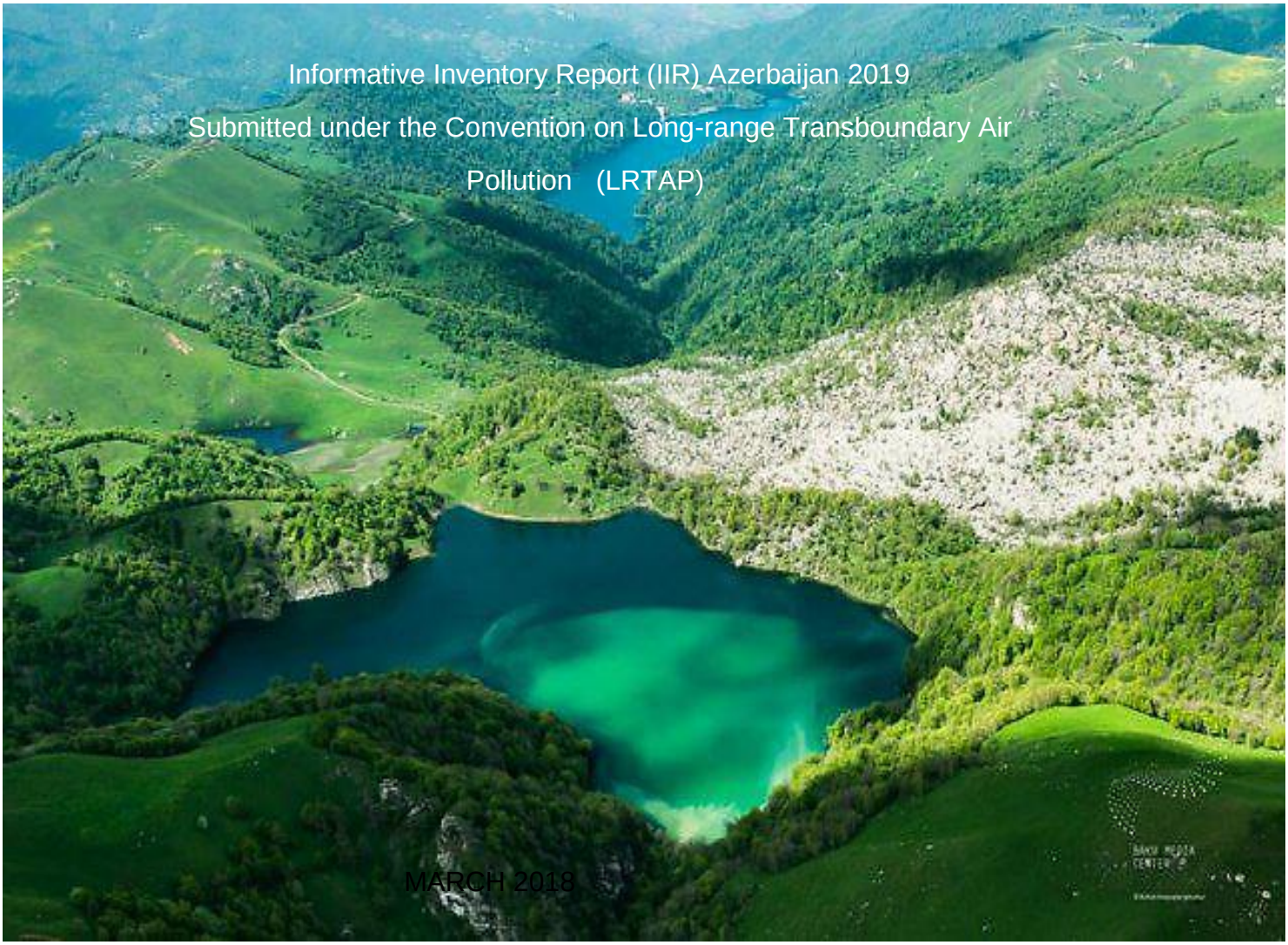

THE MINISTRY OF ECOLOGY AND NATURAL RESOURCES

INFORMATIVE INVENTORY REPORT AZERBAIJAN 2019

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ACRONYMS

MENR - Ministry of Ecology and Natural Resources

MH – Ministry of Health

MTCT - Ministry of Transport, Communications and High Technologies

MES – Ministry of Emergency Situations SCPI – State Committee on Property Issues

MA – Ministry of Agriculture

AAWF JSC – Azerbaijan Irrigation and Water Management Joint Stock Company

SOCAR – State Oil Company of Azerbaijan Republic

MEc – Ministry of Economics

ME – Ministry of Energy

EMEP - The European Monitoring and Evaluation Programme

EEA - European Environment Agency

IPCC - Intergovernmental Panel on Climate Change

CLRTAP - Convention on Long-Range Transboundary Air Pollution

CO - Carbon monoxide

IIR - Informative Inventory Report

NFR - Nomenclature for reporting (IPCC code of categories)

NH3 - Ammonia

NMVOC - Non-methane volatile organic compounds

NOx - Nitrogen oxides

PAH - polycyclic aromatic hydrocarbons; comprises Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene and Indeno(1,2,3-cd)pyrene PCDDs - Polychlorinated Dibenzo-p-dioxins

PCDFs - Dibenzofurans

PM10 - particulate matter; particles on the order of ~10 micrometers or less PM2.5 - particulate matter; particles on the order of ~ 2.5 micrometers or less POPs - persistent organic pollutants

QA/QC - Quality assurance/quality control:

SOx - Sulfur oxide

UNECE - United Nations Economic Commission for Europe

Content

Executive summary 6
i. National circumstances 8
i.1 Geographical position and physical/geographical characteristics 8
i.2 Population 8
i.3 Political profile 8
i.4 Economic profile 8
i.5 Inter-institutional cooperation 9
i.6 Air quality monitoring 10
1. Introduction
1.1 National inventory background 11
1.2 Institutional arrangements 12
1.3 Inventory preparation process 13
1.4 Methods and data sources 13
1.5 Key categories 14
1.5.1 Level assessment 14
1.6 QA/QC and verification methods 15
1.7 General assessment of completeness 15
1.7.1 List of notation keys 15
1.7.2 Sources not estimated 16
1.7.3 Sources included elsewhere 17
2. Explanation of key trends 17
3. Energy (NFR sector 1) 19
3.1 Energy industries (1A1) 20
4. Manufacturing industries and construction (1A2) 23
5. Transport (1A3) 41
6. Small combustion (1A4) and Non-road machinery (1a4 aii, bii, cii, ciii) 56
7. Fugitive emissions from fuel (1B) 74
+ each NFR subcategory
8. Industrial processes and product use (NFR sector 2) 82
Mineral products (2.A) 82
+ each NFR subcategory
9. Chemical industries (2.B) 94
10. Metal production (2.C) 97
+ each NFR subcategory
11. Other (2.D - 2.L) 107
+ each NFR subcategory

12. Agriculture (NFR sector 3) 118
+ each NFR subcategory
13. Waste (NFR sector 5) 152
+ each NFR subcategory
14. Recalculations and Improvements 162
14.1 Recalculations 162
14.2 Planned improvements 175
15. References 176

Executive Summary

The current report is the descriptive report that accompanies the Azerbaijan emission inventory of air pollutants submitted on 15 February 2019 under the Convention on Long-Range Transboundary Air Pollution (CLRTAP) of the United Nations Economic Commission for Europe (UNECE).

The IIR provides background information on institutional arrangements for inventory preparation, methodologies, data sources, emission factors used, QA/QC activities, key source analyses, trend analyses and improvement plans. Furthermore, for each sector, more detailed information is given on the methodologies and assumptions made for calculations of emissions. The report has been prepared by the inventory group at the MENR.

The emission data presented in this report were compiled according to the recommendations of the Guidelines for Estimating and Reporting Emission Data under CLRTAP (ECE/EB.AIR/97) revised in 2014 (ECE/EB.AIR/125). For the reporting, the new NFR14 templates provided by the EMEP Centre on Emission Inventories and Projections were used. The report contains emissions from 1990 to 2017.

The report includes emission data for 1990-2017 on the main pollutants (NOx, SOx, NMVOC, NH_3, CO), particulate matter ($PM_{2,5}$, PM_{10} and TSP), heavy metals (Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn) and persistent organic pollutants (POPs – PCDD/PCDF, PAHs, HCB, PCB) in the following sectors: Energy, Industrial processes and Product use, Agriculture and Waste. Azerbaijan reported also the black carbon emissions.

In comparison with the previous year data for new sources were obtained and recalculated in order to have all the categories calculated with the same method. Calculation method used for some categories were changed.

The emissions, distinguished on categories, show the following trends:

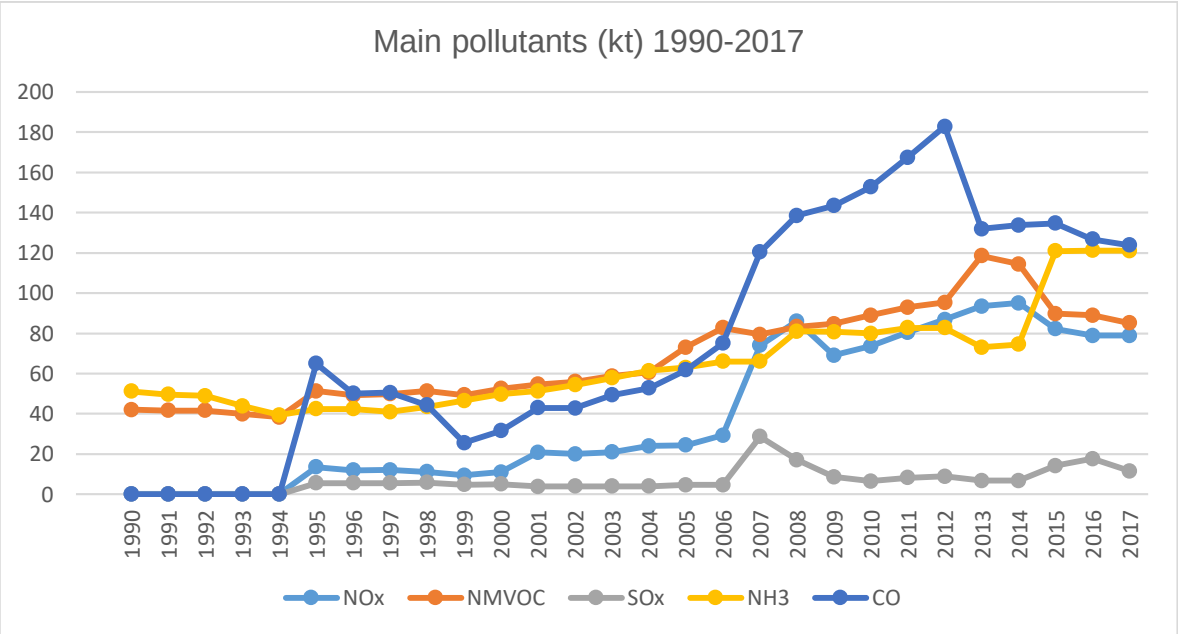


Figure 1.0 Trends of main pollutants

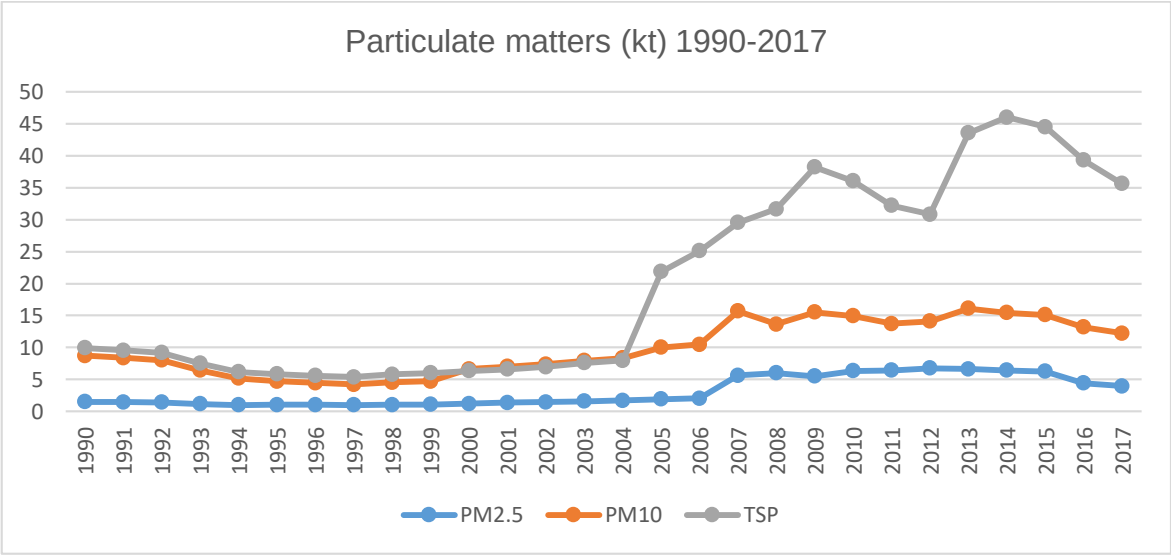


Figure 1.1 Trends of particulate matters

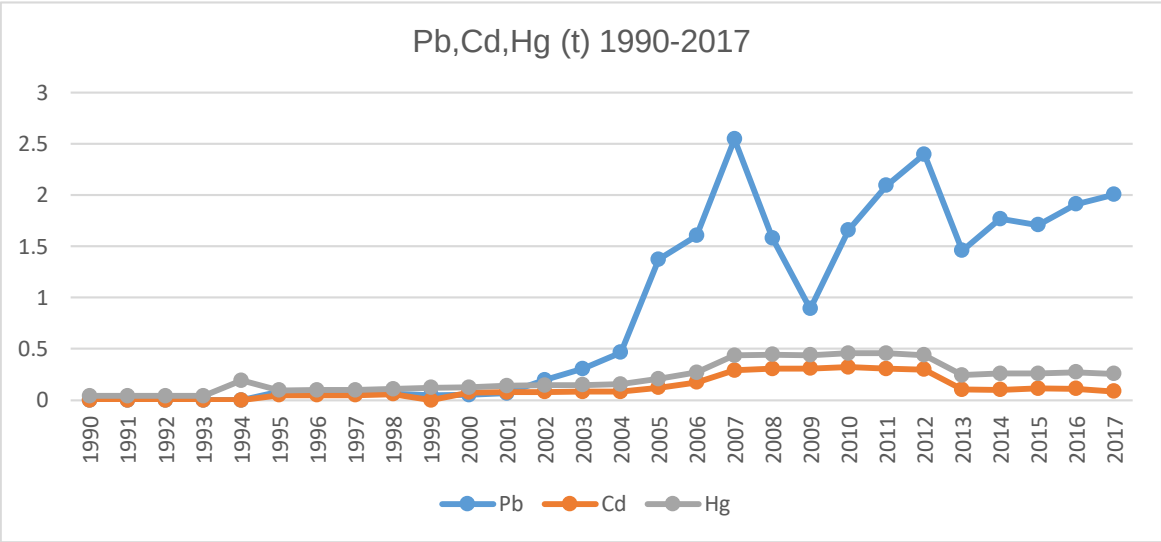


Figure 1.2 Trends of priority heavy metals

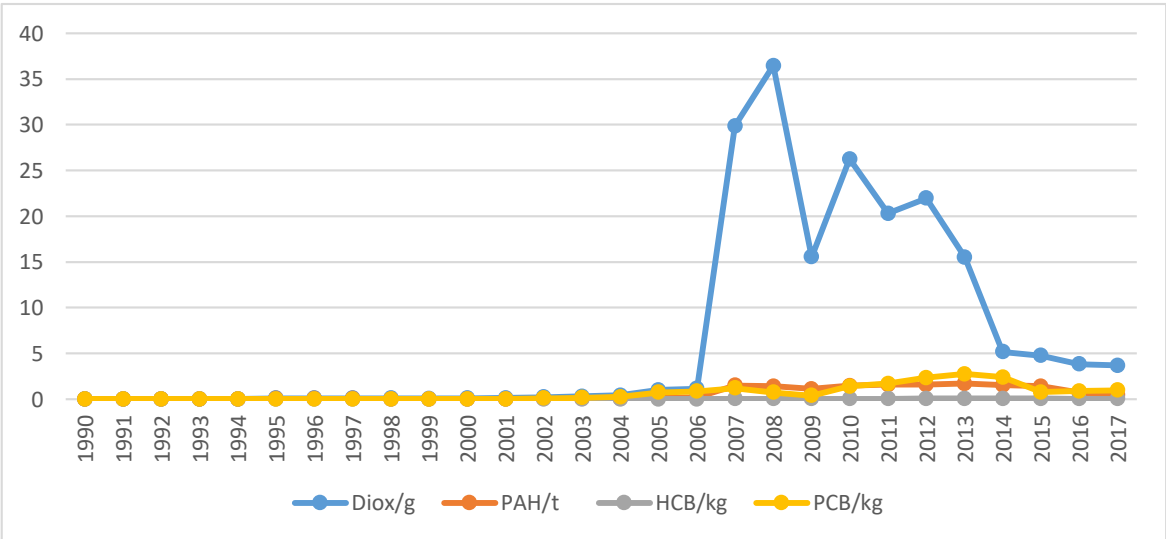


Figure 1.3 Trends of POPs

I. National circumstances

i.1 Geographical position and physical/geographical characteristics

The area of Azerbaijan extends nearly 400 kilometers to South, from West to East roughly 500 kilometers, lies between latitudes 38°25' - 41°55', and 44°50' - 50°51' East longitudes.

Azerbaijan is located at crossroads of Europe and Asia; having unique geopolitical and geographical position. Azerbaijan has been maintaining its importance and role at international economic and cultural relations since very ancient times up to our days.

The Republic of Azerbaijan has a total area of 86.6 thousand km2 and is situated in the Southern Caucasus, being the biggest country in the region. Mountains dominate the northern, southern, and western regions of Azerbaijan, covering roughly 43% of the country, and flatlands run throughout the center of the country, accounting for the other 57% of Azerbaijan's land area. Forests make up 12% of the total land area.

