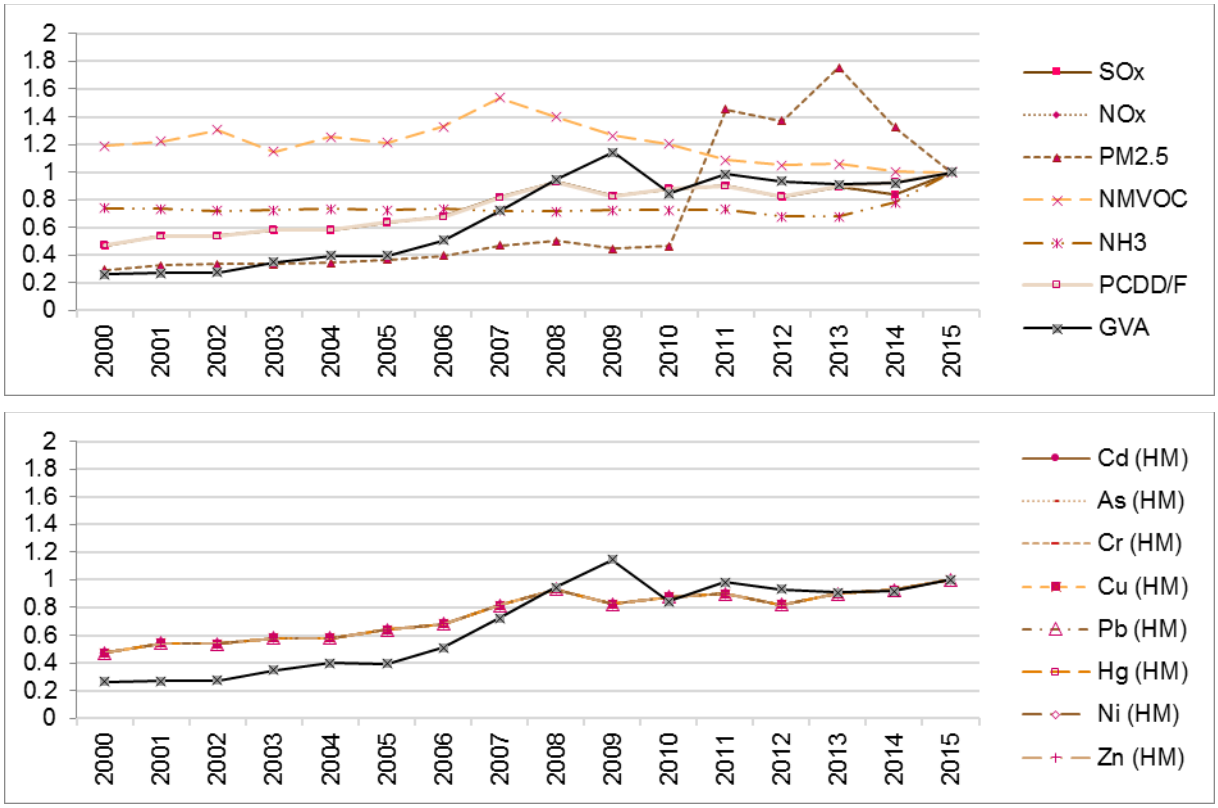


Note: No NH_3 or Zn emissions reported. NMVOC removed as an outlier in third chart to make detail for other pollutants visible.

Source: EEA (2017a), Eurostat (2017a)

Similarly, emissions to air from the **non-hazardous waste management sector** are among the lowest across industrial sectors in Latvia in terms of quantity (see Appendix 2). Despite the low quantity of emissions, the trends indicate that emissions have been increasing in more recent years (since 2006/2007) and at a faster rate than the GVA growth for the sector. This suggests that emissions could present a challenge in future years if the trend continues (Figure 22).

Figure 22: Indexed emissions to air from non-hazardous waste (waste management industrial sector) (indexed to 2015=1)



Note: All heavy metals follow the same trend line.

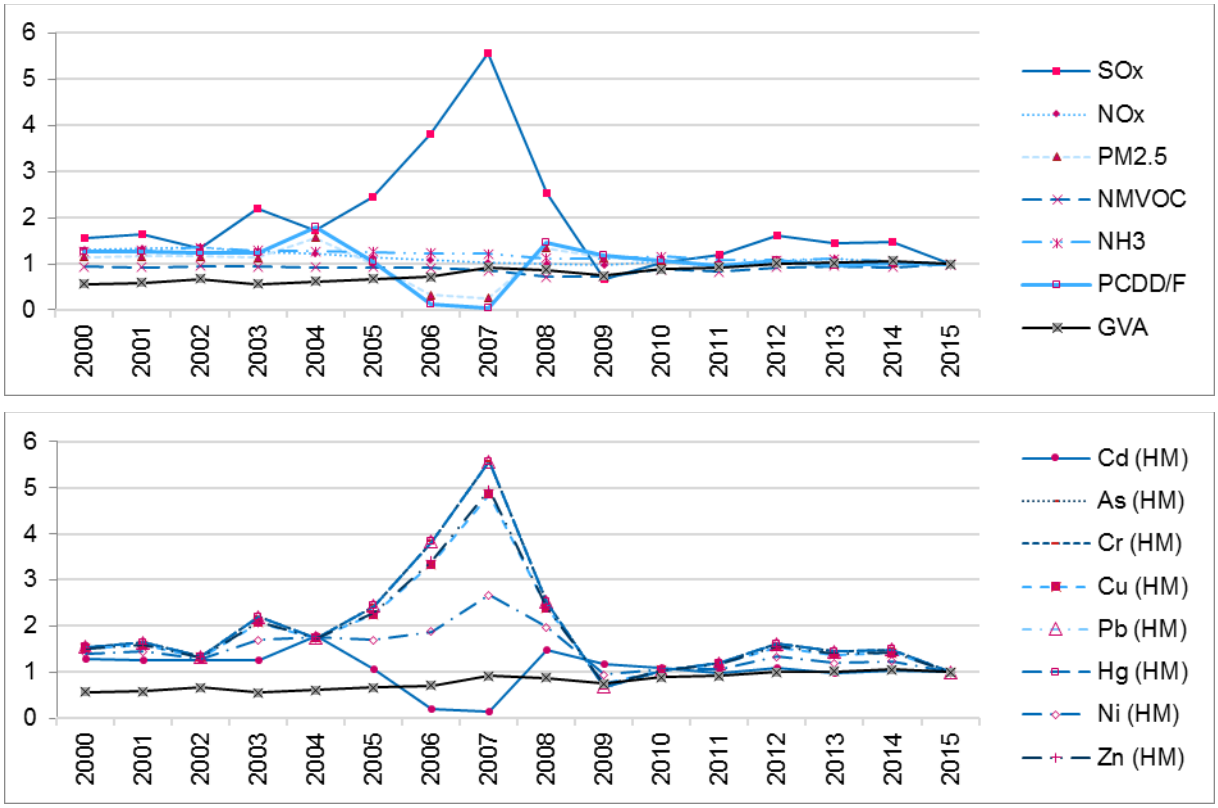
Source: EEA (2017a), Eurostat (2017a)

'Other activities'

Except from the waste management sector, emissions to air from 'other activities' are relatively low compared to other sectors in Latvia in terms of quantity (see Appendix 2). Moreover, the trends indicate that emissions have been decreasing over time while GVA has grown. The spikes reported in 2007 (most apparent for SOx, Cr and As) are reported by the surface treatment industries (IED activities 2.6 and 6.7). However, in proportion to the emissions by other industrial sectors in Latvia (Figure 12, Figure 13), they are insignificant.

Although not apparent from the indexed charts presented below, emissions of NMVOC from 'other activities' are significant as a proportion of the national total. The quantity of pollutant emitted overtime has remained fairly constant, falling only between 2007 and 2009 owing to the economic crisis (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017).

Figure 23: Indexed emissions to air from other activities (indexed to 2015=1)



Source: EEA (2017a), Eurostat (2017a)

Limitations

The use of emissions data reported to LRTAP has generally led to overreporting against IED activities as emissions are reported by NFR classification and thus no activity thresholds apply as in the case of IED annex I activities.

Table 9: Gaps in emissions to air data for Latvia

Missing data	Description	Conclusion and actions taken#
Partial time series for certain pollutants and sectors	No extrapolation or interpolation undertaken as explained in the accompanying methodology paper.	No action
Data gaps	No data reported for the chemical sector.	National data used

4.2 Emissions to water

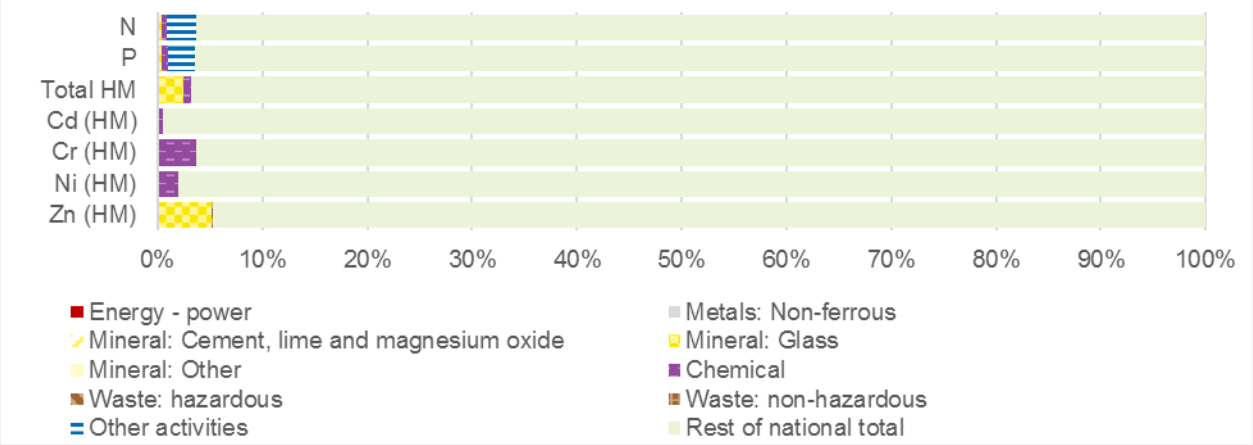
Emissions to water data were obtained from a national dataset as on inspection it appeared to be a more complete dataset compared to reporting to the E-PRTR (State Enterprise Latvia Environment, Geology and Meteorology Centre, 2017b).

The figures in this section, apart from Figure 26, aggregate the separate metals into a single heavy metals metric based on their relative toxicity (predicted no effect concentrations). Note that As is not included in this aggregate total as no emissions were reported across any of the sectors.

The national dataset includes limited pollutant coverage up to 2015, with no data reported for cyanides, diuron, AOX, PCBs, TOC or As. Furthermore, very few sectors are reported to emit Cu, Pb and Hg emissions (only reported by the waste management sector). The emissions reported for these pollutants are insignificant compared to the national total (Figure 24). Emissions data is not reported for the iron and steel sector (see Figure 25 for emissions by sector without the rest of national total). Full details on the emissions reported by industrial sector and year are presented in tabular format at the end of this section (Table 11).