Climate: The geographical position, landscape, and the Caspian Sea have influence on the climate of Azerbaijan. There are semi-desert and dry steppe climate with cold winter and dry hot summer. 9 out of 11 existing climate zones (according to V.V. Keppen) are present in Azerbaijan.

Land cover: The relief and climate play an important role in the formation of land cover of Azerbaijan. Due to the influence of these factors, soil on the territory of the Republic of Azerbaijan is located in the vertical zones.

i.2 Population

The population of Azerbaijan on October 1, 2018 reached 9 million 959 thousand people.

The densest population rate is in the Absheron peninsula and the sparsest population is in the middle mountainous areas and in the highlands.

i.3 Political profile

After the Azerbaijan Republic proclaimed its independence on the 18th October 1991, the presidential form of state governance has been established with the government divided into executive, legislative and judicial powers.

The Constitution of the Republic of Azerbaijan was adopted through a referendum held on 12 November 1995 and amended on 24 August 2002 and 18 March 2009, and 26 September 2016 through a similar process. According to the Constitution, State power in Azerbaijan is divided into three branches: legislative, executive, and judicial.

Administratively, Azerbaijan contains one autonomous region – the Nakhchivan Autonomous Republic - and 66 districts. Azerbaijan has 78 cities, the largest of which is Baku, the capital, 13 district cities, 262 settlements and 4,255 rural settlements.

i.4 Economic profile

The years following the independence in 1991 were marked by a radical change in the country's politics, economy, and society. On top of the challenges of such transformation, Azerbaijan faced an aggression of Armenia, resulting in the occupation of about 20 percent of the country's territory and the displacement of more than 1 million people.

The territory of the Republic of Azerbaijan enjoys favorable climate conditions and rich natural resources. The economy of Azerbaijan is mainly comprised of oil and gas extraction and refining, chemical and petrochemical, metallurgical, mechanical engineering, textile and food industries and wheat, cotton, wine, fruit, tobacco, tea, vegetable growing, and cattle breeding.

Since 1995, Azerbaijan has started to implement market-oriented reform policies for the transition from planned to a free market economy.

Azerbaijan's economy showed clear signs of improvement as the result of petroleum exploration contracts with major international oil companies, known as the "Contract of the Century" and the adoption of economic reform packages by the State, implemented in partnership with national and international organizations. Subsequent years showed stable economic performance and, in 2005, the economic growth more than doubled compared to the previous year's performance. The creation of the State Oil Fund of the Azerbaijan Republic (SOCAR) to manage its oil and gas revenues and serve as a tool for developing and strengthening the non-oil sector, the regions, and small and medium-sized enterprises (SMEs).

Agriculture is the strategic sector for Azerbaijan and a key component of its non-oil economy. Although 40% of the population of Azerbaijan lives in rural areas, agricultural production accounts only for 9% of total GDP, at the same time providing income and employment for about 40% of the total workforce (employed and self-employed).

Agriculture is one of the traditional economic activities in Azerbaijan. Historically, vine growing, silkworm breeding, and fruit-growing activities have been widely spread in the country. As the most part of the country is mountainous areas, cattle breeding have an important role in income- generating activities of the local population.

i.5 Inter-institutional cooperation

Throughout the 28-years period of its independence, Azerbaijan has constantly been improving its environmental protection system, including institutional and legislative framework. With the adaptation of more than 40 environmental laws, the country has implemented a strategy of harmonization of the laws with international standards and approximation to relevant EU directives.

It should be noted that during the previous decade Azerbaijan's environmental policy focused on remediation of environmental burdens from the past, e.g. clean-up of contaminated soil, and waste and water management. However, this situation has changed recently and the government pays particular attention to measures for improvement of air quality (e.g. introduction of modern technologies at production units with less emission, etc.).

Following structural reforms within the country, the State Committee on Hydrometeorology, the State Committee of Ecology and Control on the Use of Nature and the "Azermeshe" Production Union were merged and became part of the Ministry of Ecology and Natural Resources under the Decree of the President of Republic of Azerbaijan as of May 23, 2001. Environmental management, including monitoring of

the quality of ambient air, precipitation, soil, surface and groundwater, biological resources, biodiversity, forests, radioactive pollution of the environment, as well as issues related to climate change, waste management, assessment and forecast of environmental processes under anthropogenic impact, creation of database on the state of the environment, as well as data flow is performed by the Ministry of Ecology and Natural Resources (MENR – www.eco.gov.az).
In addition to MENR, a number of other ministries and agencies in the country perform the environmental activity, having departments on environmental protection and coordinating their activity with MENR.
Other Government agencies play an important indirect role, including the Ministry of Agriculture, the Ministry of Economy, the Ministry of Education, the Ministry of Energy, the Ministry of Health, the Ministry of Justice, and the Ministry of Transport (table 1).

The institutional distribution of responsibilities is summarized in table 1:

Sector	**State ministries or agencies with environmental responsibilities**
Air protection	MENR, MH, MTCHT, MES
Biodiversity, Forestry, Fisheries	MENR
Land and Soils	MENR, SCPI, MA
Water	MES, MENR, Azersu Joint Stock Company, MH, AAWF JSC, MA
Oil pollution	SOCAR, MENR, MES
Hazardous waste	MES, MENR, MH
Waste	MEc ,MENR, Executive powers and municipalities
Mineral resources	MENR ME
Climate change	MENR, ME, ME

i.6 Air quality monitoring

Monitoring of pollution of ambient air in Azerbaijan is conducted by the National Environmental Monitoring Department in accordance with the statute “On the rules of implementation of state monitoring of the environment and natural resources” and approved by the decision No.90 of the Cabinet of Ministers of the Republic of Azerbaijan of 1 July, 2004.

There are three categories of observation and control stations which determine the concentration of sulfur dioxide, carbon monoxide, nitrogen dioxide, dust, phenol, and other noxious substances. Observations on the pollution of ambient air are carried out at stationary and mobile stations. Stationary and mobile stations are to be established, taking into account the area, landscape, industrial development, mobile pollution sources, and a number of population of each city (settlement) as follows:

Monitoring and observation of pollution of ambient air is regularly conducted at 26

observation stations located in eight big industrial cities of the Republic of Azerbaijan (Baku, Sumgayit, Nakhchivan, Ganja, Mingachevir, Shirvan, Lankaran, Sheki), covering basic polluting ingredients (dust, sulfur dioxide, nitrogen dioxide, and carbon monoxide), and specific harmful substances corresponding to the industrial profile of each city.

Information on atmospheric pollution is being published on the web page of the MENR.

Main networks of air monitoring in Azerbaijan

Introduction

1.1 National Inventory Background

The economy is driven mainly by oil and gas production, chemicals and petrochemicals, metallurgy, mechanical engineering, textiles and food industry. The agricultural sector consists mostly of wheat, cotton, wine, fruit, tobacco, tea, vegetables and cattle breeding. The chief exports are oil and oil products, electrical energy, cotton and silk fibers, and wine. Electrical energy has been significant in the development of the country's economy. The network is comprised of thermo- and hydroelectric stations. Thermal Electric Stations operate on fuel oil and gas. The main products of the chemical industry are sulfuric acids, superphosphate fertilizers, sodium hydroxide, chlorine, aluminum chloride, sulphanol, synthetic detergents, and bromide. As in other countries, environment protection and natural resources issues have come to the fore in recent years. With a view to enhancing environment protection, many important laws and regulations have been passed since 1997 in concert with European legislation. Progress on many domestic environmental challenges has been slow in the country's transition era. Therefore, priority has been

given to the development of international, regional and intergovernmental bilateral cooperation.

The Republic of Azerbaijan ratified the Convention on Long-Range Transboundary Air Pollution in 2002. According to Article 8 of the Convention, Contracting Parties, within the framework of the Executive Body referred to in article 10 and bilaterally, shall, in their common interests, exchange available information on data on emissions, air pollutants, changes in national policies and many others. Azerbaijan calculated emission inventories for air pollutants and source categories included in NFR tables (*full-time series of emissions* Annex I). The following pollutants and sectors are covered:

Table 2. Covered sectors and pollutants

Sector	Pollutant				
Energy	NOx	$PM_{2.5}$	CO	As	Se
Industrial Processes and product use	NMVOC	PM_{10}	Pb	Cr	Zn
Agriculture	NH3	TSP	Cd	Cu	PCDD/PCDF
Waste	Sox	BC	Hg	Ni	HCB
	Benzo (a) pyrene		Benzo(f)fluoranthene		PCBs
	Indeno(1,2,3cd) pyrene		Benzo(k)fluoranthene		

Starting from 2015 Azerbaijan submits national inventory data to UNECE and is planning to contribute in following years.

1.2 Institutional Arrangements

In Azerbaijan, the Ministry of Ecology and Natural Resources (MENR) is responsible for preparation and reporting of emission inventory data. The methods are based on emission factors given from the EMEP/EEA Guidebook – 2016 and activity data from the State Statistical Committee. The inventory group is still learning the principles of the preparation of inventories and will improve the completeness and transparency of the inventory as well as include proper quality check/control procedures in the future work.

The responsibilities for preparing the inventory are shown in the following figure:

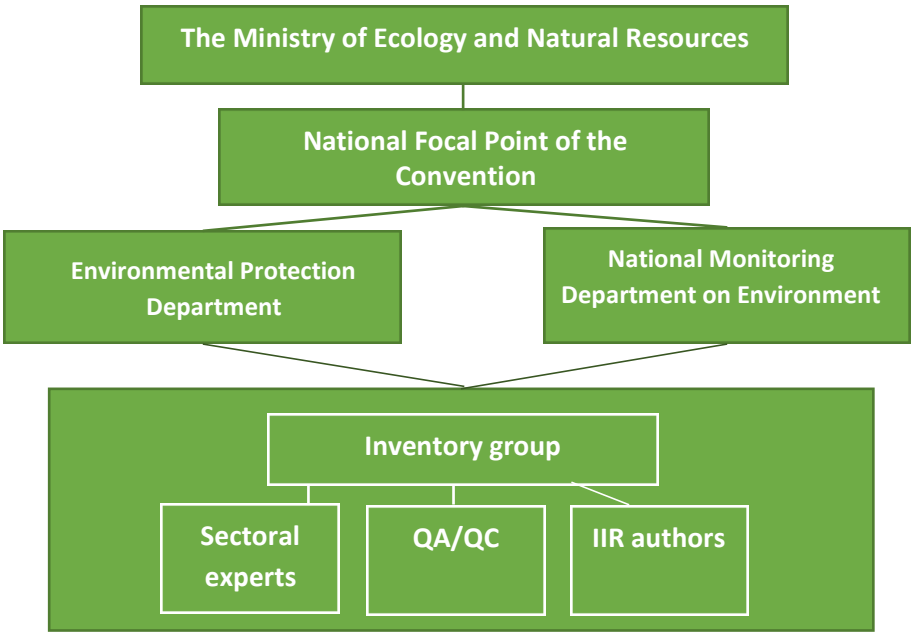


Figure: 1.5 Organizational chart

1.3 Inventory preparation process

As the first of inventory preparation, it was used the year book (2018) and official web page of the State Statistical Committee of the Republic of Azerbaijan. Experts of MENR have used emission factors from the EMEP/EEA Guidebook-2016 for calculation of air pollution emissions in all sectors.

1.4 Methods and data sources

Emissions were calculated using emission factors from the EMEP/EEA Guidebook - 2016 for all sectors. Tier 1 approach method was used for all NFR sectors. In the next submissions, Azerbaijan intends to move to higher tier methods at least for the key categories where possible and to recalculate all years in a consistent way.

1.5 Key categories

According to EMEP/EEA emission inventory guidebook – 2016 a key category is one that is prioritized within the national inventory system because it is significantly important for one or a number of air pollutants in a country's national inventory of air pollutants in terms of the absolute level, the trend, or the uncertainty in emissions. Azerbaijan used approach 1 for analysing key categories for both level and trend assessment. Approach 1 identifies key categories in terms of their contribution to the absolute level of national emissions and to the trend of emissions. In Approach 1, key categories have been identified using a predetermined cumulative emissions threshold. Key categories are those which, when summed together in descending order of magnitude, cumulatively add up to 80 % of the total level.

1.5.1 Level assessment

The contribution of each source category to the total national inventory level is calculated according to equation (1):

Key category level assessment = source category estimate/ total contribution

$L_{x,t} = E_{x,\ t} / \sum E_t$ (1)

Where:

$L_{x,\ t}$ = level assessment for source x in latest inventory year (year t) $E_{x,\ t}$= value of emission estimate of source category x in year t

$\sum E_t$ = total contribution, which is the sum of the emissions in year t, calculated using the aggregation level chosen by the country for key category analysis

Table 3-1 Level assessment of key categories for NOx in 2017

A	B	C	D	E	F
NFR category code	NFR category	Pollutant	Last year estimate Ex t	Level Assessment Lx t	Cumulative total of column E
1A3biii	Road transport: Heavy duty vehicles and buses	NOx	20104.97117	0.2609	0.261
1A1a	Public electricity and heat production	NOx	19715.41539	0.2559	0.517
1A3bi	Road transport: passenger cars	NOx	9995.025839	0.1297	0.646
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	NOx	9196.4049	0.1193	0.766
1A4bi	Residential: Stationary	NOx	5674.9421	0.0736	0.839
1A3dii	National navigation (shipping)	NOx	3720.9	0.0483	0.888

Table 3-2 Level assessment of key categories for NH_3 in 2017

A	B	C	D	E	F
NFR category code	NFR category	Pollutant	Last year estimate Ex t	Level Assessment Lx t	Cumulative total of column E
3B1a	Manure management - Dairy cattle	NH3	40516.34	0.3348	0.3348
3Da2a	Animal manure applied to soils	NH3	24496.04	0.2024	0.5372
3B1b	Manure management - Non-dairy cattle	NH3	14516.91	0.1200	0.6572

3Da3	Urine and dung deposited by grazing animals	NH3	12237.15	0.1011	0.758
3B2	Manure management - Sheep	NH3	10949.37	0.0905	0.849
3B4giv	Manure management - Other poultry	NH3	6392.78	0.0528	0.902

Table 3-3 Level assessment of key categories for CO in 2017

A	B	C	D	E	F
NFR category code	NFR category	Pollutant	Last year estimate Ex t	Level Assessment Lx t	Cumulative total of column E
1A3bi	Road transport: Passenger cars	CO	86017.75	0.696	0.696
1A1a	Public electricity and heat production	CO	8633.22	0.070	0.766
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	CO	6648.41	0.054	0.819
1A4bi	Residential: Stationary	CO	5089.68	0.041	0.860

1.6 QA/QC and verification methods

Quality management system has been established in order to ensure completeness, exactness, and transparency of submitted data. Each calculation was checked and reviewed by the inventory group.

1.7 General assessment of completeness

1.7.1 List of notation keys

Notation keys are listed below (as defined in the UNFCCC reporting guidelines (ECE/EB.AIR/125):

(a) “NE” (not estimated), for activity data and/or emissions by sources of pollutants which have not been estimated but for which a corresponding activity may occur within a Party.

(b) “IE” (included elsewhere), for emissions by sources of pollutants estimated but included elsewhere in the inventory instead of under the expected source category.

(c) “C” (confidential information), for emissions by sources of pollutants of which the reporting could lead to the disclosure of confidential information. The source category where these emissions are included should be indicated;

(d) “NA” (not applicable), for activities under a given source category that do occur within the Party but do not result in emissions of a specific pollutant. If the cells for categories in the NFR tables for which NA is applicable are shaded, they do not need to be filled in;

(e) “NO” (not occurring), for categories or processes within a particular source category that do not occur within a Party;

(f) “NR” (not relevant). According to paragraph 37 in the Guidelines, emission inventory reporting for the main pollutants should cover all years from 1990 onwards if data are available. However, NR is introduced to ease the reporting where reporting of emissions

is not strictly required by the different protocols, e.g., emissions for some Parties prior to agreed base years.

1.7.2 Sources not estimated

List of important sectors with “NE” and short justification why these sectors have not been estimated.

Table 4-1 Explanation of not estimated categories

NFR code	Reason for not estimated
1A1b	Emission occur, but have not been estimated due to lack of statistic data
1A2gviii	Emission occur, but have not been estimated due to lack of statistic data
1A3ai(i)	Emission occur, but have not been estimated due to lack of statistic data
1A3aii(i)	
1A3di(ii)	Emission occur, but have not been estimated due to lack of statistic data
1A4ciii	Emission occur, but have not been estimated due to lack of statistic data
1B2c	Emission occur, but have not been estimated due to lack of statistic data
1B2d	
2B1	Emission occur, but have not been estimated due to lack of statistic data
2B7	
2B10a	
2C2	Emission occur, but have not been estimated due to lack of statistic data
2C5	Emission occur, but have not been estimated due to lack of statistic data
2C6	Emission occur, but have not been estimated due to lack of statistic data
2C7b	Emission occur, but have not been estimated due to lack of statistic data
2C7d	
2D3c	Emission occur, but have not been estimated due to lack of statistic data
2D3d	
2D3e	Emission occur, but have not been estimated due to lack of statistic data
2D3f	
2D3h	Emission occur, but have not been estimated due to lack of statistic data
2D3i	Emission occur, but have not been estimated due to lack of statistic data
2H1	Emission occur, but have not been estimated due to lack of statistic data
2I	Emission occur, but have not been estimated due to lack of statistic data
3F	Emission occur, but have not been estimated due to lack of statistic data
5A	Emission occur, but have not been estimated due to lack of statistic data
5C1a	Emission occur, but have not been estimated due to lack of statistic data

5C1bi	Emission occur, but have not been estimated due to lack of statistic data
5C1bii	Emission occur, but have not been estimated due to lack of statistic data
5C2	
5D1	Emission occur, but have not been estimated due to lack of statistic data

1.7.3 Sources included elsewhere

List of important categories with “IE” and short explanation are provided below:

Categories with IE

NFR code	Where included
1A5a	1A4ai 1A4aii
5C1biii	5C1a

The 1A5a (Other stationary including millitary) category was reported under 1A4ai and 1A4aii categories, because of military plants are considered as commercial. The 5c1biii (Clinical waste incineration) category was reported under 5C1a category (Municipal waste incineration), because the clinical waste is incinerated in waste incineration plant (Balakhani).

2. Explanation of key trends

Azerbaijan is a country rich in natural resources and developed industry. Azerbaijan has found success in social and economic development in recent times. Ensuring sustainability in these achievements has been adopted by the state as a top priority. The environmental strategy of the country is aimed at the protection of natural resources at national, regional and international levels by strengthening coordination of actions, the application of scientifically-grounded development principles, and ensuring the sustainable use of resources to meet the needs of the present and future generations. Ensuring environmental sustainability of development require the elimination and restriction of serious problems arising from industrial activities. As socio-economic processes develop rapidly, new methodologies and principles are emerging in the environmental policy realm.

As most energy in Azerbaijan is generated from burning hydrocarbons, a reduction in emissions might be possible through gains in efficiency, energy saving, the transfer from liquid fuel to gas and the use of alternative energy sources. The country also depends on natural gas, fuel oil, and water resources.

Figure 2-1 Sectoral relative trends of NOx in 1990 -2017

The time series is consistent only for the years 2007-2017 because all sources have not been estimated for all previous years.

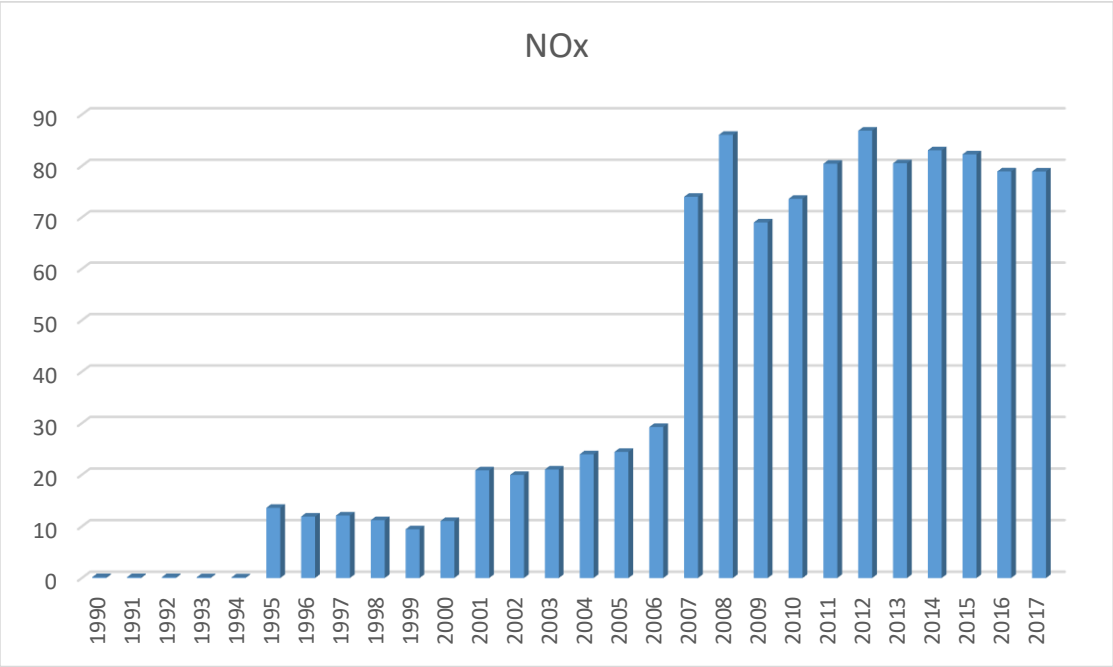


Figure 2-2 Sectoral relative trends of NMVOC in 1990-2017

The time series is consistent only for the years 2007-2017 because all sources have not been estimated for all previous years.

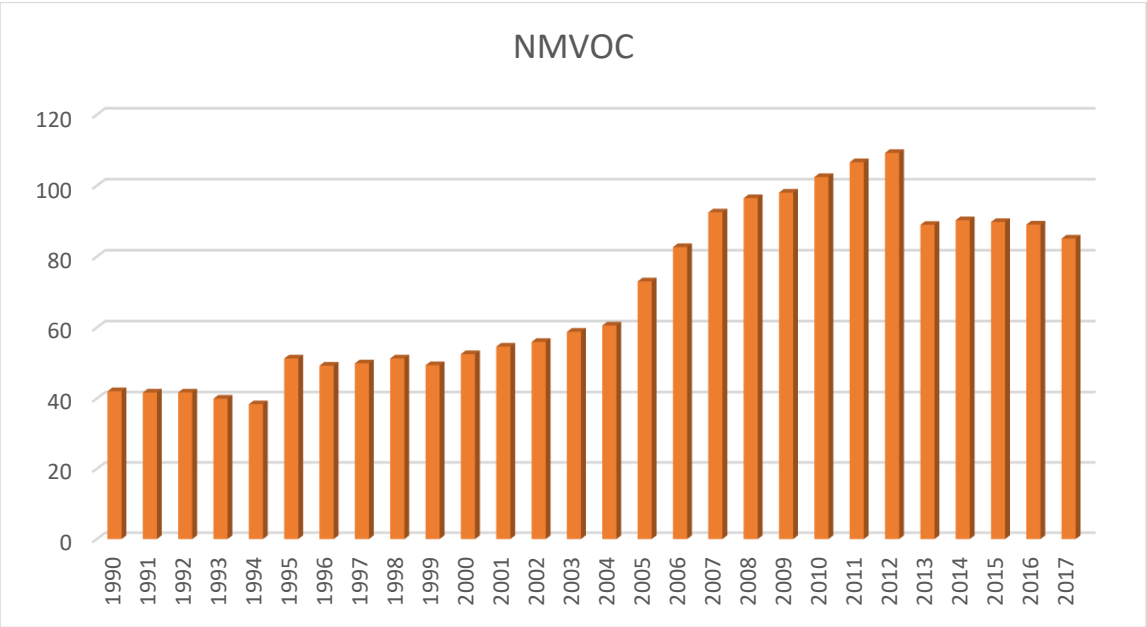


Figure 2-3 Sectoral relative trends of NH3 in 1990-2017

The time series is consistent only for the years 2007-2017 because all sources have not been estimated for all previous years. The reason for the increase in ammonia since 2013 is the addition of new sources.

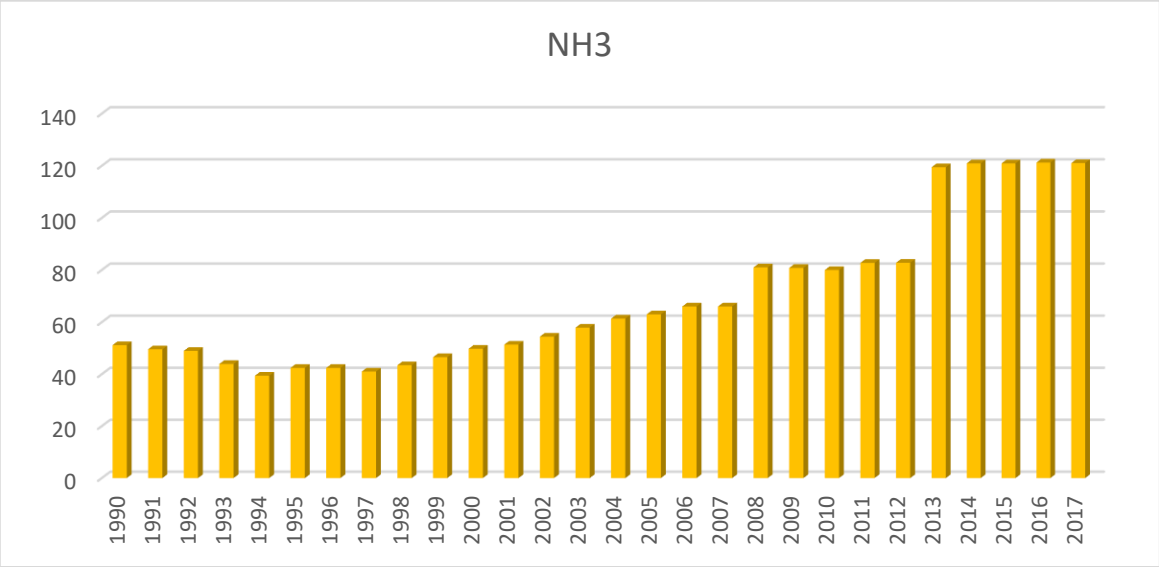
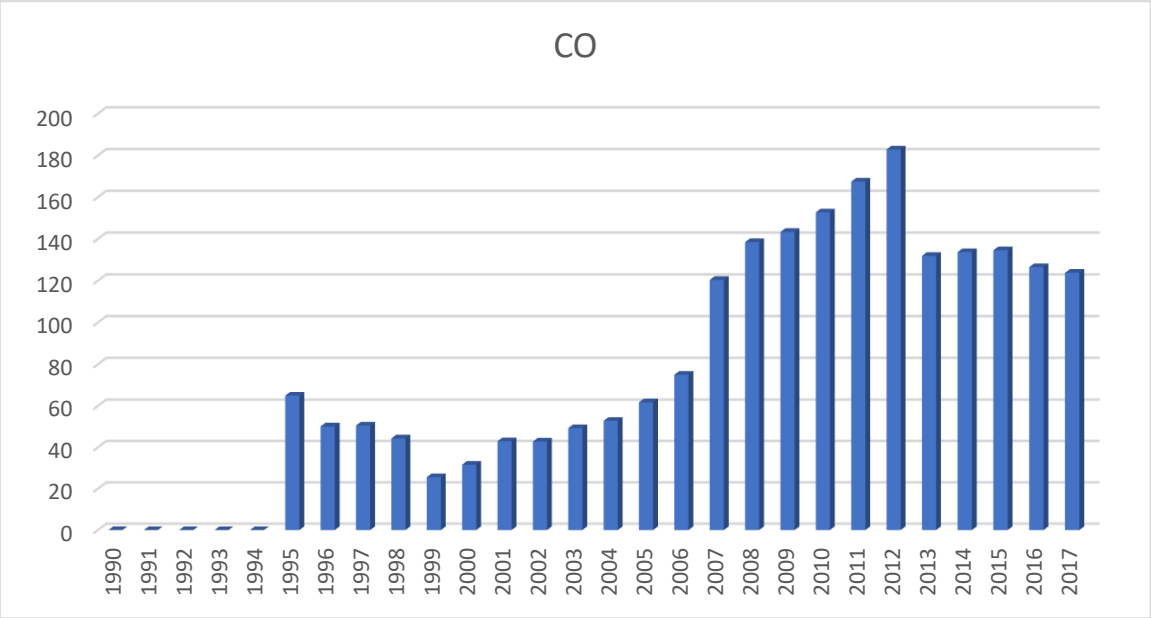


Figure 2-4 Sectoral relative trends of CO in 1990-2017

The time series is consistent only for the years 2013-2017 because all sources have not been estimated for all previous years.



3. NFR Energy (NFR sector 1)

Dynamics of fossil fuels extracted and consumed in a country rich in oil and gas resources, oil products and natural gas are the most commonly consumed fossil fuels. Coal was important in Azerbaijan until 1990, but its import ended with the fall of the Soviet Union.

As an oil and gas country, Azerbaijan has been continuously extracting oil and gas for industrial purposes over 130 years. These fossil fuels are found both under the sea and on land. The production capacity of the oil refinery plants is 20 million tons per year. However, due to the obsolescence of the plants, the level of oil refining has declined.

3.1 Energy industries (1A1)

NFR 1.A.1.a Public electricity and heat production

Source category description

Currently there are 14 power stations in the country. More than 95% of the total electricity power is produced in electricity power stations; the rest is produced in water power stations.

Emission trend

The emissions from public electricity and heat production are presented in Table 5 and in Figures 3-1,3-2,3-3.

The use of fuels impacts the time series, for instance in 2010, 2013 and 2014 use of liquid fuel decreased, while also gaseous fuels use was lower that year. The use of fuels is presented in the table under the chapter Activity data in 2007 and in 2016 the use of Mazout was exceptionally high as can be seen in the table under “Methodological issues”, and this is the cause of the peaks in SO_2 emissions those years.

Table 5. Emissions from Public electricity and heat production (NFR 1.A.1.a)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NOx	22.33242	20.84663	16.73852	14.73238	17.00742	19.19347	18.93862	19.74888	21.93991	21.9875	21.58523
NMVOC	0.572471	0.573266	0.478701	0.429802	0.49016	0.552724	0.553011	0.576335	0.610167	0.593624	0.605725
SOx	21.41149	9.568562	2.773266	0.168411	1.815133	2.149321					
PM2.5	0.994593	0.551664	0.265538	0.151523	0.233588	0.267158					
PM10	1.249545	0.665473	0.298236	0.153229	0.254807	0.292431					
TSP	1.690148	0.862025	0.354654	0.156063	0.291396	0.33596					
BC	0.024865	0.013792	0.006638	0.003788	0.00584	0.006679					
CO	7.751072	8.227665	7.074593	6.443072	7.283974	8.210081					
Pb	0.197746	0.088795	0.025834	0.001869	0.016923	0.020271					
Cd	0.052068	0.023407	0.006811	0.000507	0.004459	0.00536					
Hg	0.033166	0.027213	0.019973	0.016771	0.019897	0.022576					
As	0.193857	0.101231	0.04359	0.020984	0.036577	0.042142					
Cr	0.110392	0.04942	0.014311	0.000907	0.009348	0.011144					
Cu	0.229579	0.102577	0.029517	0.001625	0.019173	0.022869					
Ni	10.99957	4.894516	1.399813	0.059863	0.905827	1.07277					
Se	0.092198	0.043437	0.014211	0.003257	0.010145	0.012305					
Zn	3.787803	1.685839	0.48239	0.021014	0.312283	0.369903					
PCDD/ PCDF	0.198914	0.149819	0.103397	0.083182	0.101607	0.115013					
benzo(a)pyrene	0.000102	0.000114	0.0001	9.24E-05	0.000104	0.000117					
benzo(b)fluoranthene	0.000347	0.000257	0.000175	0.00014	0.000172	0.000194					
benzo(k)fluoranthene	0.000347	0.000257	0.000175	0.00014	0.000172	0.000194					
Indeno (1,2,3-cd) pyrene	0.000453	0.000305	0.000189	0.000141	0.000181	0.000206					
Total 1-4	0.001248	0.000934	0.00064	0.000513	0.000628	0.000711					

0.082775	0.165447	8.254876	12.99855	6.607527
0.189944	0.200865	0.515042	0.686677	0.451594
0.190549	0.202521	0.613059	0.841694	0.530437
0.191443	0.205187	0.782345	1.109334	0.66636
0.004749	0.005022	0.012876	0.017167	0.01129
8.295347	8.642366	8.832584	8.399694	8.832048
0.001183	0.002122	0.07652	0.121043	0.06226
0.000332	0.000593	0.020162	0.031945	0.016482
0.021515	0.02252	0.027904	0.02998	0.027221
0.025956	0.027732	0.092557	0.129262	0.079812
0.000481	0.000958	0.042594	0.06729	0.034389
0.000661	0.001636	0.088342	0.139765	0.071226
0.007926	0.048086	4.216345	6.657193	3.361852
0.003659	0.004429	0.037855	0.05891	0.032672
0.003251	0.017159	1.4523	2.292995	1.158426
0.106471	0.111298	0.151428	0.168017	0.143763
0.000119	0.000124	0.000123	0.000115	0.000124
0.000179	0.000187	0.000259	0.00029	0.000245
0.000179	0.000187	0.000259	0.00029	0.000245
0.00018	0.000189	0.000301	0.000356	0.00028
0.000657	0.000687	0.000942	0.00105	0.000894