The available data of emissions to water for the year 2015 are shown in Figure 26. This plot presents, per pollutant, the proportion of emissions to water by the industrial sector compared to the rest of the national total reported by Latvia in 2015. For total N, total P and aggregate heavy metals (comprising Cd, Cr, Ni and Zn), industrial sectors make up ~5% of national total emissions to water.

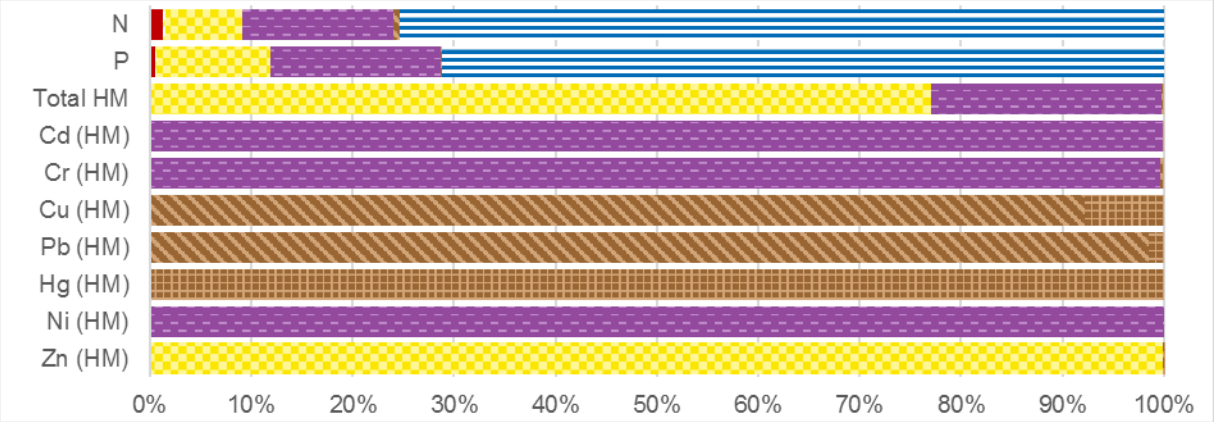
Figure 24: Pollutant emissions to water from industrial sectors and rest of national total (2015)



Notes: Rest of national total relates to the emissions from total NACE reporting minus the industrial sectors shown here. No emissions data reported for the iron and steel sector in 2015. Emissions are only reported by the waste management sectors for Cu, Pb, and Hg; although as a proportion of the national total they are insignificant. No emissions are reported for cyanides, diuron, AOX, PCBs, TOC and As.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b)

Figure 25: Pollutant emissions to water from industrial sectors (2015)



Note: Key is included in the previous chart comparing emissions to water from industry to the national total.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b)

The following sections discuss the emission trends between 2007 and 2015 by industrial sector. In the following subsections, emissions data are shown in indexed charts by sector. This was done to compare the development of pollutant emissions with the GVA in specific sectors in the time period 2007 to 2015.

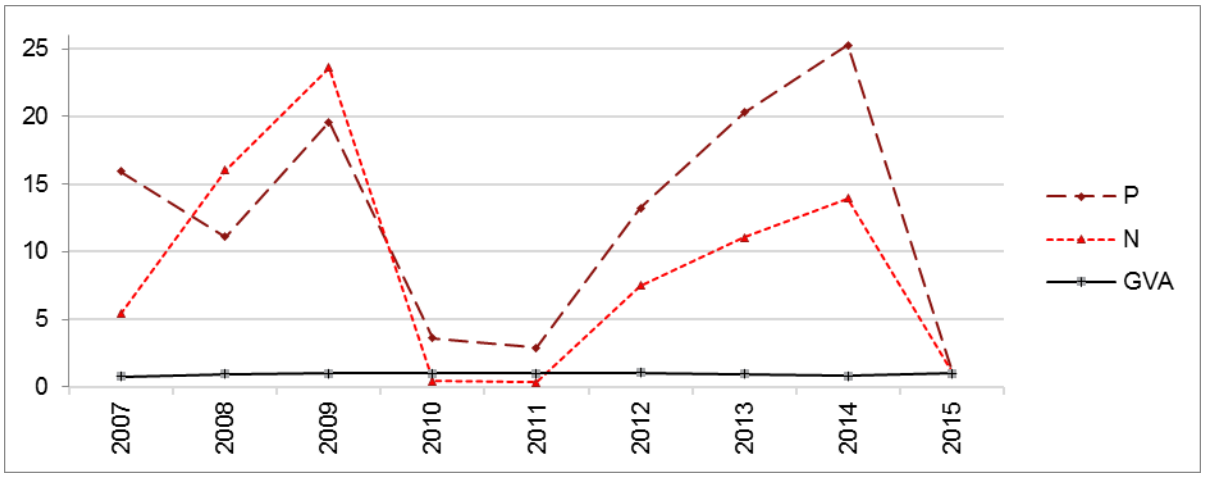
Emissions to water generally relate to small quantities with the largest emissions reported by the energy – power sector (Table 11). Typically, industrial installations in Latvia discharge waste water to municipal waste water treatment systems with only a few installations having their own dedicated waste water treatment system. The industrial sector data presented here does not capture emissions to water from municipal waste water treatment systems, as this is not regulated by the IED and is therefore captured under 'rest of national total'. Thus, the small quantities of emissions to water presented here are expected to be underreporting.

The many fluctuations in emissions presented in the following charts relate to small quantities overall. Moreover, emissions from many sectors have decreased over time while GVA has grown (including: energy - power; cement, lime and magnesium production; ceramics, waste management and 'other activities'). The increased emissions reported by the metal and glass production sectors are relatively small and their implications are discussed below.

Energy industry

Emissions to water of total P and total N from the energy – power sector are reported between 2007 and 2015. The trend shows considerable fluctuations over time, with spikes in 2009 and 2014 for both pollutants presented here. In terms of quantity, emissions of total P are small; emissions of total N are larger in comparison (albeit still small relative to the sector across the EU), with the largest spike reported in 2009 relating to 16 kg. Of note, the trends do not correlate with the emissions to air data which show a steady decline over this time.

Figure 26: Indexed emissions to water from the energy - power industrial sector (indexed to 2015=1)



Notes: Only total P and total N emissions reported.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

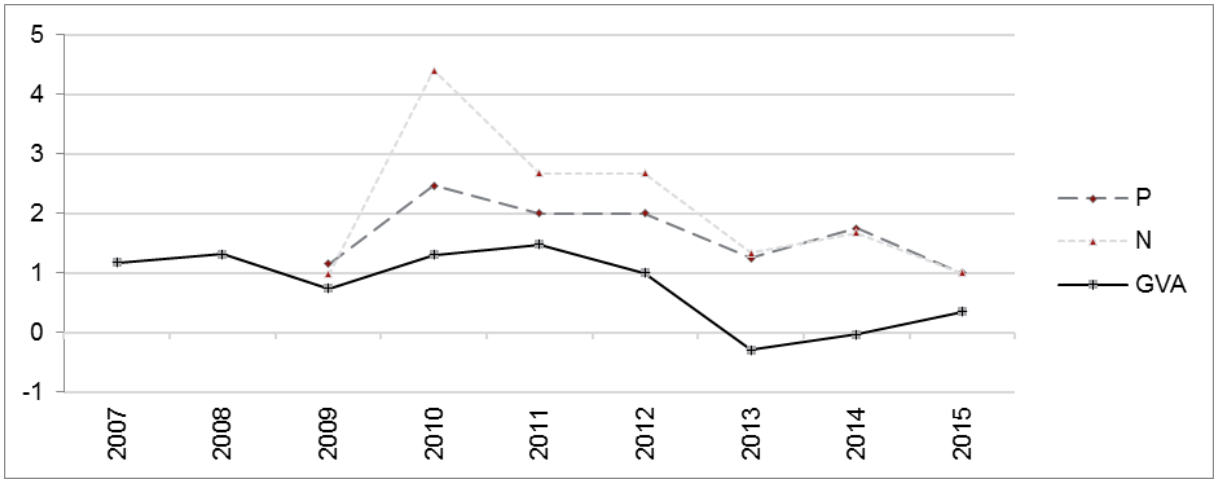
No data is included here for the energy – refining, gasification and liquefaction and coke sector to reflect the fact that there are no IED installations reported for this sector.

Metal industry

Between 2007 and 2013, total N emissions to water from the iron and steel sector have decreased, while decreases in total P emissions are most apparent since 2011. This decrease occurred as a result of technical improvements, whereby the one installation permitted for this sector switched from an Open Hearth Furnace to an Electric Arc Furnace (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 2017). No emissions are reported from the iron and steel sector after 2013 and therefore emissions are not presented in an indexed chart. Emissions data for the sector are reported in Table 11.

Emissions to water from the non-ferrous metal sector have been reported since 2009 for total P and showing a slight increase until 2012 when emissions started to decrease along with emissions of total N. This trend is similar to the trend identified for emissions reported by the iron and steel sector and is indicative of wider economic pressures facing the metal sector (MASOC, 2016).

Figure 27: Indexed emissions to water from the non-ferrous industrial sector (indexed to 2015=1)

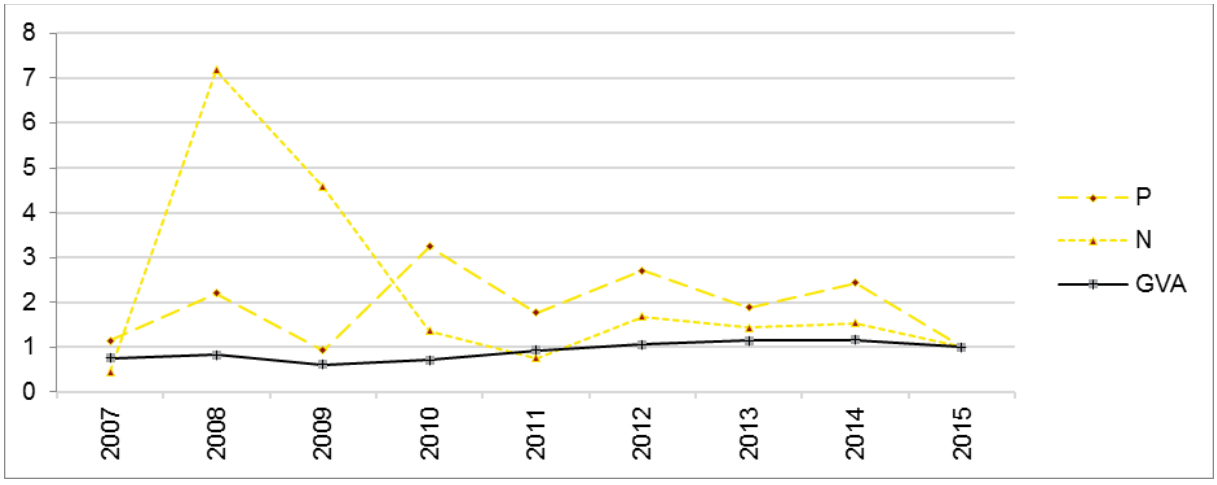


Notes: Only total P and total N reported.
Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Mineral industry

Emissions to water from cement, lime and magnesium oxide production are reported for total N and total P and have decreased between 2008 and 2015, with fluctuations between years. The largest fluctuation is reported for total N between 2007 and 2008, and comparing 2007 emissions to 2015, emissions have increased. However, the quantity reported is small and the increase is negligible (Table 11).