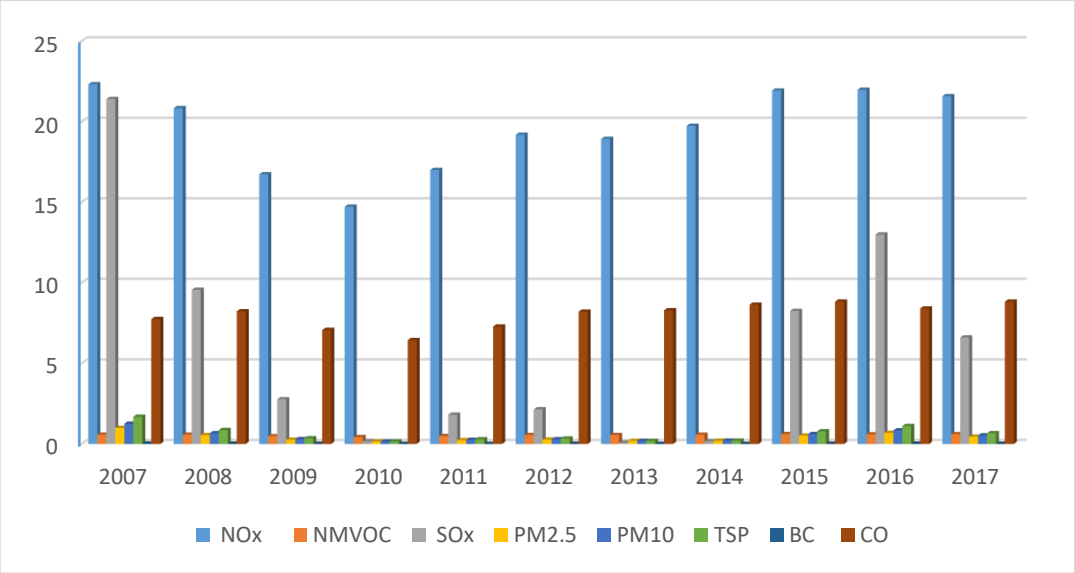


Figure 3-1

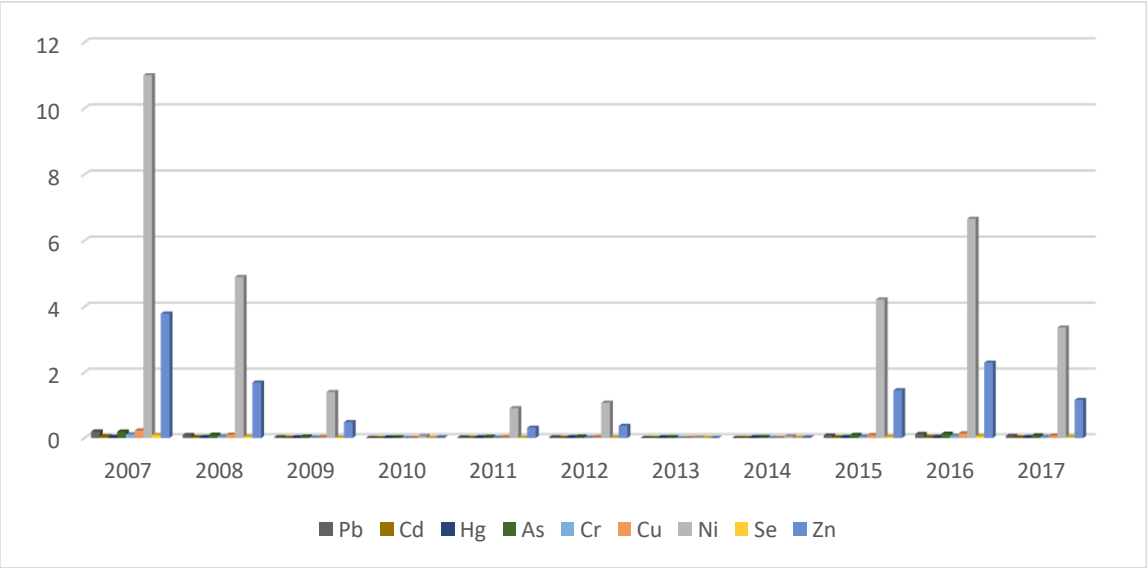


Figure 3-2

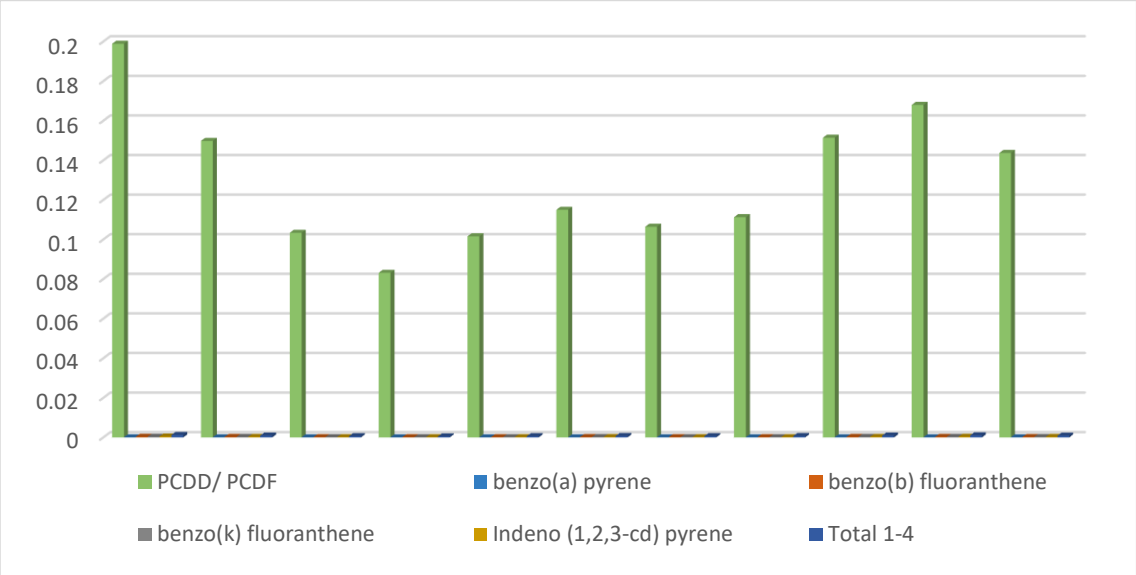


Figure 3-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/) and available from since 2007.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural gas	181965	203435.6	179219.9	165059.8	185347.5	208806.9	212615.3	221431.1	219993.7	205096.2	221173.3
Diesel fuel	192	238.9	132.2	136.5	110.9	191.9	179.1	230.3	196.2	418	448
Fuel oil, low sulphur	43134.2	19192.5	5488.4	233.7	3551.3	4205.5	29.7	186.9	16533.2	26104	13180.9

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2007 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A1b Petroleum refining

The possibility to include these emissions in the next submission is studied.

NFR 1A1c Manufacture of solid fuels and other energy industries

Not occurring in Azerbaijan, therefore emissions are reported as NO.

4. Manufacturing industries and construction (1A2)

NFR 1A2a Stationary combustion in manufacturing industries and construction: Iron and steel

Source category description

Ferrous industry has been established for the needs of oil-gas industry and later on expanded to further develop other industrial fields. There are a few privately owned metallurgical plants in Azerbaijan.

Emission trend

The emissions from 1A2a category are presented in Table 6 and in Figures 4-1,4-2,4-3

In 2016 the use of low sulphur fuel oil stopped and only natural gas was used in 2016-2017. The consumption of natural gas was double in the volume in 2017 compared to 2016 as can be seen in the table under “Methodological issues” where the consumption of fuels is presented.

Table 6. Emissions from category 1A2a

	2010	2011	2012	2013	2014	2015	2016	2017
NO_x	0.14	0.14	0.138998	0.148714	0.142413	0.148931	0.051164	0.090761

NMVOC	0.0242579	0.0319692	0.036923	0.039365	0.04027	0.042861	0.015902	0.02821
SO_x	0.0071939	0.0050633	0.003236	0.003507	0.002547	0.002428	0.000463	0.000822
$PM_{2.5}$	0.0035078	0.0027945	0.002147	0.002312	0.001935	0.001942	0.000539	0.000957
PM_{10}	0.0035078	0.0027945	0.002147	0.002312	0.001935	0.001942	0.000539	0.000957
TSP	0.0035078	0.0027945	0.002147	0.002312	0.001935	0.001942	0.000539	0.000957
BC	0.0015984	0.0010405	0.000572	0.000623	0.000386	0.000343	2.16E-05	3.83E-05
CO	0.0354199	0.0433879	0.048166	0.051393	0.0518	0.054921	0.020051	0.035569
Pb	2.114E-05	2.137E-05	2.08E-05	2.23E-05	2.13E-05	2.22E-05	7.61E-06	1.35E-05
Cd	1.653E-06	1.699E-06	1.68E-06	1.8E-06	1.72E-06	1.81E-06	6.22E-07	1.1E-06
Hg	0.0005041	0.0007089	0.000845	0.0009	0.000932	0.000994	0.000373	0.000662
As	9.444E-05	0.000132	0.000157	0.000167	0.000173	0.000184	6.91E-05	0.000123
Cr	3.977E-05	3.467E-05	2.95E-05	3.17E-05	2.83E-05	2.9E-05	8.99E-06	1.59E-05
Cu	3.319E-05	2.301E-05	1.43E-05	1.55E-05	1.1E-05	1.04E-05	1.8E-06	3.19E-06
Ni	1.285E-05	1.752E-05	2.06E-05	2.19E-05	2.26E-05	2.41E-05	8.99E-06	1.59E-05
Se	6.776E-05	8.481E-05	9.53E-05	0.000102	0.000103	0.000109	4.01E-05	7.11E-05
Zn	0.0047245	0.0035335	0.002489	0.002688	0.002116	0.00208	0.000505	0.000895
PCDD/ PCDF	0.0006655	0.0007973	0.000874	0.000933	0.000935	0.00099	0.00036	0.000638
benzo(a)pyrene	9.16E-07	1.101E-06	1.21E-06	1.29E-06	1.29E-06	1.37E-06	4.98E-07	8.83E-07
benzo(b) fluoranthene	4.72E-06	5.089E-06	5.21E-06	5.57E-06	5.43E-06	5.71E-06	2.01E-06	3.56E-06
benzo(k) fluoranthene	1.231E-06	1.574E-06	1.79E-06	1.91E-06	1.94E-06	2.06E-06	7.61E-07	1.35E-06
Indeno (1,2,3-cd) pyrene	1.185E-06	1.53E-06	1.75E-06	1.87E-06	1.9E-06	2.02E-06	7.47E-07	1.32E-06
Total 1-4	8.051E-06	9.294E-06	9.96E-06	1.06E-05	1.06E-05	1.12E-05	4.01E-06	7.11E-06

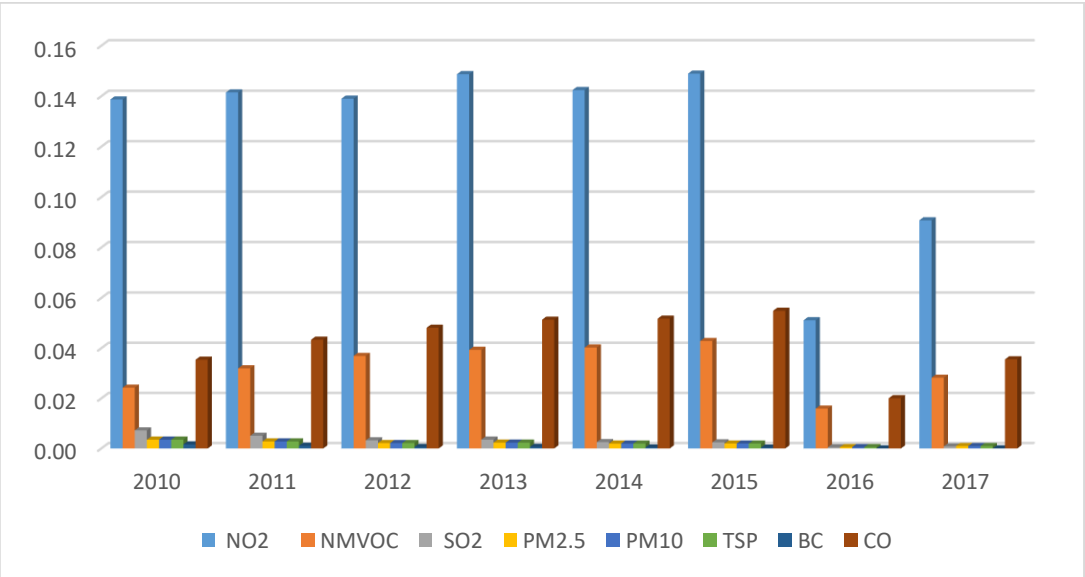


Figure 4 -1

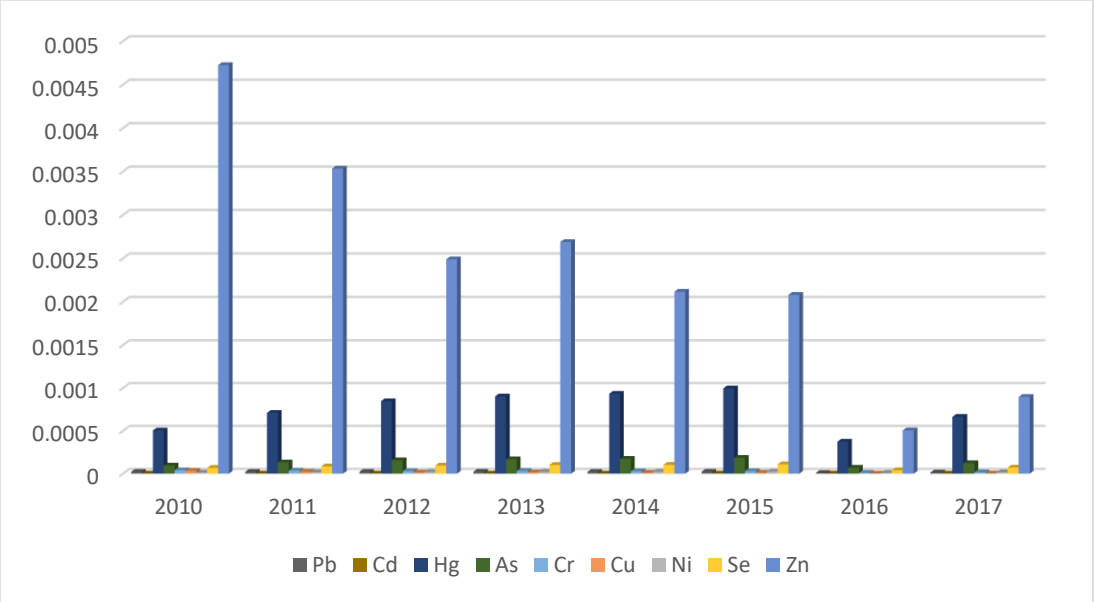


Figure 4-2

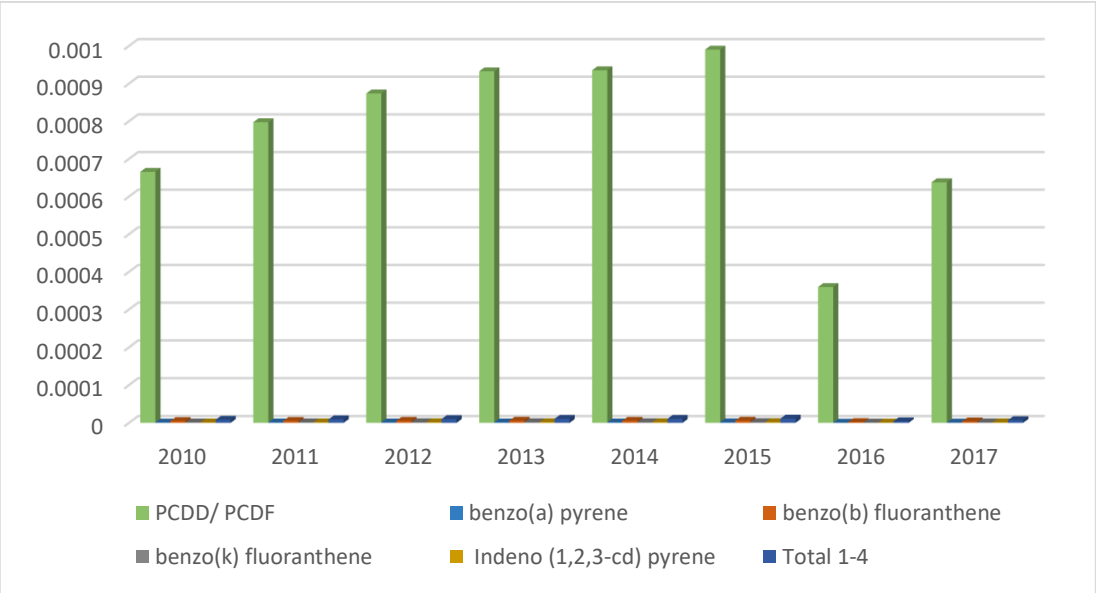


Figure 4-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.
Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2010	2011	2012	2013	2014	2015	2016	2017
Natural gas	902.3	1292.9	1554.6	1656.1	1718.6	1835.8	691.4	1226.5
Fuel oil, low sulphur	140.2	89.3	46.7	51	29.7	25.5		

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2010 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals

Source category description

There are a few non-ferrous industrial enterprises in Azerbaijan.They are copper, aluminum and other industry enterprises.

Emission trend

The emissions from 1A2b category are presented in Table 7 and in Figures 5-1,5-2,5-3,5-4

The emission trends are impacted by the variations in the use of fuels. The emissions have decreased significantly because one aluminium production was closed down in 2010. Also the production varies annually and is decreasing as can be seen from the table provided for aluminium production volumes under the relevant chapter in the IPPU sector.

Table 7. Emissions from category 1A2b

	2007	2008	2009	2010	2011
NOx	1.2046828	1.0731165	0.1817267	0.0175208	0.0262418
NMVOC	0.3481577	0.3038371	0.040497	0.0025954	0.0030204
SOx	0.019183483	0.019072334	0.006681405	0.001056566	0.001855566
PM2.5	0.015549422	0.014534756	0.00365057	0.000494044	0.000834044
PM10	0.015549422	0.014534756	0.00365057	0.000494044	0.000834044
TSP	0.015549422	0.014534756	0.00365057	0.000494044	0.000834044
BC	0.002654137	0.00287875	0.001382583	0.000240242	0.000430642
CO	0.4457185	0.3907152	0.0551609	0.0040034	0.0051254
Pb	0.000179806	0.000160344	2.74585E-05	2.6838E-06	4.0438E-06

Cd	1.46048E-05	1.29986E-05	2.18175E-06	2.0802E-07	3.1002E-07
Hg	0.008082894	0.007030416	0.000895278	0.000051036	0.000053076
As	0.001498352	0.001303647	0.000166717	0.000009616	0.000010126
Cr	0.000233104	0.000212793	4.49895E-05	5.4074E-06	8.8074E-06
Cu	8.17927E-05	8.23205E-05	3.03999E-05	4.89748E-06	8.63748E-06
Ni	0.000195587	0.00017038	2.21607E-05	0.000001337	0.000001473
Se	0.000887138	0.000776571	0.000107706	7.5404E-06	9.4104E-06
Zn	0.016561777	0.015874346	0.004639095	0.000680354	0.001173354
PCDD/ PCDF	0.008034508	0.007053764	0.00101484	0.000076376	0.000100176
benzo(a) pyrene	1.11172E-05	9.75825E-06	1.40059E-06	1.04936E-07	1.37236E-07
benzo(b) fluoranthene	4.62132E-05	4.09271E-05	6.51485E-06	5.7842E-07	8.3342E-07
benzo(k) fluoranthene	1.67496E-05	1.46428E-05	1.99678E-06	1.3482E-07	1.6372E-07
Indeno (1,2,3-cd) pyrene	1.6412E-05	1.43392E-05	1.94037E-06	1.28784E-07	1.54284E-07
Total 1-4	9.0492E-05	7.96673E-05	1.18526E-05	9.4696E-07	1.28866E-06

2012	2013	2014	2015	2016	2017
0.016895	0.011559	0.011847	0.014587	0.051779	0.002316
0.004687	0.003593	0.003682	0.003969	0.006387	0.00072
0.000331	0.000105	0.000107	0.00031	0.003527	2.1E-05
0.000239	0.000122	0.000125	0.000215	0.001599	2.44E-05
0.000239	0.000122	0.000125	0.000215	0.001599	2.44E-05
0.000239	0.000122	0.000125	0.000215	0.001599	2.44E-05
5.33E-05	4.87E-06	5E-06	5.23E-05	0.000815	9.77E-07
0.006054	0.00453	0.004643	0.005149	0.010542	0.000908
2.53E-06	1.72E-06	1.76E-06	2.18E-06	7.97E-06	3.44E-07
2.04E-07	1.41E-07	1.44E-07	1.76E-07	6.12E-07	2.82E-08
0.000108	8.43E-05	8.65E-05	9.12E-05	0.000116	1.69E-05
2E-05	1.56E-05	1.6E-05	1.69E-05	2.21E-05	3.13E-06
3.43E-06	2.03E-06	2.08E-06	3.02E-06	1.7E-05	4.07E-07
1.44E-06	4.06E-07	4.16E-07	1.36E-06	1.64E-05	8.14E-08
2.62E-06	2.03E-06	2.08E-06	2.22E-06	3.17E-06	4.07E-07
1.2E-05	9.06E-06	9.29E-06	1.02E-05	1.95E-05	1.82E-06
0.000267	0.000114	0.000117	0.000244	0.002239	2.28E-05
0.000109	8.12E-05	8.33E-05	9.32E-05	0.000205	1.63E-05
1.51E-07	1.12E-07	1.15E-07	1.29E-07	2.81E-07	2.25E-08
6.41E-07	4.53E-07	4.64E-07	5.5E-07	1.66E-06	9.08E-08
2.26E-07	1.72E-07	1.76E-07	1.92E-07	3.42E-07	3.44E-08
2.21E-07	1.69E-07	1.73E-07	1.88E-07	3.23E-07	3.38E-08
1.24E-06	9.06E-07	9.29E-07	1.06E-06	2.61E-06	1.82E-07

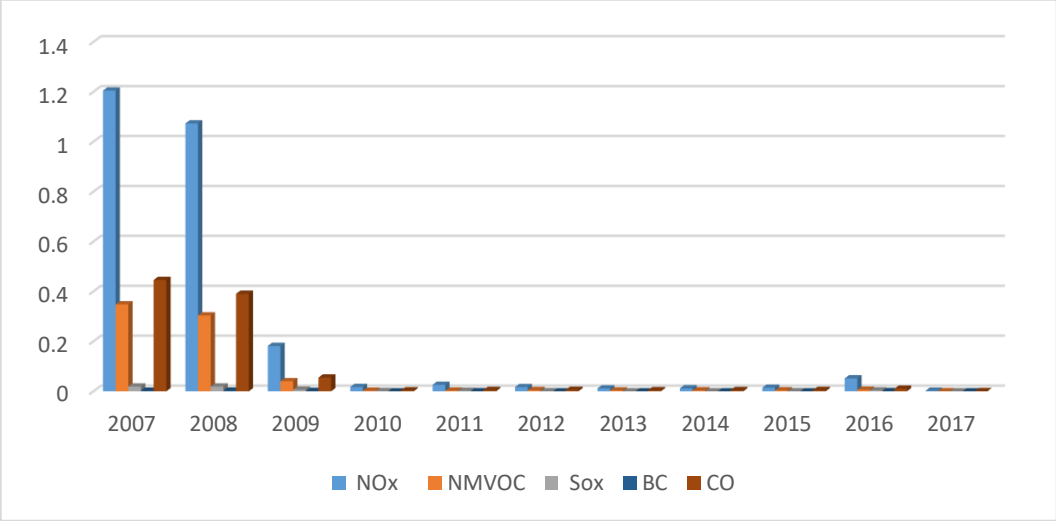


Figure 5-1

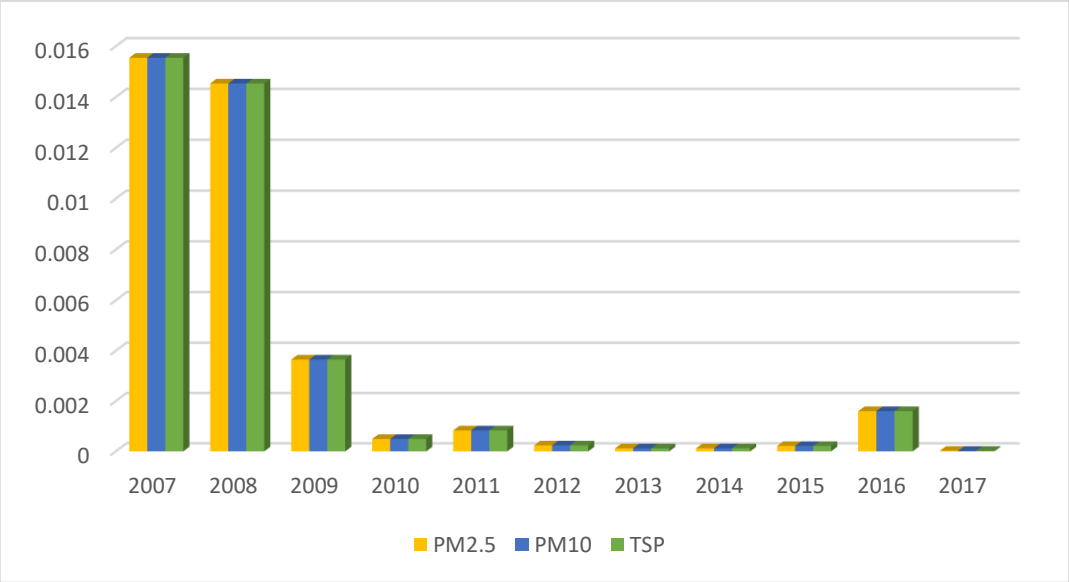


Figure 5-2

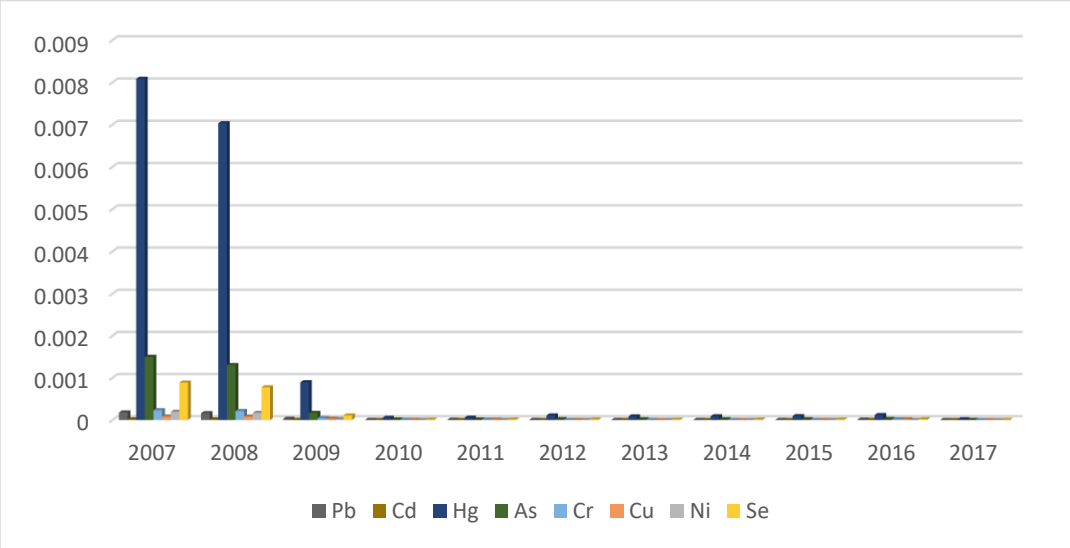


Figure 5-3

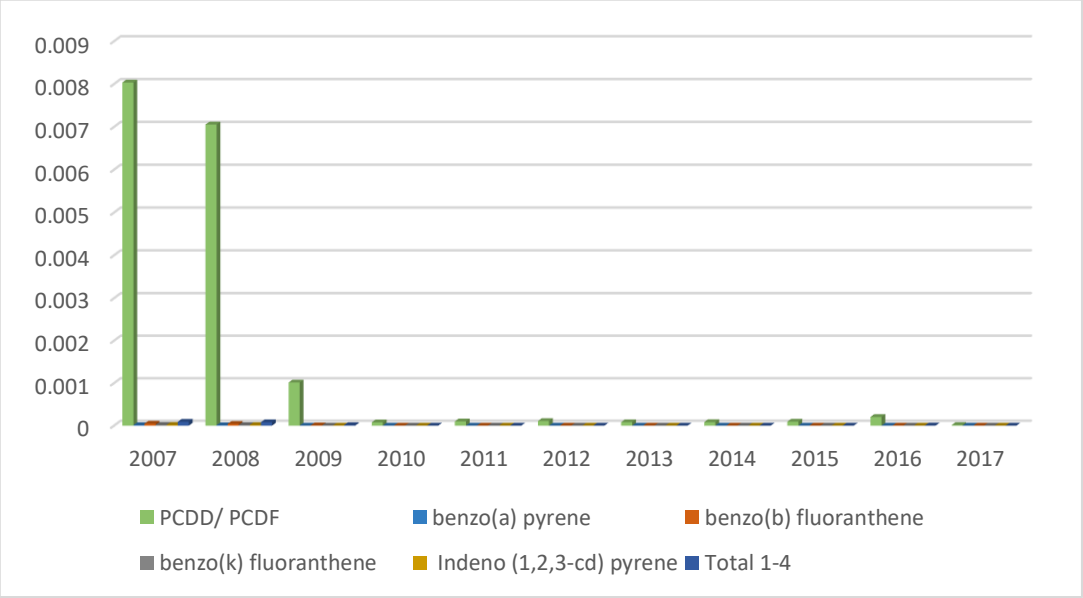


Figure 5-4

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/) and available from since 2007.

TJ

	2007	2208	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural gas	14924.9	12970.2	1631.5	300.8	89.8	199.2	156.2	160.1	168	199.2	31.3
Fuel oil, low sulphur	195.4	220.9	118.9	21.2	38.2	4.2	-	-	4.2	72.2	-

Uncertainty and time series consistency

An uncertainty analysis will be developed in the future.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2007 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A2c Stationary combustion in manufacturing industries and construction: Chemicals

Source category description

The chemical and petrochemical industry was established in 60-70s of XIX century owing to the development of oil refinery.

Fuel use varies according to production volumes which are presented under chapter “Chemical industry”. However, no explanation has been found for the statistical higher use of natural gas in 2016.

Emission trend

The emissions from 1A2c category are presented in Table 8 and in Figures 6-1,6-2,6-3

Table 8. Emissions from 1A2c category

	2013	2014	2015	2016	2017
NOx	0.732038	0.747941	0.753432	1.081895	0.506693
NMVOC	0.226947	0.23189	0.233597	0.336265	0.157486
SOx	0.00681	0.006954	0.007004	0.009796	0.004588
PM2.5	0.007779	0.007946	0.008004	0.011404	0.005341
PM10	0.007779	0.007946	0.008004	0.011404	0.005341
TSP	0.007779	0.007946	0.008004	0.011404	0.005341
BC	0.000356	0.000363	0.000365	0.000456	0.000214
CO	0.286299	0.292531	0.294683	0.423986	0.198569
Pb	0.000109	0.000111	0.000112	0.000161	7.53E-05
Cd	8.9E-06	9.1E-06	9.16E-06	1.32E-05	6.16E-06
Hg	0.005326	0.005442	0.005482	0.007895	0.003697
As	0.000986	0.001008	0.001015	0.001462	0.000685
Cr	0.000129	0.000132	0.000133	0.00019	8.9E-05
Cu	2.66E-05	2.71E-05	2.73E-05	3.8E-05	1.78E-05
Ni	0.000128	0.000131	0.000132	0.00019	8.9E-05
Se	0.000573	0.000585	0.000589	0.000848	0.000397
Zn	0.007324	0.007481	0.007535	0.010673	0.004998
PCDD/ PCDF	0.005135	0.005246	0.005285	0.007603	0.003561
benzo(a) pyrene	7.11E-06	7.26E-06	7.32E-06	1.05E-05	4.93E-06
benzo(b) fluoranthene	2.87E-05	2.93E-05	2.95E-05	4.24E-05	1.99E-05
benzo(k) fluoranthene	1.09E-05	1.11E-05	1.12E-05	1.61E-05	7.53E-06
Indeno (1,2,3-cd) pyrene	1.07E-05	1.09E-05	1.1E-05	1.58E-05	7.39E-06
Total 1-4	5.73E-05	5.85E-05	5.9E-05	8.48E-05	3.97E-05

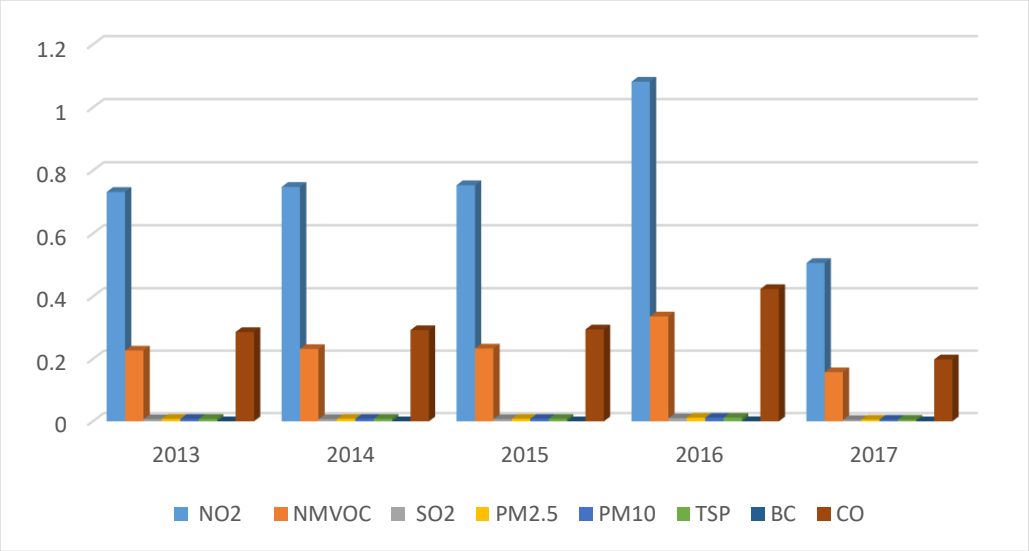


Figure 6 -1

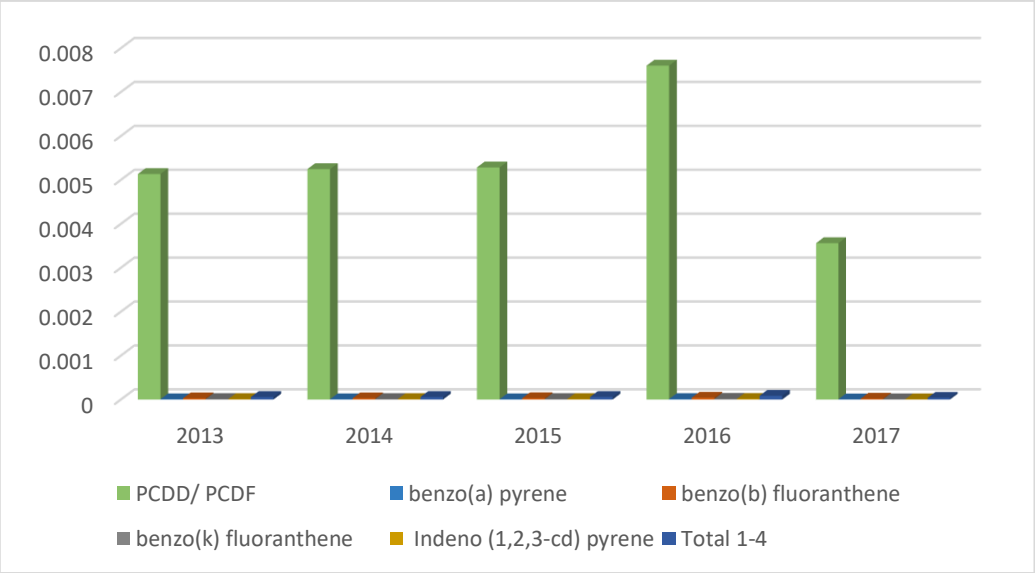


Figure 6-2

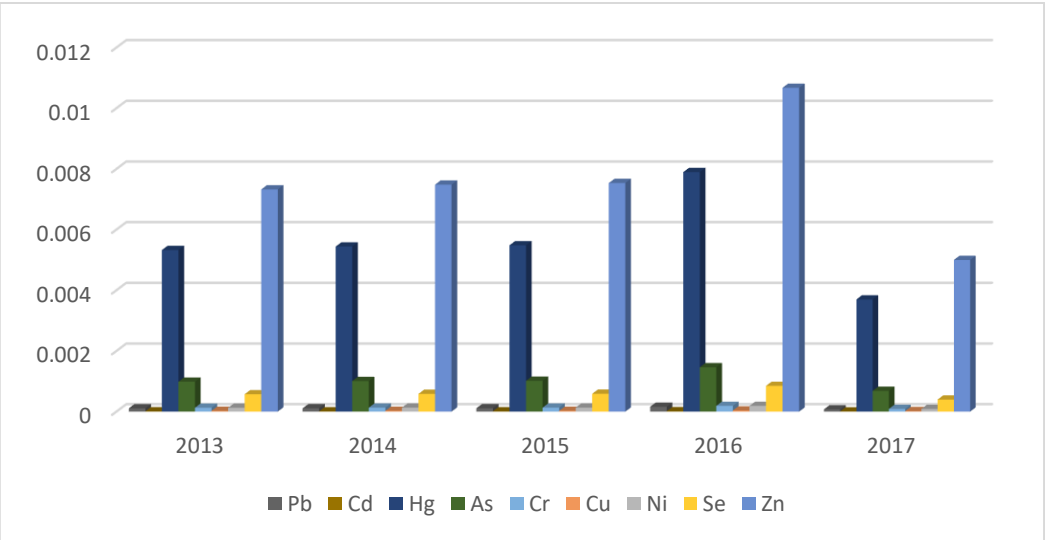


Figure 6-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	9862.6	10077.5	10151.7	14620.2	6847.2
Diesel fuel	4.3	4.3	4.3	4.3	-

Uncertainty and time series consistency

An uncertainty analysis will be developed in the future.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A2d Stationary combustion in manufacturing industries and construction: Pulp, Paper and Print

Source category description

Azerbaijan does not product pulp but has paper production, which is energy intensive. The use of fuels has been decreasing and the reason for this will be studied for the next submissions.