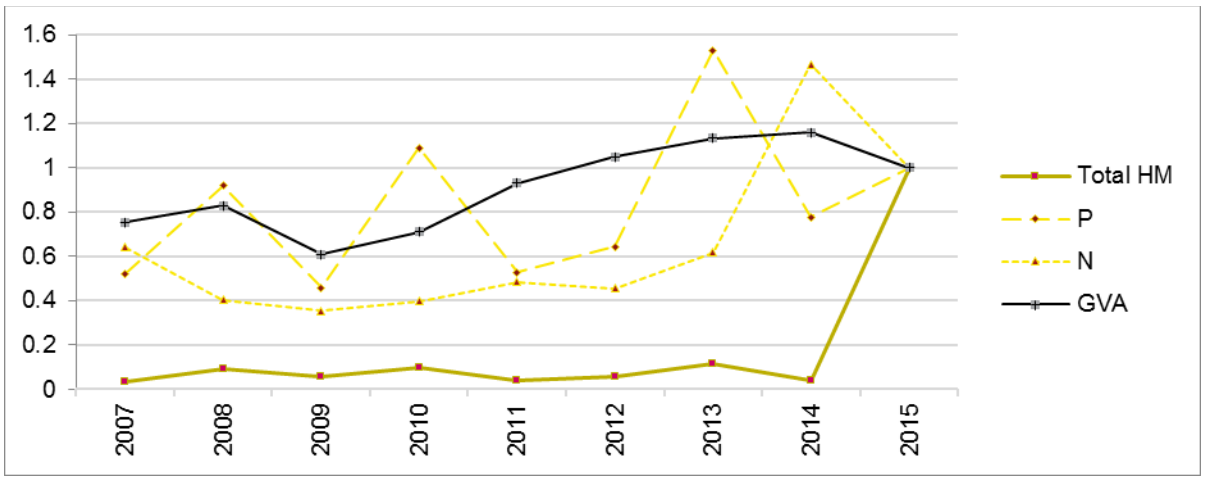
Figure 28: Indexed emissions to water from cement, lime and magnesium oxide production (mineral industrial sector) (indexed to 2015=1)



Note: Only total P and total N emissions reported.
Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Emissions to water from glass production have increased between 2007 and 2015 (Figure 29). Emissions are reported for total heavy metals, total N and total P. Although the quantities reported are small (Table 11), if the trend continues the emissions may become significant in future years. Particularly for heavy metal emissions which have been constant until 2015. The pollutant causing the increase in 2015 is Zn (presented in aggregate form by PNEC value).

Figure 29: Indexed emissions to water from glass production (mineral industrial sector) (indexed to 2015=1)

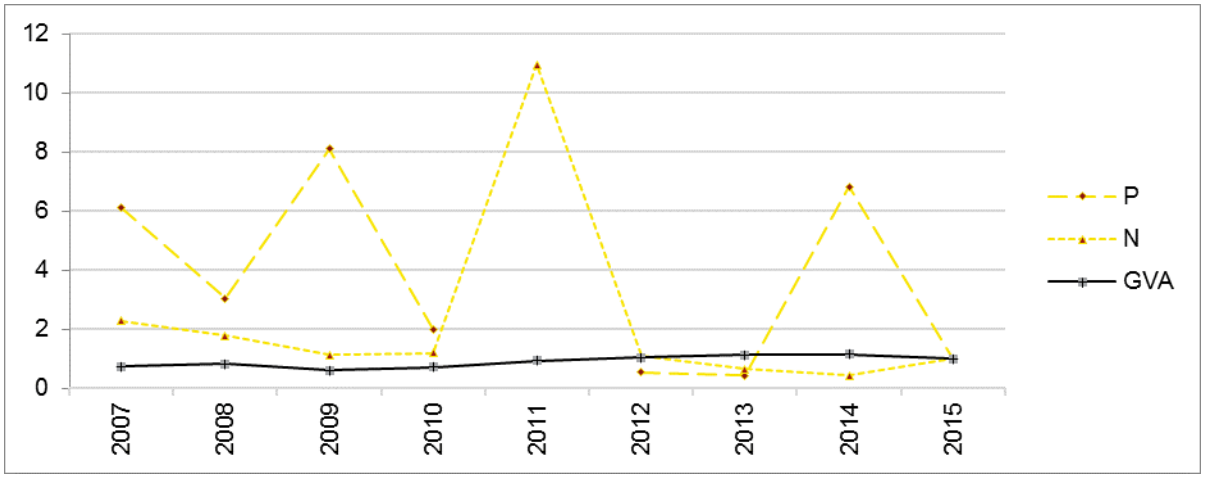


Note: Only total P and total N and heavy metal emissions reported. Heavy metal emissions presented here in aggregate form by PNEC value.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Emissions to water from ceramic production (within mineral – other), have fluctuated and decreased over time (Figure 30). Emissions are reported for total N and total P. A slight increase is apparent between 2012 and 2015 but the quantities reported are small and the increases are negligible (Table 11).

Figure 30: Indexed emissions to water from ceramic production (mineral industrial sector) (indexed to 2015=1)



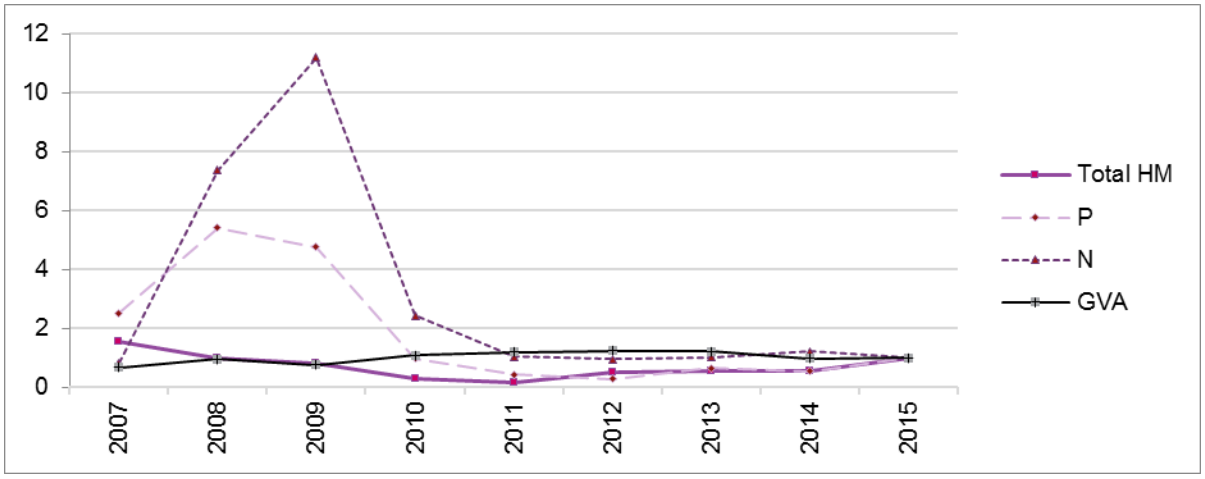
Note: Only total P and total N emissions reported. No emissions reported for total P in 2011. Value not plotted to avoid misrepresenting trend.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Chemical industry

The time series for emissions to water for the chemical sector are illustrated in Figure 31. Emissions are reported for heavy metals, total N and total P, with decreases reported for total heavy metals and total P. Although, the quantities reported are small and the increase is negligible (Table 11), the ongoing nature of the trends identified since 2011 indicates that emissions to water from the chemical sector could present a challenge for the sector in future years. Moreover, the pollutants comprising total heavy metals has changed over years, with Ni and Cr becoming more significant since 2012 and driving the increase apparent below. This suggests that the increase may be linked to changes in the manufacturing process and/ or products produced.

Figure 31: Indexed emissions to water from the chemical sector (indexed to 2015=1)



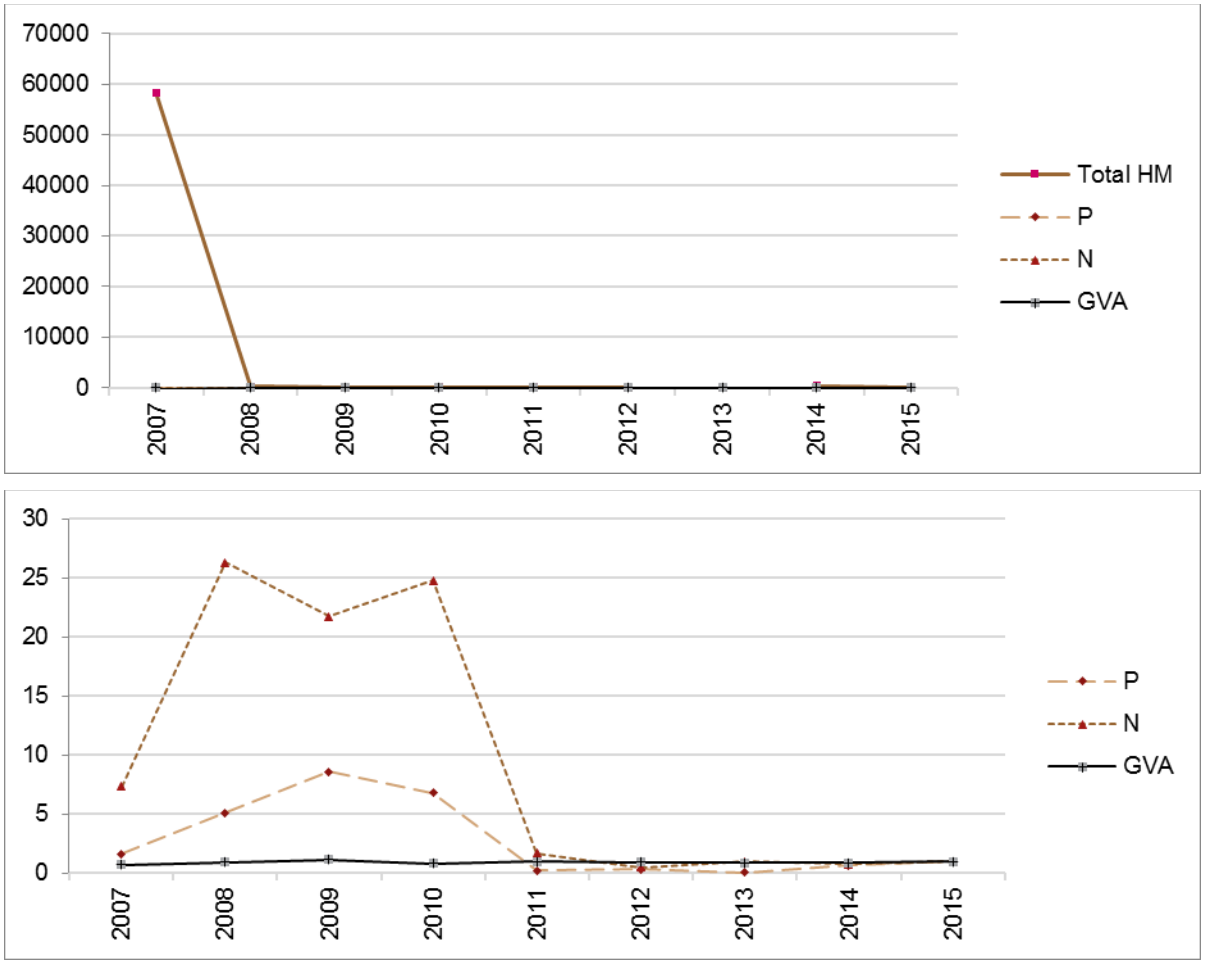
Note: Only total P and total N and heavy metal emissions reported. Heavy metal emissions presented here in aggregate form by PNEC value.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Waste management industry

Emissions to water from **hazardous waste management** are reported for heavy metal, total N and total P and have decreased between 2007 and 2015, with a significant drop reported between 2007 and 2008 for heavy metals. However, the quantity reported is small and the decrease is negligible (Table 11). Figure 32 includes a second chart with heavy metals removed as an outlier to make the detail visible for the other pollutants presented in the chart. Emissions to water for total N and total P have both decreased over time, although increases have been reported since 2011 for both pollutants. The quantities reported are small and the increases are negligible (Table 11).