Emission trend

The emissions from 1A2d category are presented in Table 9 and in Figures 7-1,7-2,7-3

Table 9. Emissions from 1A2d category

	2013	2014	2015	2016	2017
NOx	0.005202	0.007511	0.005779	0.002309	0.001154
NMVOC	0.001617	0.002335	0.001796	0.000718	0.000359
SOx	4.71E-05	6.8E-05	5.23E-05	2.09E-05	1.05E-05
PM2.5	5.48E-05	7.92E-05	6.09E-05	2.43E-05	1.22E-05
PM10	5.48E-05	7.92E-05	6.09E-05	2.43E-05	1.22E-05
TSP	5.48E-05	7.92E-05	6.09E-05	2.43E-05	1.22E-05
BC	2.19E-06	3.17E-06	2.44E-06	9.73E-07	4.87E-07
CO	0.002039	0.002944	0.002265	0.000905	0.000452
Pb	7.73E-07	1.12E-06	8.59E-07	3.43E-07	1.72E-07
Cd	6.33E-08	9.14E-08	7.03E-08	2.81E-08	1.4E-08
Hg	3.8E-05	5.48E-05	4.22E-05	1.68E-05	8.42E-06
As	7.03E-06	1.02E-05	7.81E-06	3.12E-06	1.56E-06
Cr	9.14E-07	1.32E-06	1.02E-06	4.06E-07	2.03E-07
Cu	1.83E-07	2.64E-07	2.03E-07	8.11E-08	4.06E-08
Ni	9.14E-07	1.32E-06	1.02E-06	4.06E-07	2.03E-07
Se	4.08E-06	5.89E-06	4.53E-06	1.81E-06	9.05E-07
Zn	5.13E-05	7.41E-05	5.7E-05	2.28E-05	1.14E-05
PCDD/ PCDF	3.66E-05	5.28E-05	4.06E-05	1.62E-05	8.11E-06
benzo(a) pyrene	5.06E-08	7.31E-08	5.62E-08	2.25E-08	1.12E-08
benzo(b) fluoranthene	2.04E-07	2.94E-07	2.26E-07	9.05E-08	4.52E-08
benzo(k) fluoranthene	7.73E-08	1.12E-07	8.59E-08	3.43E-08	1.72E-08
Indeno (1,2,3-cd) pyrene	7.59E-08	1.1E-07	8.43E-08	3.37E-08	1.68E-08
Total 1-4	4.08E-07	5.89E-07	4.53E-07	1.81E-07	9.05E-08

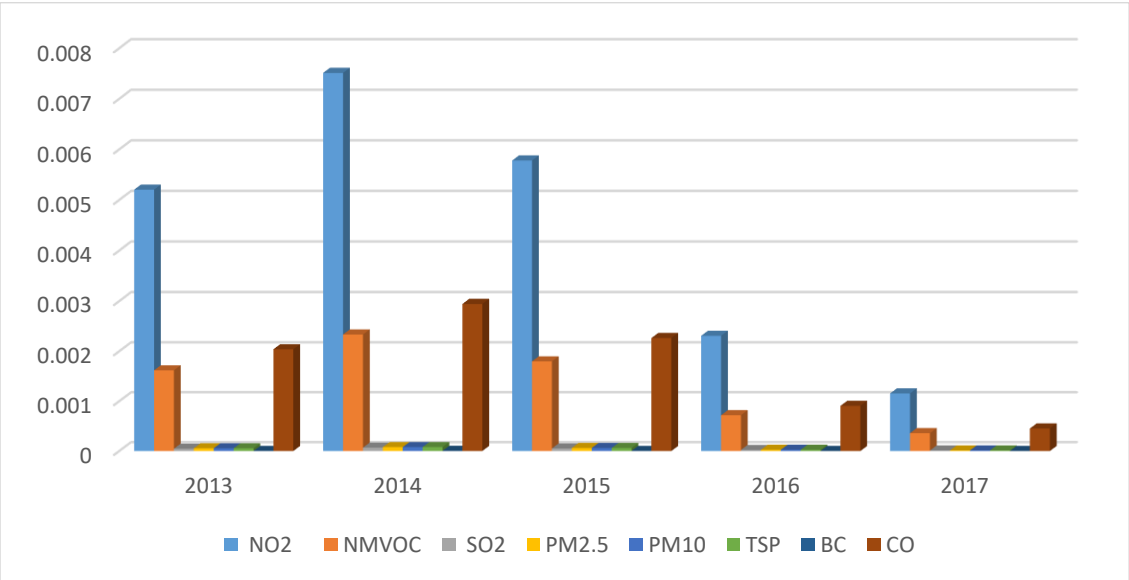


Figure 7-1

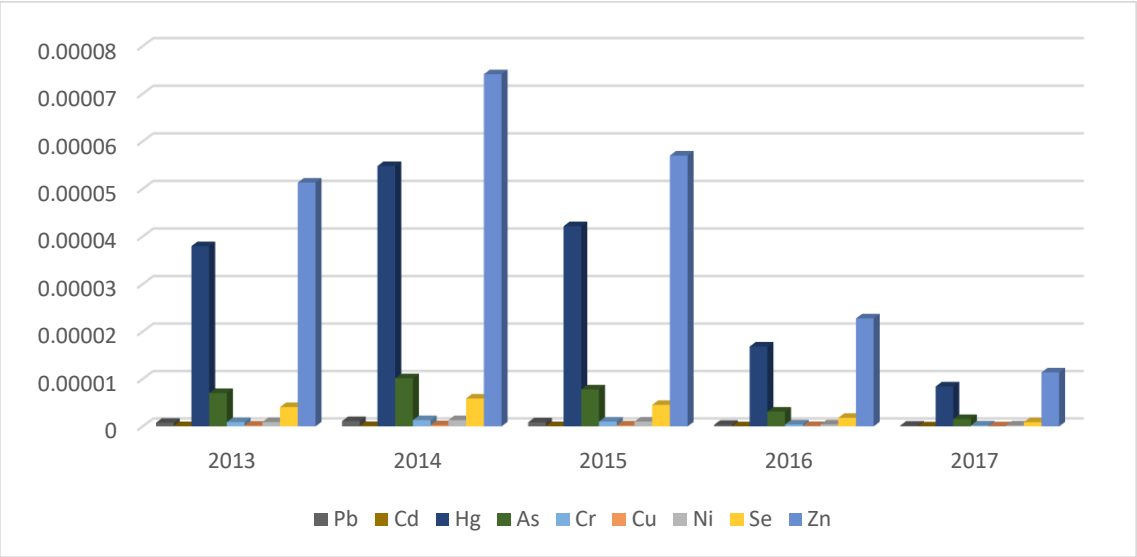


Figure 7-2

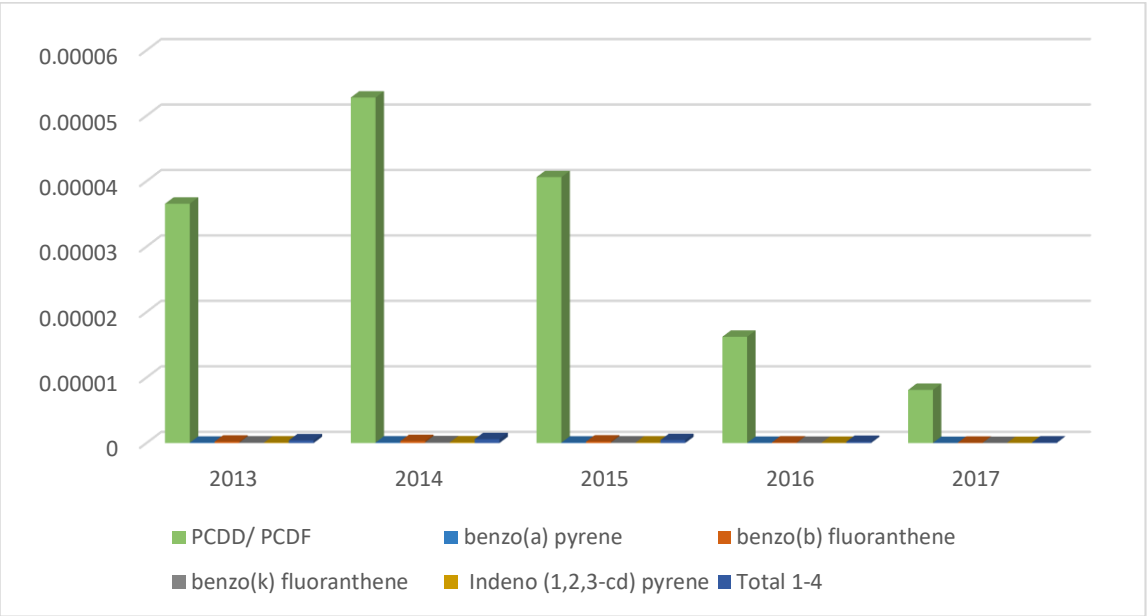


Figure 7-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	70.3	101.5	78.1	31.2	15.6

Uncertainty and time series consistency

An uncertainty analysis will be developed in the future.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A2e Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco

Source category description

Food industry is one of the main industries of a country economy. After Azerbaijan gained its independency, food industry started to develop like other industries. There are wine, canned food, tobacco, mineral water production facilities in the country.
The bread and bewerages production volumes are presented under the industry sector chapters.

Emission trend

The emissions from 1A2e category are presented in Table 10 and in Figures 8-1,8-2,8-3 .
The increase of heavy metals and POPs is related to increased wood use in 2017, which was 7-fold in 2017 compared to 2016. NOx emissions, for instance, follow the consumption of natural gas.

Table 10. Emissions from 1A2e category

	2013	2014	2015	2016	2017
NOx	1.255265	1.2367	1.262733	1.545336	0.709903
NMVOC	0.332953	0.339762	0.348439	0.343075	0.181056
SOx	0.030189	0.025857	0.025707	0.058029	0.024531
$PM_{2.5}$	0.020855	0.01894	0.018797	0.032599	0.02169
PM10	0.02088	0.018959	0.01881	0.032625	0.021866
TSP	0.020939	0.019003	0.018839	0.032683	0.022278
BC	0.005717	0.004553	0.004387	0.012378	0.007142
CO	0.436675	0.441484	0.451726	0.469961	0.253812
Pb	0.000415	0.000355	0.000302	0.00046	0.001694
Cd	0.000124	9.69E-05	6.99E-05	0.000128	0.000773

Hg	0.007556	0.007775	0.007997	0.007516	0.003677
As	0.001403	0.001443	0.001484	0.001401	0.000689
Cr	0.000462	0.0004	0.000355	0.000579	0.001522
Cu	0.000184	0.000151	0.000137	0.000314	0.000461
Ni	0.000201	0.000201	0.000203	0.000203	0.000207
Se	0.000858	0.000871	0.000893	0.000912	0.000461
Zn	0.027267	0.023669	0.022647	0.04438	0.04695
PCDD/ PCDF	0.00868	0.008557	0.00855	0.009406	0.00992
benzo(a) pyrene	9.48E-05	7.4E-05	5.32E-05	9.58E-05	0.000594
benzo(b) fluoranthene	0.000181	0.000147	0.000115	0.00019	0.000966
benzo(k) fluoranthene	5.8E-05	4.78E-05	3.78E-05	5.88E-05	0.000302
Indeno (1,2,3-cd) pyrene	4.93E-05	4.12E-05	3.32E-05	4.99E-05	0.000243
Total 1-4	0.000383	0.00031	0.000239	0.000394	0.002105
HCB	0.000042	3.15E-05	0.000021	0.000042	0.000294
PCBs	5.04E-07	3.78E-07	2.52E-07	5.04E-07	3.53E-06

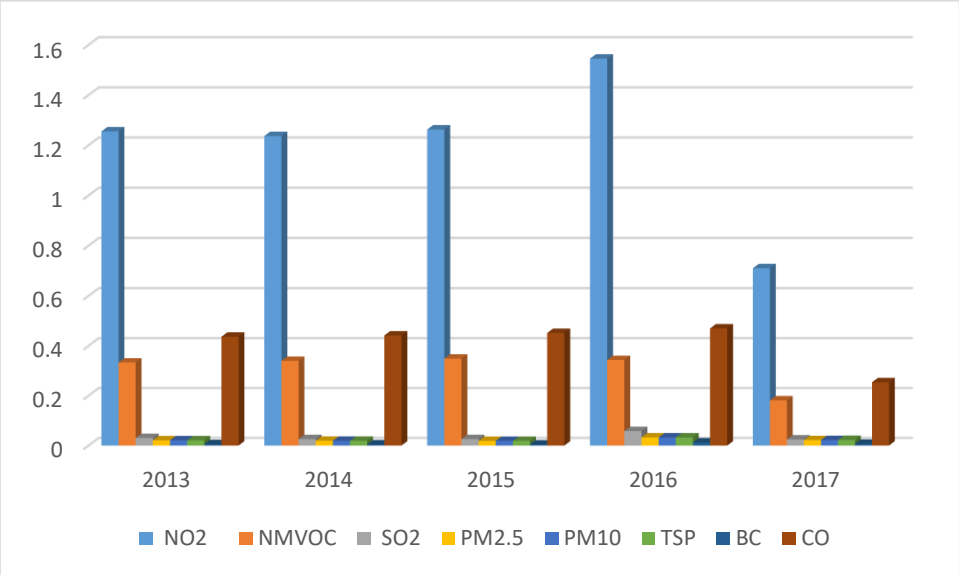


Figure 8-1

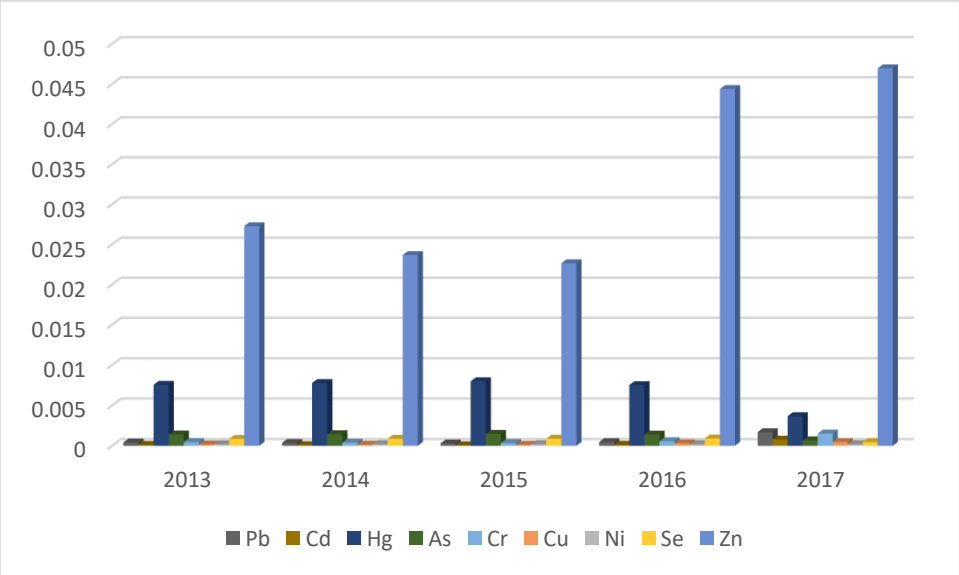


Figure 8-2

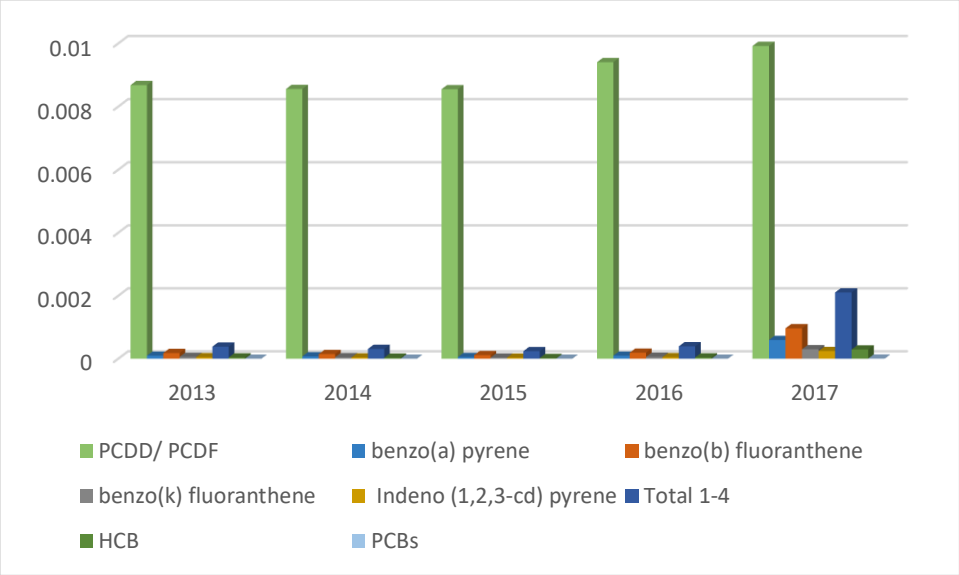


Figure 8-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	13885.8	14315.5	14729.5	13678.8	6655.8
Diesel fuel	149.3	132.2	119.4	277.3	315.6
Fuel oil, low sulphur	293.1	212.4	216.6	760.4	97.7
Wood	8.4	6.3	4.2	8.4	58.8

Uncertainty and time series consistency

An uncertainty analysis will be developed in the future.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A2f Stationary combustion in manufacturing industries and construction: Non-metallic minerals

Source category description

There are a number of enterprises manufacturing cement, ferroconcrete constructions, ready-made concrete mixture for brickwork, glass for construction, asphalt and bricks. The basis of this field is the production of construction materials.