Figure 32: Indexed emissions to water from hazardous waste management (indexed to 2015=1)

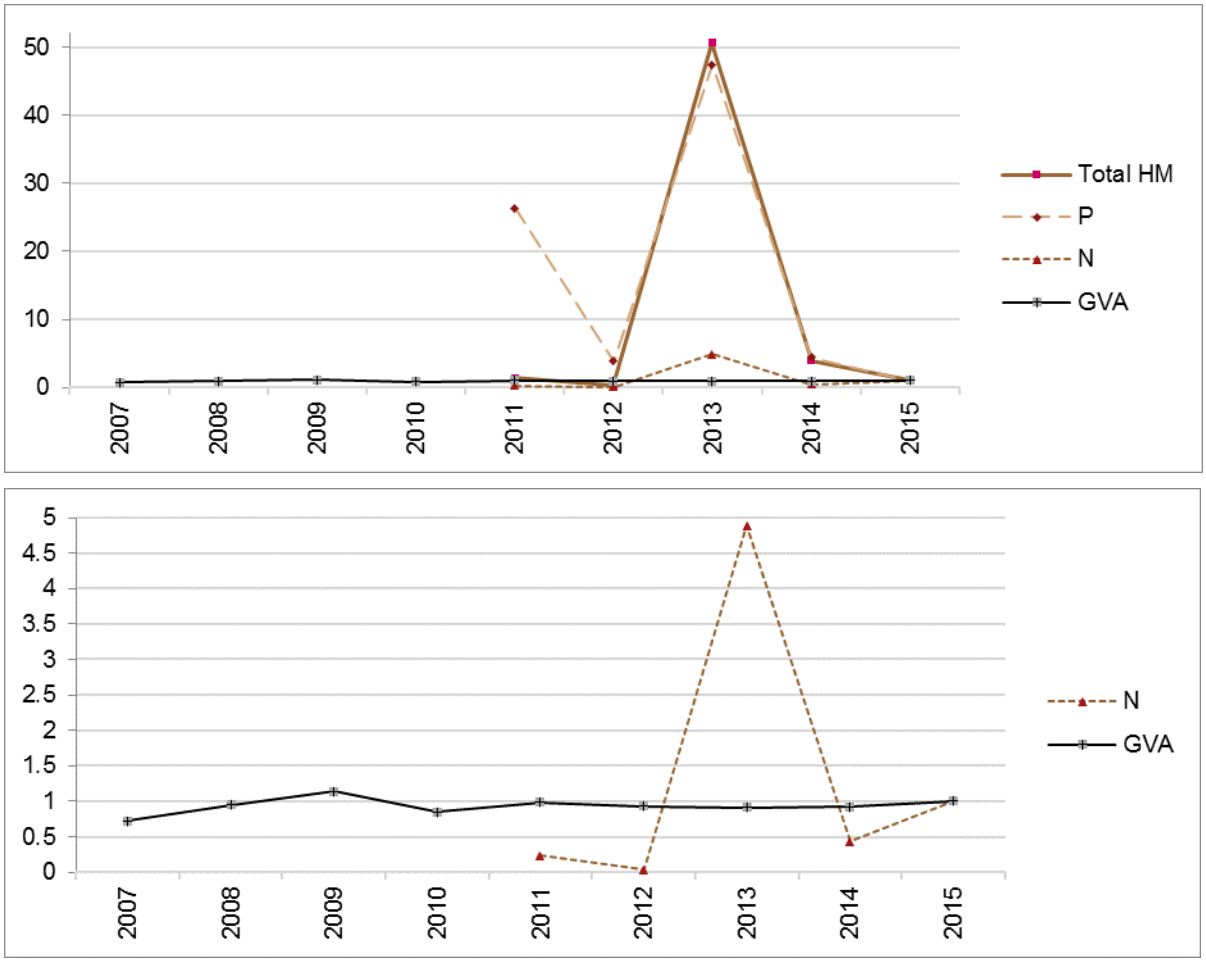


Note: Only total P and total N and heavy metal emissions reported. Heavy metal emissions presented here in aggregate form by PNEC value. Heavy metals removed from the second chart as outliers to make detail visible for total N.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Emissions to water from **non-hazardous waste management** are reported for heavy metals, total N and total P since 2011 (Figure 33). The quantities reported are small (Table 11), and the lack of data reported prior to 2011 is expected to be owing to changes in monitoring and reporting.

Figure 33: Indexed emissions to water from non-hazardous waste management (indexed to 2015=1)



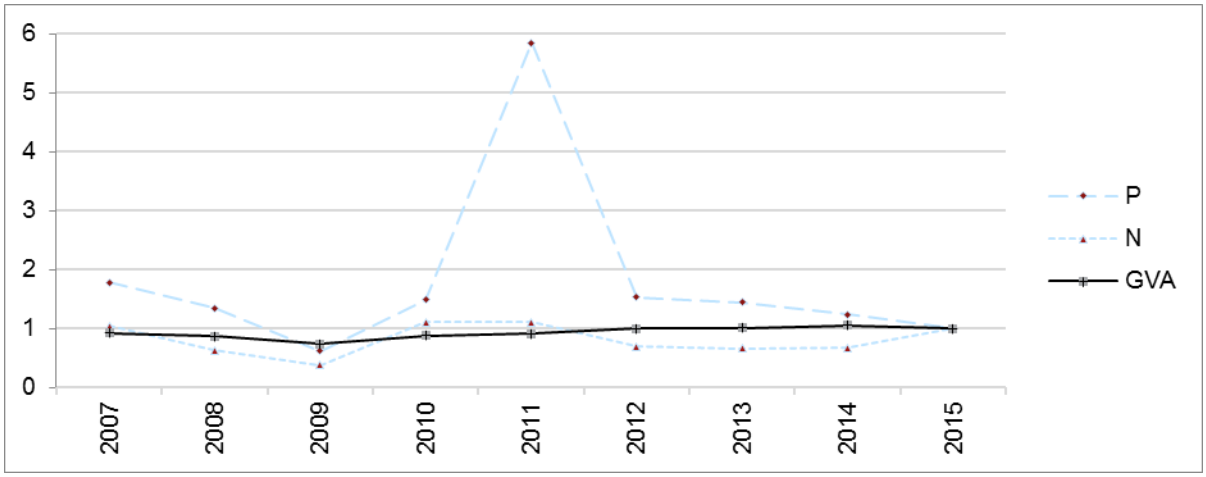
Notes: Only total P and total N and heavy metal emissions reported. Heavy metal emissions presented here in aggregate form by PNEC value. No emissions reported for total N, total P and heavy metals between 2007 and 2010. Values not plotted for these years to avoid misrepresenting trends. Heavy metals and total P removed from the second chart as outliers to make detail visible for total N.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

'Other activities'

Emissions to water from 'other activities' are reported for total N and total P. Between 2007 and 2015, emissions have decreased; although total N emissions have only decreased marginally subject to fluctuations between years. The main sector within 'other activities' emitting these pollutants is the food and drink sector, with the pulp, paper and wood-based product industry and intensive rearing of poultry or pigs emitting a small fraction of the emissions presented here.

Figure 34: Indexed emissions to water from 'other activities' (indexed to 2015=1)



Notes: Only total P and total N reported.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b), Eurostat (2017a)

Limitations

Limited emissions to water are reported by Latvia to the E-PRTR. A national dataset was used instead, without any reporting thresholds. The national dataset is presented using NACE reporting and at an appropriate level of NACE classification to map adequately to the industrial sectors included in this profile. The national dataset has the same time series as the E-PRTR dataset (2007 – 2015) but the scope of pollutants reported is reduced with data only reported for total N, total P and heavy metals. It is understood that the reduced scope of pollutants is owing to the limited pollutants emitted (State Enterprise Latvia Environment, Geology and Meteorology Centre, 2017b).

Table 10: Gaps in emissions to water data for Latvia

Missing data	Description	Conclusion and actions taken
Limited pollutant coverage	No data reported for TOC, PCBs, PCDD/F, AOX, diuron and cyanides.	No analysis included for these pollutants. Unclear if it is not emitted or not reported.
Limited time series	Reduced time series.	No action

Additional data for emissions to water

Additional data reported to the PRTR for emissions to water are presented in Table 11 – including for pollutants with no time series.

Table 11: Emissions to water by pollutant and industrial sector (all available data) (kg)

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy - power									
P	0.55	0.38	0.68	0.12	0.10	0.46	0.70	0.87	0.03
N	3.59	10.59	15.58	0.29	0.22	4.93	7.30	9.22	0.66
Metals: iron and steel									
Total HM	0.001	0.0004	0.0004	0.001	0.0001	-	-	-	-
P	0.01	0.01	0.01	-	0.22	0.01	0.00	-	-
N	1.69	0.05	0.08	0.03	0.19	0.29	0.00	-	-
Metals: Non-ferrous									
P	-	-	0.0005	0.001	0.0008	0.0008	0.0005	0.0007	0.0004
N	-	-	0.003	0.013	0.008	0.008	0.004	0.005	0.003
Mineral: Cement, lime and magnesium oxide									
P	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.005
N	0.08	1.28	0.82	0.24	0.13	0.30	0.26	0.27	0.18
Mineral: Glass									
Total HM	0.0001	0.0003	0.0002	0.0003	0.0001	0.0002	0.0003	0.0001	0.003
P	0.38	0.67	0.34	0.80	0.39	0.47	1.12	0.57	0.73
N	2.63	1.66	1.45	1.63	1.99	1.87	2.54	6.00	4.09
Mineral: Other									
P	0.002	0.001	0.002	0.001	-	0.0002	0.0001	0.002	0.0003
N	0.01	0.01	0.004	0.004	0.04	0.004	0.002	0.002	0.004
Chemical									
Total HM	0.001	0.001	0.001	0.0003	0.0001	0.0004	0.0004	0.0005	0.001
P	2.74	5.88	5.18	1.07	0.49	0.33	0.71	0.59	1.09
N	6.64	59.20	90.07	19.66	8.45	7.77	8.31	9.78	8.04
Waste: hazardous									
Total HM	0.44	0.003	0.0005	0.001	0.001	0.000004	-	0.003	0.000007
P	0.02	0.06	0.10	0.08	0.003	0.004	0.001	0.01	0.01
N	2.66	9.54	7.89	9.00	0.62	0.18	0.37	0.28	0.36
Waste: non-hazardous									
Total HM	-	-	-	-	0.000001	0.0000002	0.000043	0.000003	0.000001
P	-	-	-	-	0.0001	0.000011	0.0001	0.000013	0.000003
N	-	-	-	-	0.002	0.0003	0.04	0.004	0.01
Other activities									
P	8.22	6.24	2.86	6.90	26.95	7.07	6.68	5.70	4.61
N	42.44	25.72	15.60	45.45	45.33	28.47	26.90	27.69	40.77

Notes: Industrial sectors and pollutants with no data reported across the timeseries have been removed.

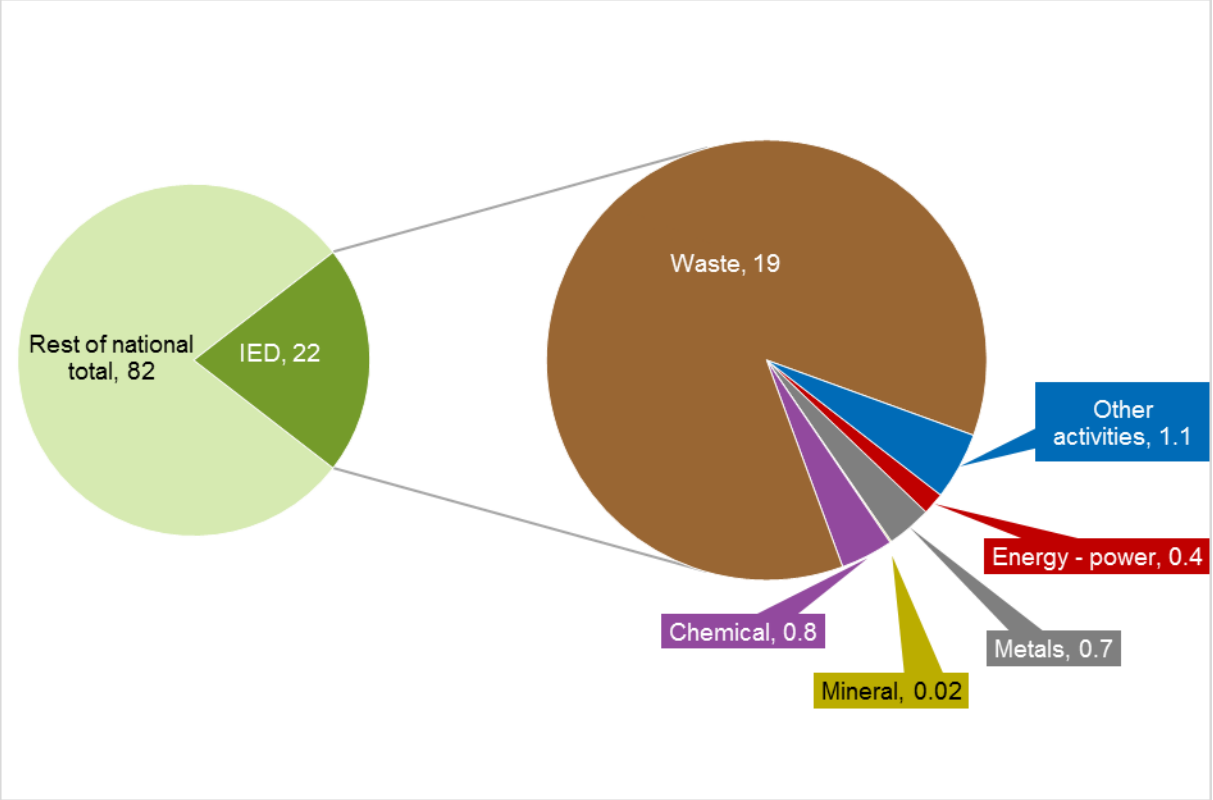
Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b),

5 Waste generated by industrial sectors

The data presented in this section is the generation of waste by waste category (hazardous and non-hazardous) (Eurostat, 2017e). Data is reported by Member States biennially.

Industrial sectors account for almost a quarter of total hazardous waste generated in Latvia (21% of the national total) (Figure 35). Of this, the waste management industrial sector generates the largest quantity (18% of national the national total and 86% of industry total). Although secondary waste, typical waste streams from this sector that require disposal include a mixture of ash, carbon and lime residue, bottom ash, leachate, bioaerosols and discards.

Figure 35: Hazardous waste generation by industrial sector in 2014 (kt)

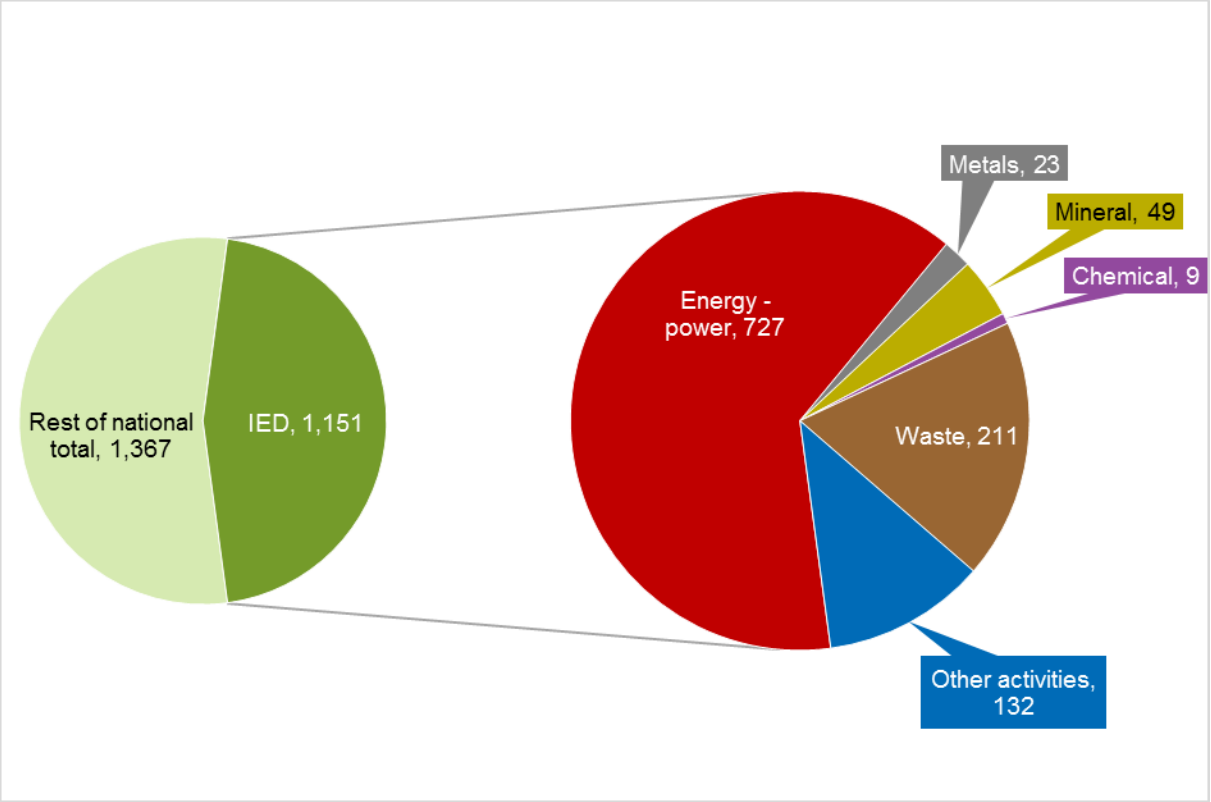


Note: Rest of national total relates to all NACE activities minus industrial sectors shown here.

Source: Eurostat (2017e)

The quantity of non-hazardous waste generated by industry in Latvia is greater compared to hazardous waste, and presents a greater share of the national total (46% of the national total) (Figure 36). The energy – power sector is reported as generating the majority of this non-hazardous waste (accounting for 63% of the industry total and 29% of the national total).

Figure 36: Non-hazardous waste generation by industrial sector in 2014 (kt)



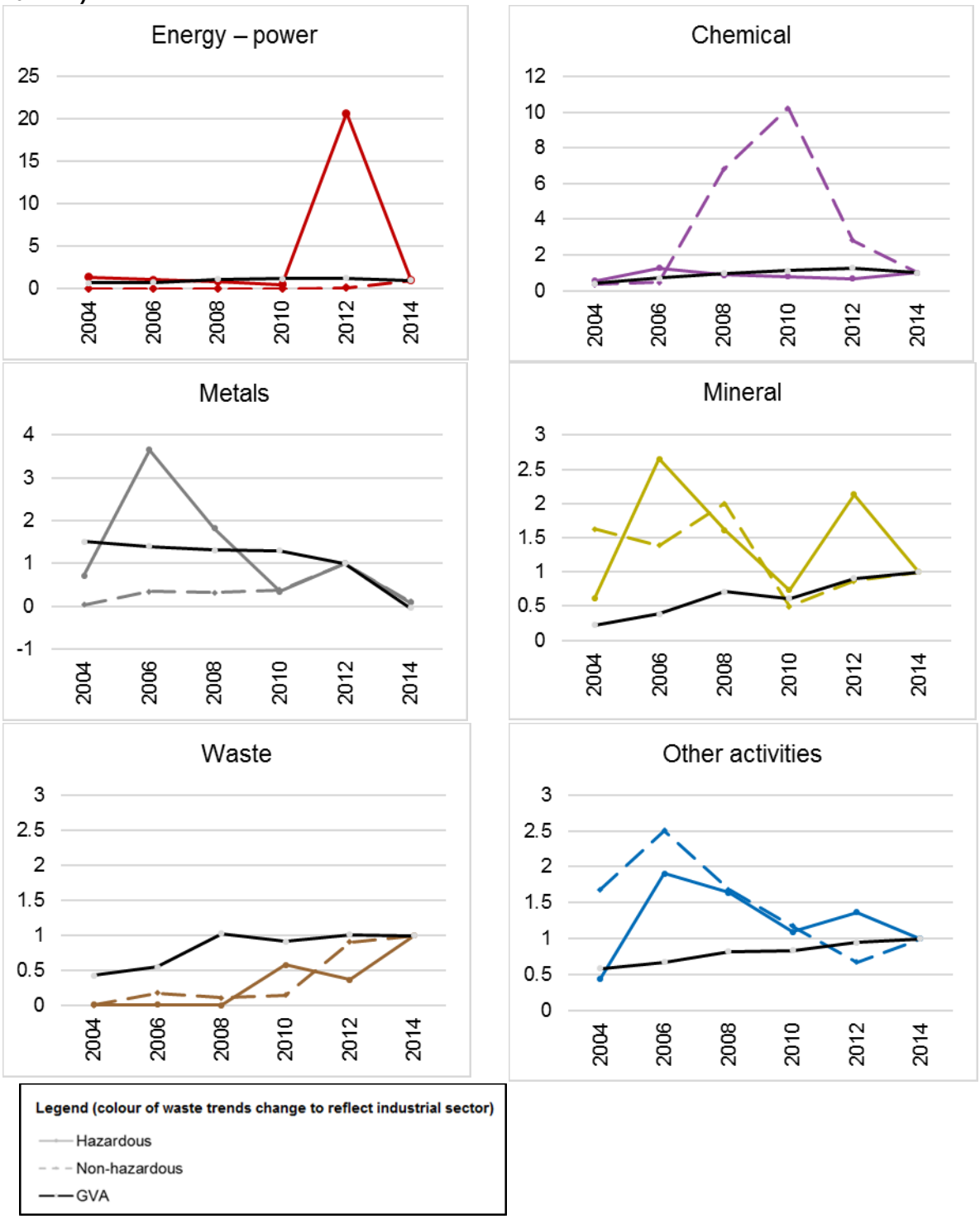
Source: Eurostat (2017e)

Between 2004 and 2014, the quantity of non-hazardous waste generated by the energy – power, the metal and the waste management sectors has increased slightly (subject to fluctuations in between this timeframe) (Figure 37). Although these trends are potentially challenging for Latvia, the general quantity of waste generated by Latvia in comparison to other EU Member States is low and appropriate plans and policy interventions are operating in the country to regulate waste (BiPRO, 2011).