Emission trend

The emissions from 1A2f category are presented in Table 11 and in Figures 9-1,9-2,9-3.

Table 11. Emissions from 1A2f category

	2013	2014	2015	2016	2017
NOx	0.681738	0.788058	0.75671	1.008281	0.889151
NMVOC	0.203892	0.239223	0.230044	0.303664	0.274072
SOx	0.008693	0.008935	0.008474	0.012191	0.00877
PM2.5	0.008054	0.008927	0.008535	0.011683	0.00962
PM10	0.008054	0.008927	0.008535	0.011683	0.00962
TSP	0.008054	0.008927	0.008535	0.011683	0.00962
BC	0.000941	0.000799	0.00074	0.001219	0.000562
CO	0.259133	0.303094	0.291377	0.385374	0.346155
Pb	0.000102	0.000117	0.000113	0.00015	0.000132
Cd	8.28E-06	9.57E-06	9.19E-06	1.22E-05	1.08E-05
Hg	0.004759	0.005597	0.005383	0.007096	0.006427
As	0.000882	0.001037	0.000997	0.001315	0.00119
Cr	0.000126	0.000143	0.000137	0.000185	0.000158
Cu	3.6E-05	3.63E-05	3.43E-05	5E-05	3.47E-05
Ni	0.000115	0.000135	0.00013	0.000171	0.000155
Se	0.000517	0.000605	0.000582	0.000769	0.000692
Zn	0.00815	0.008792	0.008382	0.011677	0.009178
PCDD/ PCDF	0.004659	0.005444	0.005233	0.006926	0.006211
benzo(a) pyrene	6.45E-06	7.54E-06	7.24E-06	9.59E-06	8.6E-06
benzo(b) fluoranthene	2.64E-05	3.07E-05	2.95E-05	3.91E-05	3.48E-05
benzo(k) fluoranthene	9.78E-06	1.15E-05	1.1E-05	1.46E-05	1.31E-05
Indeno (1,2,3-cd) pyrene	9.59E-06	1.12E-05	1.08E-05	1.43E-05	1.29E-05
Total 1-4	5.22E-05	6.09E-05	5.85E-05	7.76E-05	6.93E-05

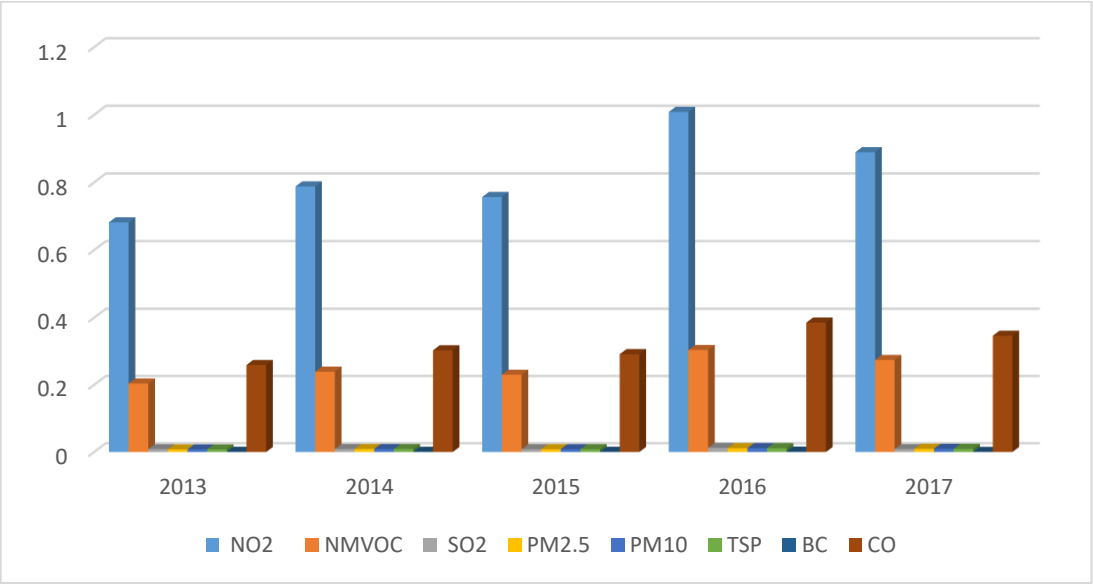


Figure 9-1

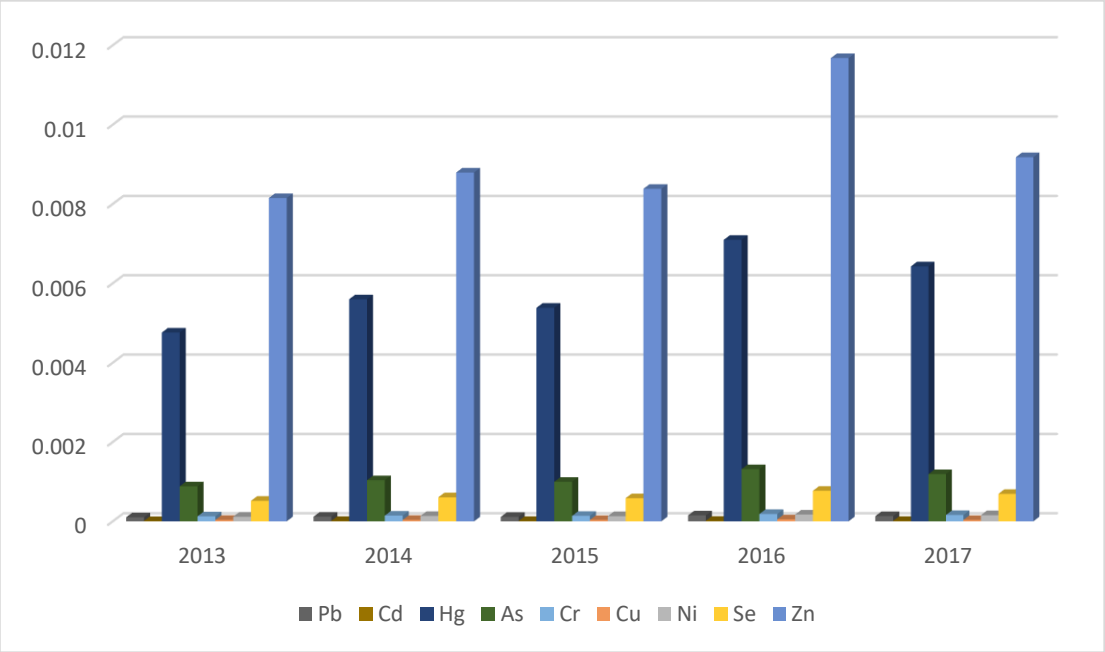


Figure 9-2

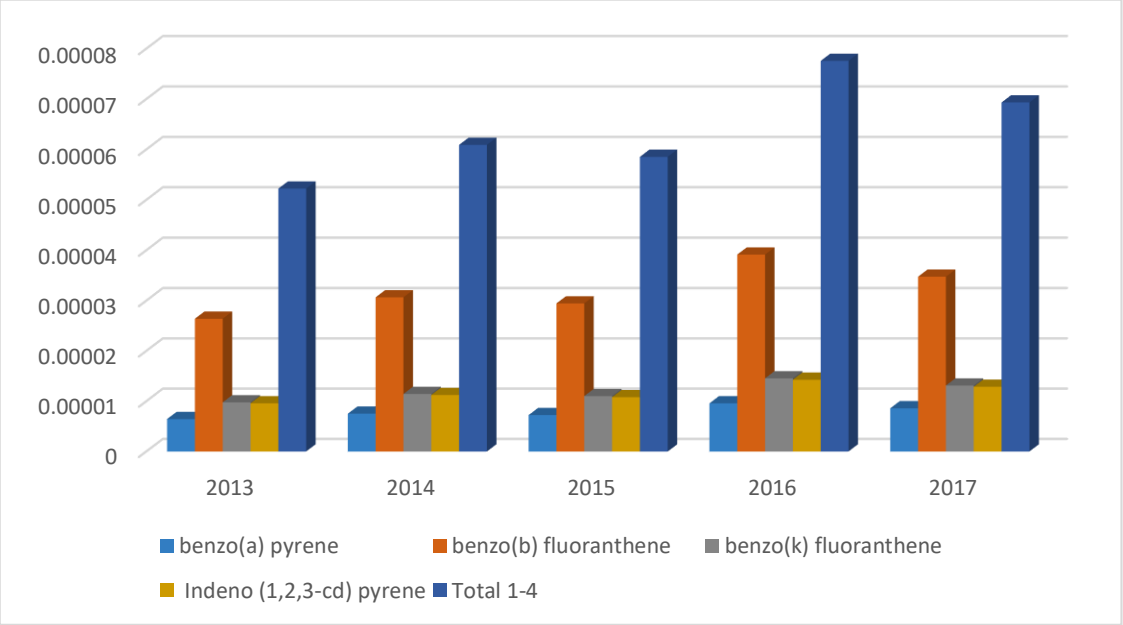


Figure 9-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page(https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	8800.2	10354.8	9960.3	13124.2	11897.7
Diesel fuel	4.3	4.3	4.3	4.3	
Fuel oil, low sulphur	55.2	38.2	34	68	17

Uncertainty and time series consistency

An uncertainty analysis will be developed in the future.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

5. Transport (1A3)

NFR 1A3a Aviation

The possibility to include these emissions in the next submission is studied.

NFR 1A3b Road Transport

Source category description

The number of officially registered vehicles is approximately 1 mln 400 000. Currently both old and new cars are used. It is envisaged to halt the use of outdated vehicles in accordance with the state program.
The length of roads is 19015.6 km, cement-concrete 125.0 km, asphalt-concrete 9466.7 km, black surface course 2118.8 km, gravel 7184.6 km and soil 120.5 km in Azerbaijan.

Emission trend

The emissions from road transport are presented in Table 12-1,12-2,12-3 and in Figure 10-1,10-2,10-3

Table 12-1 NOx

	2013	2014	2015	2016	2017
1A3Bi	9.135877	9.582894	9.839618	9.903963	9.995026
1A3Bii	1.123477	1.183034	1.184999	1.18599	1.195697
1A3Biii	18.63728	19.83956	19.88873	19.95184	20.10497
1.A.3.b.iv	0.006936	0.008023	0.008966	0.009175	0.008581

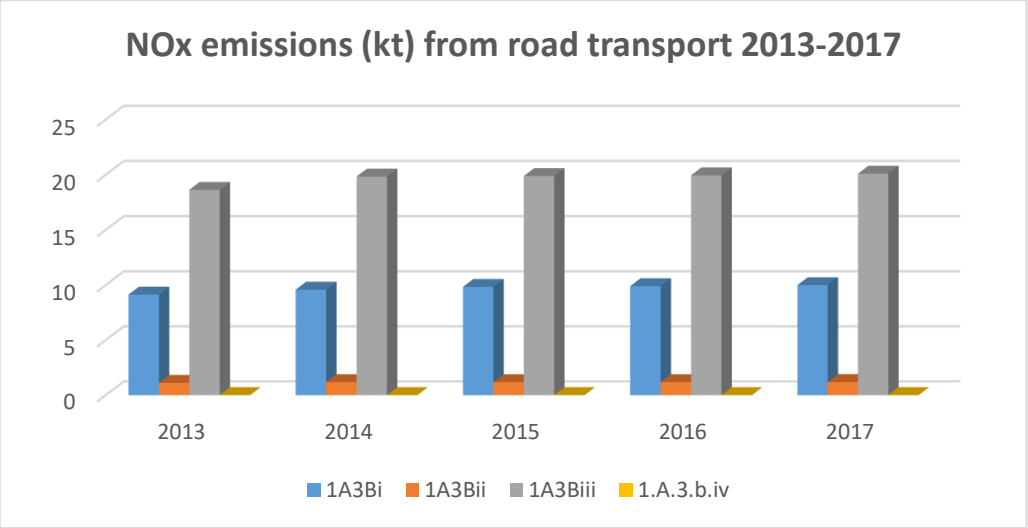


Figure 10-1

Table 12-2.CO

	2013	2014	2015	2016	2017
1A3Bi	78.62386	82.47098	84.68029	85.23411	86.01775
1A3Bii	4.680835	4.833981	4.83481	4.81825	4.862199
1A3Biii	4.23346	4.506559	4.517729	4.532064	4.566847
1.A.3.b.iv	0.519868	0.601391	0.672044	0.687722	0.643198

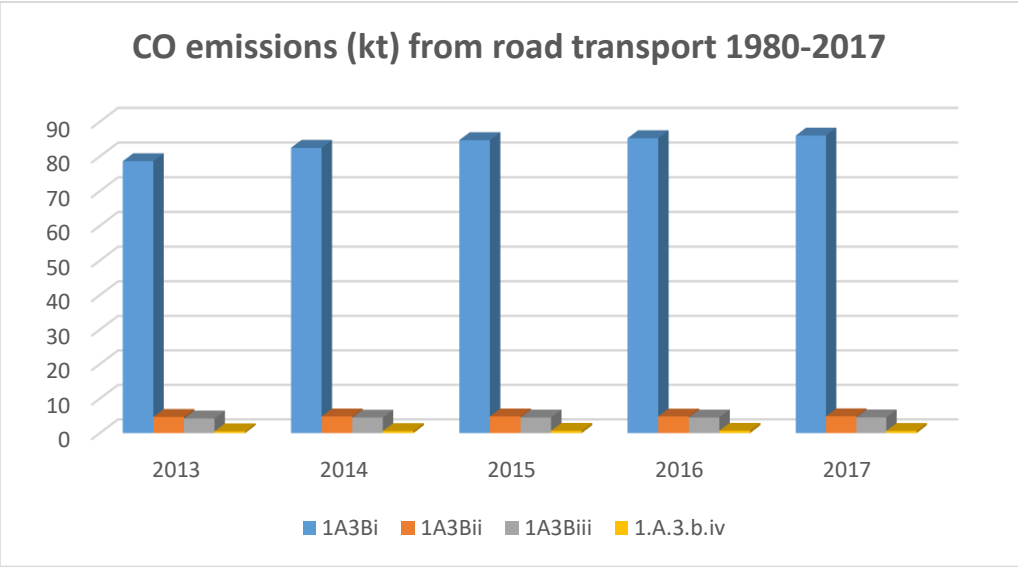


Figure 10-2

Table 12-3.NH_3

	2013	2014	2015	2016	2017
1A3Bi	1.028419	1.07874	1.107638	1.114883	1.125133
1A3Bii	0.020781	0.02147	0.021474	0.021402	0.021597
1A3Biii	0.007261	0.007729	0.007748	0.007773	0.007832
1.A.3.b.iv	6.16E-05	7.13E-05	7.97E-05	8.15E-05	7.62E-05

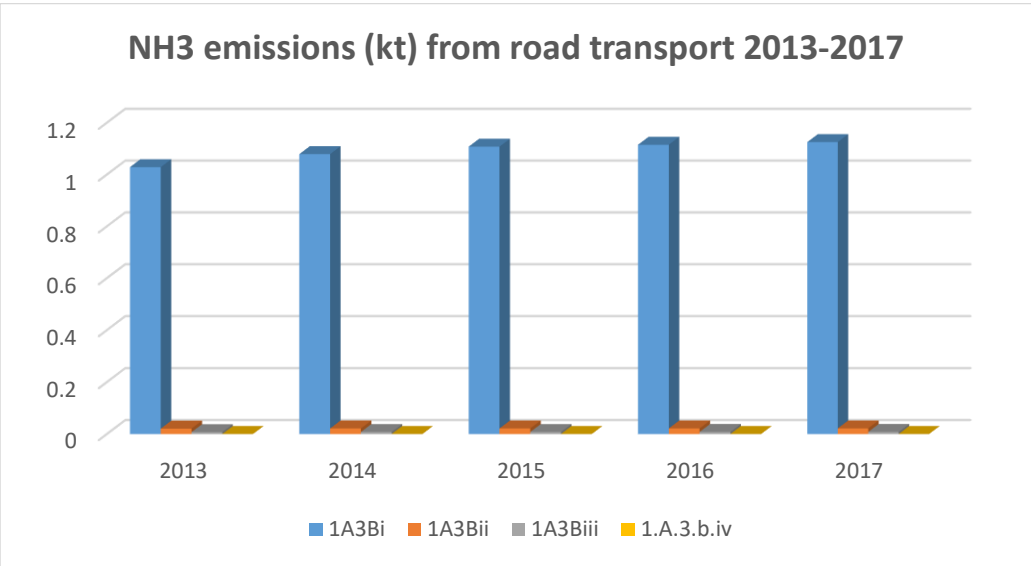


Figure 10-3

The emission factors used in the calculation do not yet take into account change in techniques over the years, therefore the trend is currently only showing the fuel use development in the different car types.

Methodological issues

In Azerbaijan, all the information needed to use the Tier 2/3 methodology presented in the Guidebook is not yet collected. Therefore the calculation has been simplified using the available statistical data.

The available data includes

- The number vehicles in the different vehicle categories
- Fuel use in some aggregated vehicle categories
- Total fuel consumption for the following years 2007-2017

In the calculation, the annual fuel consumption from the Energy Yearbook has been used for gasoline and diesel together with the number of different vehicles and the aggregated fuel consumption of some vehicle groups.

Fuel consumption levels (emission factors) are taken from the Guidebook in grammes per kilometer, except for heavy duty vehicles, for which the gasoline use is an expert estimate of 30 litres/100 kilometers.
The typical kilometers driven by the different vehicle types (km/a) have been received from national experts (“Towards the Healthly Life” Ecological Public Union).