Limitations

The use of NACE classifications for reporting has generally led to overreporting for waste generation data against each industrial sector and reporting is generally at IED sector level rather than by industrial sector. No data could be included within 'other activities' to reflect the IED activity intensive rearing of poultry or pigs as reporting was not at the appropriate level of NACE classification.

Figure 37: Hazardous and non-hazardous waste generation by industrial sector relative to GVA (indexed; 2014 = 1)



Note: Data for the metal sector are indexed to 2012 to account for the negative GVA reported between 2013 and 2015. No data is included in this profile for the energy – refining, gasification and liquefaction and coke sector as no IED installations are permitted for this sector in Latvia.
Source: Eurostat (2017e), Eurostat (2017a)

6 Challenges and Pressures

This section identifies the political and environmental challenges and pressures related to sectors or specific activities which are within the scope of the IED, and in particular whether the impact of these in a region or Member State is substantially above the EU average for that activity or sector. It is about the specific circumstances of the environmental impact of the industrial sectors or activities in that Member State which may have been indicated for example by public complaint, high profile media attention or political intervention or implementation of a specific national policy or which are evident from literature or analysis[1].

As shown in section 2, the industrial sectors comprise a relatively small share of the total GVA across all economic activities in Latvia (11%). The main industrial sector in Latvia, according to the number of IED installations reported, is intensive rearing of poultry or pigs, comprising 42% of total IED installations in 2015. This is followed by the energy - power sector (19%).

The quantitative analysis in section 4 shows that despite its significance in terms of the number of permitted installations, the emissions to air and water reported by intensive rearing of poultry or pigs and the energy – power sector are quite small (in terms of quantity of emissions); however for many pollutants it appears that emissions have increased over time, and at a faster rate than the GVA has grown which could present a challenge in future years if the trends continue.

The quantitative analysis does not incorporate odour emissions; however, it is flagged here as a particular challenge for Latvia in relation to several IED sectors (Table 12).

The quantitative analysis in this profile indicates that the quantity of non-hazardous waste generated by the energy – power, the metal and the waste management sectors has increased slightly between 2004 and 2014. Additional challenges are identified for waste management in relation to incineration (Table 12). Together, it could be inferred that increasing waste generated and its disposal is placing pressure on the waste management sector.

The challenges presented here were identified through desk based research and discussed with the national competent authority.

[1] The challenges and pressures included here do not concern the implementation of the IED.

Table 12: Key challenges identified in Latvia

Odour nuisance	LV-1
IED activities / sectors	6.6. Intensive rearing of poultry or pigs *6.4. (a) Slaughterhouses; (b) treatment and processing of raw materials for food or feed; (c) treatment and processing of milk* *5.3. (a) Disposal of non-hazardous waste; (b) Recovery, or mix of recovery and disposal, of non-hazardous waste*
Medium and pollutants	Emissions to air (odorous substances)
Description	In Latvia one of the most common public complains related to environmental issues is odour nuisance. A large number of cases is related to transhipment of oil products through the terminals (outside the scope of IED), however a significant number of complaints is regularly made accusing intensive pig rearing farms, as well as waste treatment facilities, of causing odour nuisance. Until recently this issue was particularly difficult to deal with for the responsible institutions, since there are no EU regulations and/or recommendation on management of odour nuisance and national legislation had its limitations. On 25.11.2014 the new national regulation on odour nuisance was enforced introducing a more strategic and systematic approach to odour management, however, the lack of EU level regulation on odour limitation and monitoring remains an issue.
Years applicable / current	This challenge has been important for a long period of time. According to the responsible institutions, the issue of odour nuisance has become less important over time in the case of IED animal rearing farms, as old farms have been renovated and modernised, implementing best available techniques (all farms complied with the regulations by 2010) and the new farms are built taking into consideration advanced technical solutions. Moreover, they note that control of operators outside IED scope, including smaller farms and oil products loading facilities, is much more challenging, since less strict requirements are applied to control of such operations.
Related infringement cases	No infringement cases at EU level are related to this challenge. At national level several infringement cases could be identified in the past, however none are ongoing or recent.
Public complaints	Public complaints about odour nuisance are received by the responsible institutions on a regular basis. For instance, according to the publicly available information in the first half of 2016 State Environmental Service received 266 complaints related to odour nuisance, 21 of which were recognised as justified. 66 official protocols on odour nuisance were prepared by the environmental inspectors of the State Environmental Service (source: http://www.delfi.lv/news/national/politics/valsts-vides-dienests-lidz-junijam-izskatijis-266-iesniegumus-par-smakam.d?id=47601659). Moreover, registration of complaints about odour nuisance is now a key element of the odour management system introduced under the Regulation No. 724, adopted on 25 November 2014 "Regulations Regarding the Methods for Determination of the Odours Caused by Polluting Activity, as well as the Procedures for Restricting the Spread of such Odours"
Media Attention	Odour nuisance is one of the most common topics for public concern and media intervention in the field of environmental

	protection in Latvia. There are numerous examples (LSM.LV 2016a; 2016b; 2016c; 2016d; 2016e; 2016f).
Political interventions	New national regulations of odour and other relevant amendments on national and local level were developed and implemented (see below).
Policies implemented to address challenge	New regulation was introduced in 2014 to improve controlling and monitoring the odour concentration levels; Regulation No. 724 (2014) "Regulations Regarding the Methods for Determination of the Odours Caused by Polluting Activity, and the Procedures for Restricting the Spread of such Odours". Together these policies presented a more strategic and coherent approach to management of odour. The key elements of the new regulation are: • New odour target value; • Requirement for dispersion modelling for relevant operators as part of environmental permit; • Explicitly stating the methods for evaluation (testing) of the odour concentration; • Introducing the concept of odour nuisance which is not directly related to the concentration levels'; According to the feedback received from the responsible institutions, the new regulation is a significant improvement in terms of legal regulation of odour nuisance as it provides a more transparent and flexible system of odour management for public, operator and responsible institutions. In addition, Regulation No. 240 (Adopted 30 April 2013) "General Regulations for the Planning, Use and Building of the Territory" include the article aimed at limitation of odour nuisance from large pig rearing farms.
Related policies	MARPOL convention (installation of vapour recovery units), Directive 1994/63/EC (VOC (and consequently) odour emission control from storage and loading of petrol), Gothenburg Protocol (limit values for VOC emissions from the storage and distribution of petrol, excluding the loading of seagoing ships).

Air pollution caused by hazardous waste incineration/ co-incineration	LV-2
IED activities / sectors	5.2. Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants
Medium and pollutants	Emissions to air (dust, heavy metals and other pollutants)
Description	There are three operators dealing with incineration/co-incineration of hazardous waste or regeneration of waste harmful for the environment in Latvia. Two of them are currently the focus for relatively high media coverage and public complaints. The first case is a co-incineration plant in Saldus that planned incineration of hazardous waste, where the main issue in the view of the local citizens is related to control of compliance with the emission limit values. Second case is an operator in Ozolnieki working on setting up a pyrolysis equipment for regeneration of used tyres and other types of hazardous waste, where the main issue is related to inability of the operator to prove the ability of the equipment to meet the emission levels declared. In both cases the main public concern is related to the general public fear associated with hazardous substances including hazardous waste, disbelief in the trustworthiness of the operators as well as the capacities of the responsible institutions to ensure the compliance of the operators with the strict environmental requirements and the potential environmental pollution and health impact on nearby citizens and insufficient evaluation of monitoring results. However, as noted by the responsible institutions the negative attitude of the public can be partially attributed to the lack of information and the resulting fear from operations related to hazardous substances, general unwillingness to accept industrial activities in the proximity of their properties, as well as public activity associated with upcoming local elections. This highlights the need for more constructive dialogue between the local municipalities, environmental institutions, operators and citizens. Consequently, the responsible institutions do not necessarily see these cases as a significant challenge, despite its substantial impact of the local level and high media coverage.
Years applicable / current	Current, past 2-4 years
Related infringement cases	No infringement cases at EU level; at present members of public have challenged the permit issued by the responsible institutions (five individual complaints have been received and were combined into one case) to Saldus co-incineration plant and the decision regarding this case will potentially be taken by court (the complaint is being reviewed by the responsible institution and a decision has to be made by June 7, 2017).
Public complaints	Numerous public complaints were received by the responsible institutions including those made in the framework of EIA process. See references for examples.
Media Attention	This issue does get regular media attention (e.g. LSM.LV 2015a; 2015b; 2016g)
Political interventions	None at this stage.
Policies implemented to address challenge	None at this stage.
Related policies	EIA Directive (85/337/EEC).

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Appendices

Appendix 1 Mapping industrial sectors across data sources for Latvia

Appendix 2 Emissions to air by pollutant and industrial sector (detail)

Appendix 3 Emissions to air by pollutant and industrial sector according to the national dataset (detail)

Appendix 1 -: Mapping industrial sectors across data sources for Latvia

Industrial sector †	**GVA**	**Employment**	**Energy consumption**	Water consumption	**Emissions to air**	**Emissions to water ^**	**Waste generated**
	Eurostat (2017a)	**Eurostat (2017b)**	**Eurostat (2017c)**	Eurostat (2017d)	**EEA (2017a)**	**State Enterprise Latvia Environment, Geology and Meteorology Centre (2017b)**	**Eurostat (2017e)**
Sector classification	*NACE Rev 2*	*NACE Rev 2*	*Energy balance indicator*	NACE Rev 2	*NFR14 sector classification*	*E-PRTR*	*NACE Rev 2*
Time series available	*2000-2015, annually*	*2008-2015, annually*	*2000-2015, annually*	2000-2015, annually	*2000-2015, annually*	*2007-2015, annually*	*2004-2014, every 2 years*
Energy: power	D (electricity, gas, steam and air conditioning supply)	D35 (electricity, gas, steam and air conditioning supply)	B_101301 - Own Use in Electricity, CHP and Heat Plants	D (electricity, gas, steam and air conditioning supply)	1A1a Public electricity and heat production; 1A2a-f Stationary combustion in manufacturing industries and construction	D35 (electricity, gas, steam and air conditioning supply)	D (electricity, gas, steam and air conditioning supply)
Metals: iron and steel	C24 (basic metals)	C24 (basic metals)	B_101315 - Blast Furnaces B_101805 - Iron and Steel	C24 (basic metals)	2C1 Iron and steel	24.1 (basic iron and steel and of ferro-alloys)	C24-C25 (basic metals; fabricated metal products, except machinery and equipment)
Metals: non-ferrous			B_101810 - Non-Ferrous Metals		2C2-7 Non-ferrous metals	24.42 (aluminium)	
Mineral: Cement, lime and magnesium oxide	C23 (non-metallic mineral products)	C23 (non-metallic mineral products)	B_101820 - Non-Metallic Minerals	*Insufficient granularity in reported data*	2A1 Cement; 2A2 Lime	23.51 (cement)	C23 (non-metallic mineral products)
Mineral: Glass					2A3 Glass	23.13 (dental glass); 23.14 (glass fibres)	
Mineral: Other					2A6 Other	23.32 (bricks, tiles and construction products, in baked clay); 23.41 (ceramics); 23.99 (other)	
Chemical	C20 (chemicals); C21 (pharmaceutical products)	C20 (chemicals); C21 (pharmaceutical products)	B_101815 - Chemical and Petrochemical	DATASETS COMBINED: C20 (chemicals) and C21 (pharmaceutical products) AND C19 (coke and refined petroleum products)	2B1 Ammonia; 2B6 Titanium dioxide; 2B2 Nitric acid; 2B7 Soda ash; 2B3 Adipic acid; 2B10a Other; 2B5 Carbide; 2J Production of POPs	20.14 (organic basic chemicals); 21.2 (pharmaceuticals)	C20-C22 (chemicals; pharmaceuticals; rubber and plastic products)
Waste: hazardous	E37-E39 (water supply; sewerage, waste management and remediation)	E38 (waste collection, treatment and disposal activities; materials recovery)	*Unavailable*	*Insufficient granularity in reported data*	5C1bi Industrial waste incineration 5C1biv Sewage sludge incineration 5C1bii Hazardous waste incineration 5C1bvi Other waste incineration 5C1biii Clinical waste incineration	38.22 (treatment and placement of hazardous waste)	E37-E39 (water supply; sewerage, waste management and remediation)
Waste: non-hazardous			B_101318 - Gasification plants for biogas	*Insufficient granularity in reported data*	5A Solid waste disposal on land; 5C1a Municipal waste incineration; 5B1 Composting; 5C1bv Cremation; B2 Anaerobic digestion at biogas facilities; 5D2 Industrial wastewater handling	38.21 (waste treatment and disposal, except hazardous waste)	
Other: **Pulp, paper and wood-based products**	C16-17 (paper, paper products and wood-based products)	C16-17 (paper, paper products and wood-based products)	B_101840 - Paper, Pulp and Print	DATASETS COMBINED: C10-12 (food and drinks and tobacco); C13-15 (textiles; wearing apparel; leather); C16-17 (paper and wood products)	C16-17 (paper, paper products and wood-based products)	16.1 (sawing, planing and impregnation);17.12 (paper and paperboard)	C16-C18 (paper, paper products and wood-based products; printing)
Food and drink products	C10-C12 (food and drinks and tobacco)	C10 (food products); C11 (drink products)	B_101830 - Food and Tobacco		2H Food and beverages industry	10.11-10.13 Processing and preserving meat; 10.2 Processing and preserving of fish, crustaceans and molluscs; 10.32 Manufacture of fruit and vegetable juice; 10.39 Other processing and preserving of fruit and vegetables)	C10-C12 (food products; drink products; tobacco)
Intensive rearing of poultry and pigs	*Unavailable*	*Unavailable*	*Unavailable*	*Insufficient granularity in reported data*	3B3 Manure management – Swine; 3B4gi Manure management - Laying hens; 3B4gii Manure management - Broilers	*01.46 Pig farming; 01.47 Poultry farming*	*Unavailable*
Surface treatment	*Unavailable*	*Unavailable*	*Unavailable*	*Insufficient granularity in reported data*	2D3d Coating applications; 2D3e Degreasing; 2D3f Dry cleaning; 2D3g Chemical products; 2D3h Printing; 2D3i Other solvent use; 2G Other product use; 2H3 Other industrial processes	*Unavailable*	*Unavailable*
Rest of national total	*All NACE activities*	*All NACE activities*	*B_100900 – Gross inland consumption*	*All NACE activities*	National total for the entire territory (based on fuel sold)	*National total for all E-PRTR activities reported*	*All NACE activities plus households*

Notes: † Number of IED installations is reported against IED activities for years 2011, 2013 and 2015. All indicators for the energy – refining, gasification and liquefaction and coke sector are removed from the above table as no IED installations are permitted for this sector in Latvia. Sector mappings not shown for textiles (6.2), and tanning (6.3) as there are no IED installations for these sectors reported in Latvia .

Appendix 2 - Emissions to air by pollutant and industrial sector (detail)

Note: Emissions rounded to two decimal places unless data is less. Industrial sectors and pollutants with no data reported across the timeseries have been removed.

Source: EEA (2017a)

Pollutant	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy - power																	
SO_x	kt	10.70	7.35	6.92	5.41	3.29	2.75	2.23	2.34	1.72	1.38	1.17	0.85	0.93	0.79	0.73	0.69
NO_x	kt	7.77	6.88	6.78	6.76	6.21	5.93	6.21	5.70	5.42	4.92	5.65	4.52	4.42	4.72	4.37	4.54
$PM_{2.5}$	kt	0.78	0.82	0.89	0.94	0.93	0.94	1.03	1.06	1.00	0.87	0.90	0.80	0.99	1.40	1.66	1.75
NMVOC	kt	0.65	0.78	0.83	0.80	0.85	0.91	0.88	0.87	0.77	0.64	0.59	0.47	0.57	0.52	0.51	0.43
NH_3	kt	0.020	0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.018
Cd (HM)	t	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03
As (HM)	t	0.09	0.08	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.10	0.11	0.12
Cr (HM)	t	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.07	0.07	0.06	0.08	0.11	0.12	0.12
Cu (HM)	t	0.11	0.12	0.12	0.13	0.12	0.12	0.14	0.15	0.14	0.12	0.12	0.11	0.14	0.21	0.25	0.26
Pb (HM)	t	0.17	0.18	0.19	0.19	0.18	0.25	0.31	0.39	0.39	0.23	0.17	0.16	0.20	0.24	0.28	0.28
Hg (HM)	t	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03
Ni (HM)	t	1.42	1.20	1.20	0.90	0.79	0.61	0.40	0.39	0.26	0.34	0.26	0.22	0.19	0.17	0.17	0.18
Zn (HM)	t	1.55	1.66	1.76	1.73	1.75	1.80	1.82	1.87	1.68	1.53	1.47	1.31	1.64	2.13	2.47	2.51
PCDD/F	g	2.06	3.64	4.82	4.27	4.58	2.86	2.22	1.95	1.80	0.75	0.42	0.39	0.48	0.60	0.70	0.70

Pollutant	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Metals: iron and steel																	
SO_x	kt	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.08	0.07	0.09	0.01	0.05	0.01	0.00	0.00
NO_x	kt	2.55	2.56	2.59	2.79	2.84	2.83	2.83	2.85	2.71	2.25	2.73	0.02	0.11	0.03	0.00	0.00
$PM_{2.5}$	kt	0.30	0.30	0.30	0.33	0.33	0.33	0.33	0.33	0.32	0.26	0.32	0.00	0.02	0.00	0.00	0.00
NMVOC	kt	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.00	0.00
Cd (HM)	t	0.40	0.40	0.41	0.44	0.45	0.44	0.44	0.45	0.42	0.35	0.43	0.03	0.17	0.04	0.00	0.00
As (HM)	t	15.01	15.07	15.22	16.42	16.71	16.63	16.64	16.74	15.91	13.21	16.06	0.00	0.01	0.00	0.00	0.00
Cr (HM)	t	1.15	1.16	1.17	1.26	1.28	1.27	1.28	1.28	1.22	1.01	1.23	0.02	0.08	0.02	0.00	0.00
Cu (HM)	t	0.15	0.15	0.15	0.16	0.17	0.17	0.17	0.17	0.16	0.13	0.16	0.00	0.02	0.00	0.00	0.00
Pb (HM)	t	150.09	150.68	152.16	164.20	167.09	166.30	166.36	167.45	159.14	132.14	160.59	0.44	2.17	0.50	0.00	0.03
Hg (HM)	t	-	-	-	-	-	-	-	-	-	-	-	0.01	0.04	0.01	0.00	0.00
Ni (HM)	t	5.00	5.02	5.07	5.47	5.57	5.54	5.55	5.58	5.30	4.40	5.35	0.12	0.59	0.14	0.00	0.01
Zn (HM)	t	4.05	4.07	4.11	4.43	4.51	4.49	4.49	4.52	4.30	3.57	4.34	0.60	3.01	0.70	0.00	0.04
PCDD/F	g	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mineral: Cement, lime and magnesium oxide																	
SO_x	kt	0.85	1.04	1.13	1.23	1.33	1.35	1.69	1.73	1.71	1.74	0.07	0.37	0.39	0.17	0.15	0.19
NO_x	kt	0.23	0.27	0.30	0.33	0.35	0.36	0.45	0.46	0.45	0.55	0.49	1.02	1.52	1.54	1.80	1.864
$PM_{2.5}$	kt	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.02	0.02	0.00	0.00	0.02	0.03	0.02
NMVOC	kt	0.04	0.05	0.05	0.06	0.06	0.06	0.08	0.08	0.08	0.03	0.01	0.01	0.01	0.01	0.01	0.01
Hg (HM)	t	-	-	-	-	-	-	-	-	-	-	0.01	0.00	0.06	0.02	0.00	0.01

Pollutant	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mineral: Glass																	
SO_x	kt	-	-	-	-	-	-	-	0.04	0.04	0.03	0.04	0.04	0.06	0.06	0.06	0.00
NO_x	kt	-	-	-	-	-	-	-	0.10	0.10	0.07	0.09	0.08	0.07	0.10	0.10	0.00
$PM_{2.5}$	kt	0.002	0.01	0.01	0.01	0.01	0.01	0.004	-	-	-	-	-	-	-	-	-
NMVOC	kt	0.003	0.01	0.01	0.01	0.01	0.01	0.005	0.01	0.01	0.01	0.01	0.02	0.002	0.003	0.01	0.00
NH_3	kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cd (HM)	t	0.001	0.004	0.004	0.003	0.004	0.003	0.002	-	-	-	-	-	-	-	-	-
As (HM)	t	0.001	0.005	0.006	0.005	0.005	0.004	0.003	-	-	-	-	-	-	-	-	-
Cr (HM)	t	0.002	0.006	0.007	0.006	0.007	0.005	0.004	-	-	-	-	-	-	-	-	-
Cu (HM)	t	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	-	-	-	-	-	-	-	-	-
Pb (HM)	t	0.01	0.05	0.05	0.04	0.05	0.04	0.03	-	-	-	-	-	-	-	-	-
Hg (HM)	t	0.00002	0.00008	0.00009	0.00007	0.00009	0.00007	0.00005	-	-	-	-	-	-	-	-	-
Ni (HM)	t	0.004	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-
Zn (HM)	t	0.003	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-
Waste: hazardous																	
SO_x	t	0.06	0.18	0.03	0.03	0.07	0.07	0.18	0.21	0.02	0.02	0.02	0.01	0.01	0.00	0.01	0.01
NO_x	t	0.73	1.64	0.22	0.27	0.44	0.42	1.29	1.28	0.29	0.20	0.20	0.03	0.04	0.01	0.17	0.04
$PM_{2.5}$	t	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	-
NMVOC	t	5.15	9.91	1.25	1.52	1.63	1.66	6.00	4.25	2.23	1.49	1.49	0.06	0.01	0.00	1.24	0.01
Cd (HM)	kg	0.52	1.84	0.27	0.35	0.92	0.84	2.17	2.86	0.13	0.11	0.12	0.10	0.14	0.05	0.10	0.15
As (HM)	kg	0.02	0.06	0.01	0.01	0.03	0.02	0.06	0.08	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Cr (HM)	kg	0.11	0.43	0.06	0.08	0.22	0.20	0.52	0.70	0.02	0.02	0.03	0.03	0.04	0.01	0.02	0.04
Cu (HM)	kg	5.53	20.90	3.16	3.98	11.01	10.01	25.67	34.38	1.21	1.14	1.26	1.25	1.77	0.58	1.01	1.81
Pb (HM)	kg	4.39	14.94	2.21	2.78	7.24	6.61	17.26	22.46	1.16	0.98	1.06	0.80	1.12	0.36	0.86	1.15
Hg (HM)	kg	2.46	9.25	1.40	1.76	4.84	4.40	11.31	15.12	0.55	0.51	0.56	0.55	0.78	0.25	0.45	0.80
Ni (HM)	kg	0.21	0.61	0.09	0.11	0.25	0.23	0.63	0.78	0.07	0.05	0.05	0.03	0.04	0.01	0.04	0.04
PCDD/F	g	2.50	8.99	1.35	1.69	4.57	4.16	10.75	14.22	0.60	0.54	0.58	0.51	0.72	0.24	0.47	0.74

Pollutant	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Waste: non-hazardous																	
SO_x	t	0.13	0.15	0.15	0.16	0.16	0.17	0.18	0.22	0.25	0.22	0.24	0.24	0.22	0.24	0.23	0.27
NO_x	t	0.93	1.07	1.07	1.15	1.15	1.26	1.34	1.62	1.84	1.63	1.73	1.78	1.63	1.77	1.65	1.98
$PM_{2.5}$	t	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.10	0.09	0.09	0.29	0.27	0.35	0.26	0.20
NMVOC	kt	0.94	0.96	1.03	0.90	0.99	0.95	1.05	1.21	1.10	0.99	0.94	0.86	0.83	0.83	0.79	0.79
NH_3	kt	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07
Cd (HM)	kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
As (HM)	kg	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Cr (HM)	kg	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Cu (HM)	kg	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.03
Pb (HM)	kg	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.07	0.07
Hg (HM)	kg	1.68	1.93	1.93	2.07	2.07	2.28	2.43	2.92	3.32	2.95	3.13	3.22	2.94	3.20	3.31	3.57
Ni (HM)	kg	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.03	0.04	0.04	0.03	0.04	0.04	0.04
Zn (HM)	kg	0.18	0.21	0.21	0.22	0.22	0.24	0.26	0.31	0.36	0.32	0.34	0.35	0.32	0.34	0.36	0.38
PCDD/F	mg	0.03	0.04	0.03	0.04	0.04	0.04	0.04	0.05	0.06	0.05	0.06	0.06	0.05	0.06	0.06	0.06
Other activities																	
SO_x	t	0.63	0.67	0.55	0.90	0.71	1.00	1.57	2.29	1.04	0.28	0.42	0.49	0.66	0.59	0.61	0.41
NO_x	kt	0.06	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
$PM_{2.5}$	kt	0.07	0.07	0.07	0.07	0.09	0.06	0.02	0.01	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06
NMVOC	kt	10.77	10.69	10.91	10.79	10.64	10.67	10.54	9.75	8.22	8.38	10.12	9.43	10.69	11.02	10.60	11.50
NH_3	kt	2.87	2.96	3.11	2.95	2.91	2.87	2.83	2.80	2.56	2.55	2.66	2.49	2.46	2.52	2.39	2.29
Cd (HM)	t	0.01	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
As (HM)	kg	0.28	0.30	0.24	0.40	0.31	0.44	0.69	1.01	0.46	0.12	0.19	0.22	0.29	0.26	0.27	0.18
Cr (HM)	kg	3.28	3.47	2.83	4.67	3.68	5.16	8.10	11.81	5.35	1.44	2.19	2.53	3.42	3.06	3.15	2.12
Cu (HM)	t	0.10	0.11	0.09	0.14	0.12	0.16	0.23	0.34	0.17	0.05	0.07	0.08	0.11	0.10	0.10	0.07
Pb (HM)	t	0.16	0.17	0.14	0.23	0.18	0.26	0.41	0.59	0.27	0.07	0.11	0.13	0.17	0.15	0.16	0.11
Hg (HM)	kg	0.01	0.01	0.01	0.02	0.01	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Ni (HM)	t	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zn (HM)	t	0.06	0.06	0.05	0.08	0.07	0.09	0.14	0.20	0.10	0.03	0.04	0.05	0.06	0.06	0.06	0.04
PCDD/F	mg	0.21	0.21	0.21	0.21	0.30	0.17	0.02	0.01	0.24	0.20	0.18	0.16	0.18	0.16	0.17	0.17

Appendix 3 - Emissions to air by pollutant and industrial sector according to the national dataset (detail)

Note: Industrial sectors and pollutants with no data reported across the timeseries have been removed.

Source: State Enterprise Latvia Environment, Geology and Meteorology Centre (2017a)

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy - power												
SO2	t	6,561	3,664	3,734	2,229	2,236	2,322	1,030	1,041	731	626	562
NOx	t	6,528	7,181	2,498	1,609	1,953	1,833	2,230	2,214	2,340	2,547	2,747
PM10	t	133	173	293	190	183	228	3,772	449	574	482	568
NMVOC	t	2	11	9	21	29	29	42	57	79	78	115
Cr (HM)	kg	470.49	2.00	68.02	64.01	26.04	36.11	804.28	1,068.21	1,088.11	1,128.14	854.18
Pb (HM)	kg	1.26	0.01	1.21	1.21	1.21	0.02	7.00	0.02	0.02	0.02	-
Metals												
SO2		3.06	42	55	53	126	125	1.09	10.09	0.22	0.03	0.76
NOx		7,014	6,459	6,557	4,891	0.07	5,088	0.12	0.01	0.02	-	1
PM10		18	55	170	69	550	738	33	63	29	0.61	0.71
NMVOC		-	-	-	-	0.17	0.71	0.92	0.02	0.21	0.28	1.79
Cr (HM)	kg	0.01	0.62	0.02	-	-	0.01	-	-	0.01	0.03	0.03
Pb (HM)	kg	-	-	0.00	-	-	-	-	-	-	-	-
Minerals												
SO2	t	189	166	173	183	164	365	1,261	1,341	687	645	580
NOx	t	774	1,185	1,183	1,244	1,021	1,777	3,055	4,560	4,621	5,389	5,597
PM10	t	80	41	24	18	15	16	72	82	122	130	121
NMVOC	t	6.42	0.77	0.30	-	0.01	-	-	0.30	0.10	-	1.11
Cd (HM)	kg	-	0.46	0.28	3.40	3.68	-	-	-	-	0.02	0.08
As (HM)	kg	604.00	940.00	-	-	-	-	-	-	-	1.04	0.64
Cr (HM)	kg	-	-	121.13	-	2.48	4.02	-	-	0.002	0.56	0.002
Cu (HM)	kg	-	-	-	-	134.30	-	-	-	-	0.94	1.47
Pb (HM)	kg	-	-	-	-	-	-	-	-	-	4.08	5.80
Ni (HM)	kg	-	-	-	-	-	-	-	-	-	0.80	1.19
Zn (HM)	kg	58.50	92.74	-	-	-	-	-	-	-	-	-
PCDD/F	g	-	-	-	-	-	-	0.062	0.006	-	-	0.0001

	Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Chemicals												
SO2		11.46	165.29	158.72	150.81	145.24	146.23	6.48	10.39	8.85	9.00	11.02
NOx		74.20	105.88	154.60	45.93	71.76	92.27	31.59	27.98	172.23	140.60	153.88
PM10		16.00	14.93	7.09	4.92	4.62	7.38	23.16	24.50	29.25	40.25	36.02
NMVOC		1.44	-	0.05	0.73	0.25	0.38	0.20	0.21	0.27	1.49	4.84
NH3		2.68	-	-	-	-	-	-	-	-	-	-
Waste management												
SO2	t	42.01	24.08	36.09	1.05	18.73	24.36	16.67	17.02	17.72	4.76	9.18
NOx	t	66.84	54.43	49.09	67.83	65.22	76.15	11.76	49.98	116.20	136.57	105.25
PM10	t	8.27	6.48	5.97	7.21	9.38	14.11	5.44	16.12	15.75	9.13	13.87
NMVOC	t	-	1.36	0.21	-	0.29	30.75	30.89	30.89	43.90	42.72	46.05
Cr (HM)	kg	0.04	1.16	0.08	-	-	-	0.01	-	-	-	-
Pb (HM)	kg	-	0.001	-	-	-	-	-	-	-	-	-
Ni (HM)	kg	0.02	-	-	-	-	-	-	-	-	-	-
Other activities												
SO2	t	1,338.73	1,097.60	449.93	315.52	202.94	959.14	313.64	335.38	234.63	212.28	113.90
NOx	t	1,164.71	3,673.27	806.85	498.40	503.55	684.83	775.30	727.58	583.09	737.63	848.99
PM10	t	552.64	1,024.06	848.87	610.17	941.25	777.45	742.47	1,198.25	1,182.46	1,252.87	1,251.88
NMVOC	t	6.55	23.80	53.52	306.40	449.90	516.91	458.47	528.19	712.64	714.75	721.09
As (HM)	kg	0.06	150.06	0.03	-	-	-	-	-	-	-	-
Cr (HM)	kg	6.56	6.46	5.05	3.44	29.60	3.58	3.58	29.62	26.19	8.84	3.60
Pb (HM)	kg	-	0.001	-	-	-	-	-	-	-	-	-

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