The kilometers driven in the different vehicle categories (gasoline and diesel) are presented in Table 13.

Table 13

Categories of road vehicles		Average annual mileage driven by vehicle type (km)
passenger car	gasoline	14000
	diesel	13000
Heavy-duty vehicles	gasoline	22000
	diesel	25000
Light commercial vehicles	gasoline	25000
	diesel	27000
Motosiclets, mopeds	gasoline	12000

The fuel consumption calculated from the driven kilometers by vehicle categories using the Guidebook EFs are presented in Table 14.

Category	Fuel	CO (g/kg fuel) Mean	NMVOC (g/kg fuel) Mean	NOx (g/kg fuel) Mean	TSP(g/kg fuel) Mean	N_2O (g/kg) Mean	NH3 (g/kg fuel) Mean	ID(l,2,3-cd)P (g/kg fuel) Mean	Pb (g/kg fuel) Mean	B(k)F (g/kg fuel) Mean	B(b)F (g/kg fuel) Mean	B(a)P (g/kg fuel) Mean
PC	Petrol	84.7	10.1	8.73	0.03	0.21	1.11	8.90E-06	3.30E-05	3.90E-06	7.90E-06	5.50E-06
	Diesel	3.33	0.70	13	1.10	0.09	0.07	2.12E-05	5.20E-05	1.18E-05	2.24E-05	2.14E-05
	LPG	84.7	13.6	15.2	0.00	0.089	0.08	2.00E-07	n.a	2.00E-07	n.a	2.00E-07
LCV	Petrol	152	14.6	13.2	0.02	0.19	0.67	6.90E-06	3.30E-05	3.00E-06	6.10E-06	4.20E-06
	Diesel	7.4	1.54	14.9	1.52	0.06	0.04	1.58E-05	5.20E-05	8.70E-06	1.66E-05	1.58E-05
HDV	Diesel	7.58	1.92	33.4	0.94	0.05	0.01	7.90E-06	5.20E-05	3.44E-05	3.08E-05	5.10E-06
	LPG	5.70	0.26	13.00	0.02	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Two-wheel	Petrol	498	131	6.64	2.20	0.06	0.06	1.02E-05	3.30E-05	6.80E-06	9.40E-06	8.40E-06

From the fuel use in the different vehicle categories emissions have been calculated using emission factors from the 2016 Guidebook.

Uncertainty and time series consistency

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

The calculations will be revised when collection of technical data has been made so that the Guidebook methods can be fully implemented or a COPERT method implemented.

In case the option above will take a longer time, we try to reflect the actual development of the fleet and driven kilometers by vehicle categories from the 1990's by changing the fuel consumptions to meet the actual consumptions at each period of time.

FR 1A3bv Road transport: Gasoline evaporation

Source category description

This category includes evaporation from the vehicles.

Emission trend

The emissions from 1A3bv category are presented in Table 15 and in Figure 11.

Table 15. Emissions from Gasoline evaporation

	2013	2014	2015	2016	2017
NMVOC	3.440469	3.601507	3.689073	3.712	3.748431

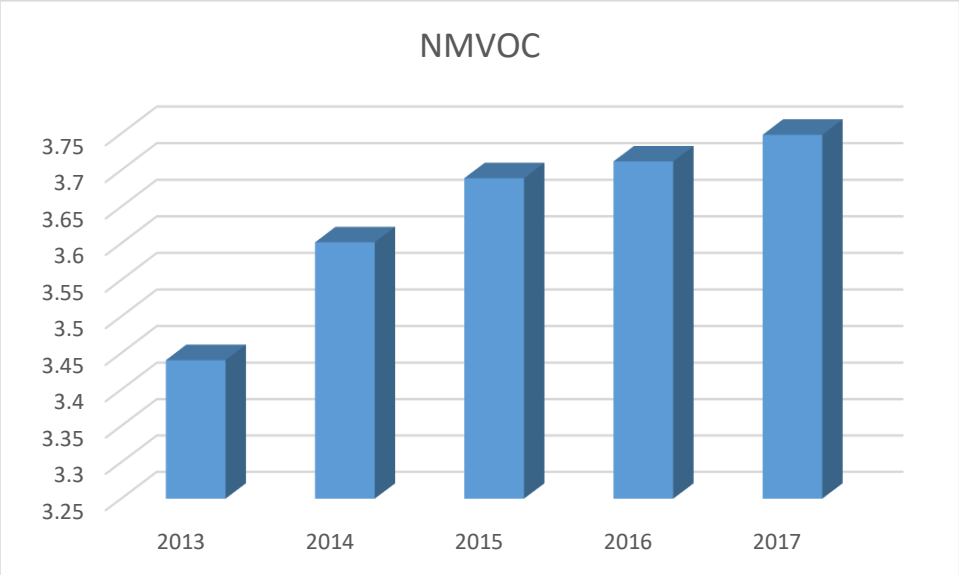


Figure 11

Methodological issues

Emission factors

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook 2016.

Pollutant	Vehicle type	Unit	EF				Average EF
Daily temperature range			**20 to 35 °C**	**10 to 25 °C**	**0 to 15 °C**	**-5 to 10 °C**	
NMVOC	Gasoline PCs	g/vehicle/day	14.6	7.8	5.7	4.0	**8.0**
NMVOC	Gasoline LDVs	g/vehicle/day	22.2	12.7	9.3	6.5	**12.7**
NMVOC	Two-wheel vehicles	g/vehicle/day	7.5	4.6	3.4	2.6	**4.525**

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

None

NFR 1A3bvi Road transport: Automobile tyre and brake wear

Source category description

The emissions from this category are calculated based on the number of transport vehicles and the average annual kilometers.

Emission trend

The emissions from 1A3bvi category are presented in Table 16 and in Figure 12.

Table 16. Emissions from Automobile tyre and brake wear

	2013	2014	2015	2016	2017
$PM_{2.5}$	0.215134	0.227576	0.230849	0.231629	0.233513
PM_{10}	0.400913	0.424117	0.43022	0.431675	0.435181
TSP	0.528689	0.559274	0.567323	0.569242	0.573869

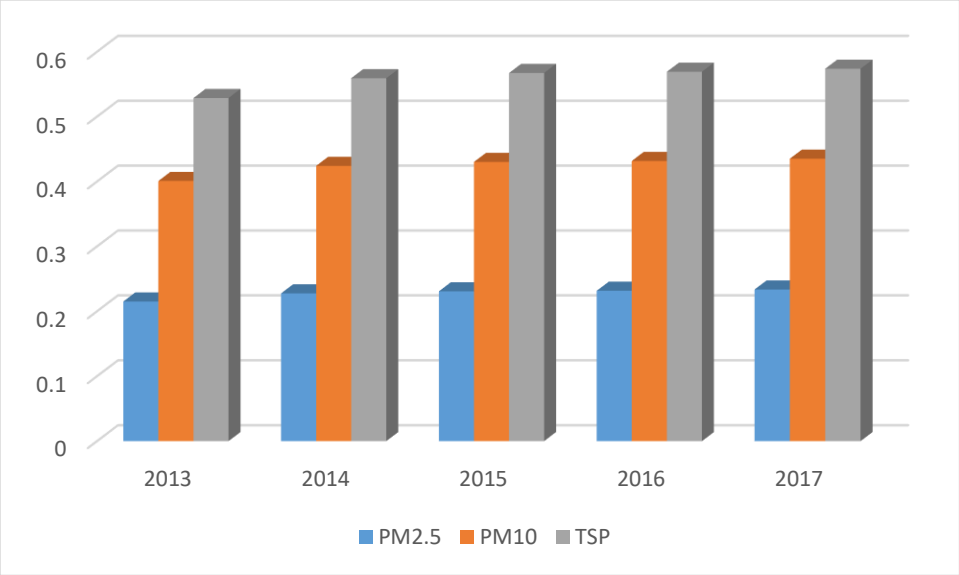


Figure 12

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

TSP	Two-wheelers	0.0083	g km^{-1} $vehicle^{-1}$
PM_{10}	Two-wheelers	0.0064	g km^{-1} $vehicle^{-2}$
PM_{25}	Two-wheelers	0.0034	g km^{-1} $vehicle^{-3}$
TSP	Passenger cars	0.0182	g km^{-1} $vehicle^{-4}$
PM_{10}	Passenger cars	0.0138	g km^{-1} $vehicle^{-5}$
PM_{25}	Passenger cars	0.0074	g km^{-1} $vehicle^{-6}$
TSP	Light duty trucks	0.0286	g km^{-1} $vehicle^{-7}$
PM_{10}	Light duty trucks	0.0216	g km^{-1} $vehicle^{-8}$
PM25	Light duty trucks	0.0117	g km^{-1} $vehicle^{-9}$
TSP	Heavy duty trucks	0.0777	g km^{-1} $vehicle^{-10}$
PM_{10}	Heavy duty trucks	0.059	g km^{-1} $vehicle^{-11}$
PM_{25}	Heavy duty trucks	0.0316	g km^{-1} $vehicle^{-12}$

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Calculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission.

Source-specific planned improvements

None

NFR 1A3bvii Road transport: Automobile road abrasion

Source category description

The emissions from this category are calculated based on the number of transport vehicles and the average annual kilometers.

Emission trend

The emissions from 1A3bvii category are presented in Table 17 and in Figures 13.

Table 17. Emissions from 1A3bvii category

	2013	2014	2015	2016	2017
$PM_{2.5}$	0.121839	0.129199	0.131017	0.131427	0.132422
PM_{10}	0.224168	0.237733	0.241062	0.24181	0.243637
TSP	0.448336	0.475466	0.482123	0.48362	0.487275

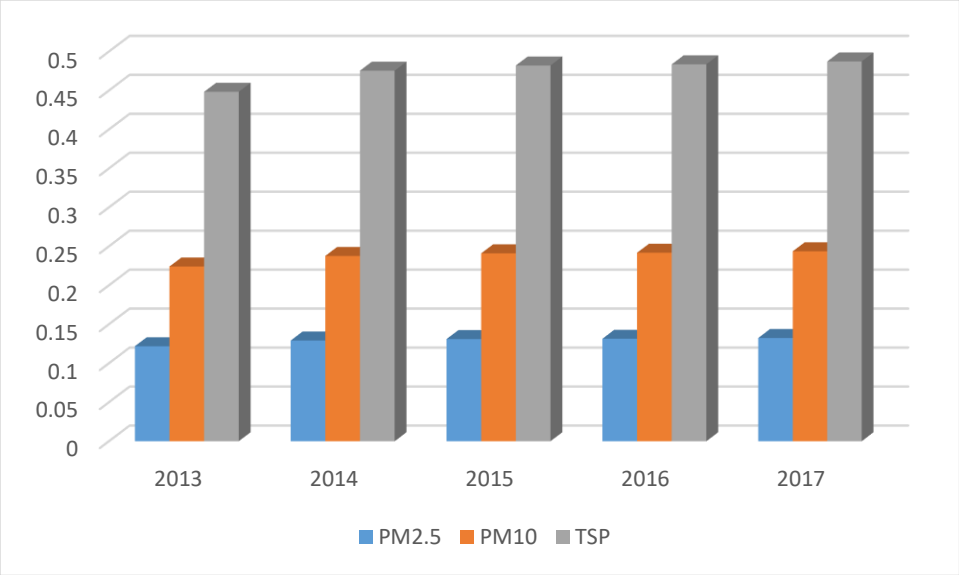


Figure 13

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

TSP	Two-wheelers	0.006	g km^{-1} $vehicle^{-1}$
PM_{10}	Two-wheelers	0.003	g km^{-1} $vehicle^{-2}$
PM_{25}	Two-wheelers	0.0016	g km^{-1} $vehicle^{-3}$
TSP	Passenger cars	0.015	g km^{-1} $vehicle^{-4}$
PM_{10}	Passenger cars	0.0075	g km^{-1} $vehicle^{-5}$
PM_{25}	Passenger cars	0.0041	g km^{-1} $vehicle^{-6}$
TSP	Light duty trucks	0.015	g km^{-1} $vehicle^{-7}$
PM_{10}	Light duty trucks	0.0075	g km^{-1} $vehicle^{-8}$
PM25	Light duty trucks	0.0041	g km^{-1} $vehicle^{-9}$
TSP	Heavy duty trucks	0.076	g km^{-1} $vehicle^{-10}$
PM_{10}	Heavy duty trucks	0.038	g km^{-1} $vehicle^{-11}$
PM_{25}	Heavy duty trucks	0.0205	g km^{-1} $vehicle^{-12}$

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Calculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission.

Source-specific planned improvements

None

NFR 1A3c Railways

Source category description

Railways have been developed and improved based on the demand for cargo transportation. 1241,4 km or 59,7% of the railways are electrified and 40,3% are locomotive based. Emissions from railways are released from diesel fuelled passenger trains and cargo trains.

Emission trend

The emissions from 1A3c category are presented in Table 18 and in Figures 14-1,14-2,14-3.

The reason for rising fuel use is increased demand of population and economy for railways services. The cause for falling fuel use in 2016 will be studied.

Table 18. Emissions from Railways

	2013	2014	2015	2016	2017
NOx	0.236725	0.347073	0.326113	0.19986	0.447064
NMVOC	0.021007	0.030799	0.028939	0.017736	0.039673
NH3	3.16E-05	4.64E-05	4.36E-05	2.67E-05	5.97E-05
$PM_{2.5}$	0.006189	0.009074	0.008526	0.005225	0.011689
PM_{10}	0.006505	0.009538	0.008962	0.005492	0.012286
TSP	0.006867	0.010068	0.00946	0.005797	0.012968
BC	0.004023	0.005898	0.005542	0.003396	0.007598
CO	0.048339	0.070872	0.066592	0.040811	0.09129
Cd	4.52E-05	6.62E-05	6.22E-05	3.81E-05	8.53E-05

Cr	0.000226	0.000331	0.000311	0.000191	0.000427
Cu	0.00768	0.01126	0.01058	0.006484	0.014504
Ni	0.000316	0.000464	0.000436	0.000267	0.000597
Se	4.52E-05	6.62E-05	6.22E-05	3.81E-05	8.53E-05
Zn	0.004518	0.006624	0.006224	0.003814	0.008532
benzo(a) pyrene	0.000136	0.000199	0.000187	0.000114	0.000256
benzo(b) fluoranthene	0.000226	0.000331	0.000311	0.000191	0.000427
Total 1-4	0.000361	0.00053	0.000498	0.000305	0.000683

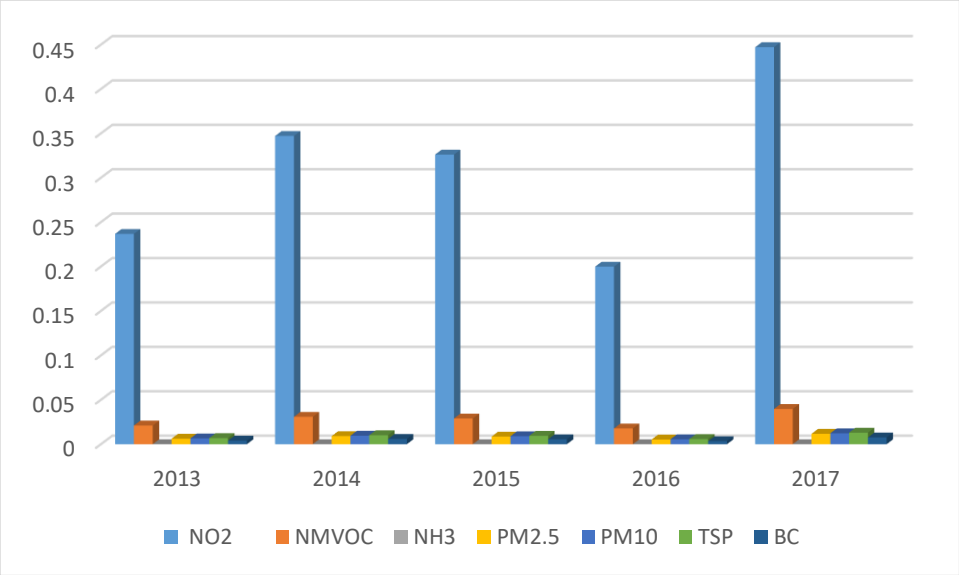


Figure 14-1

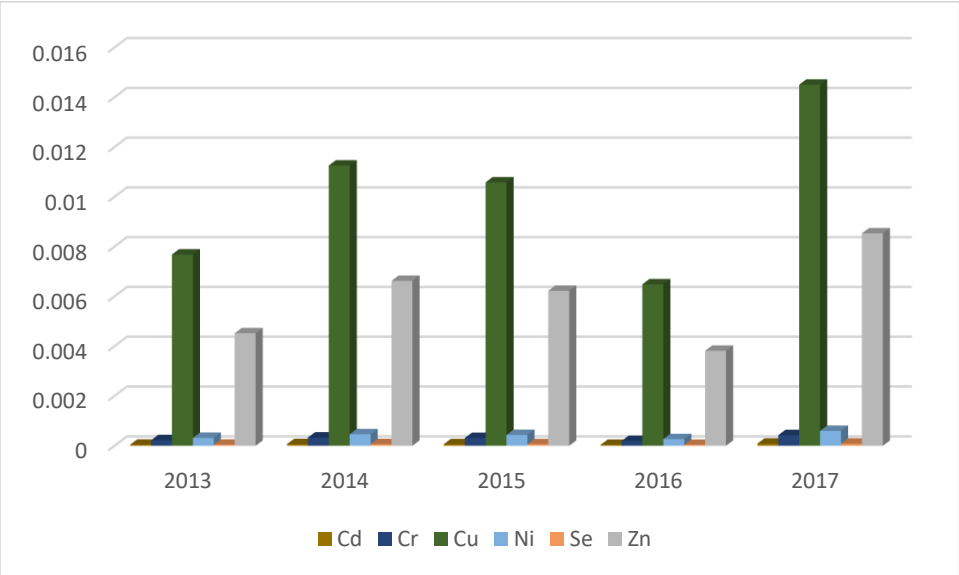


Figure 14-2

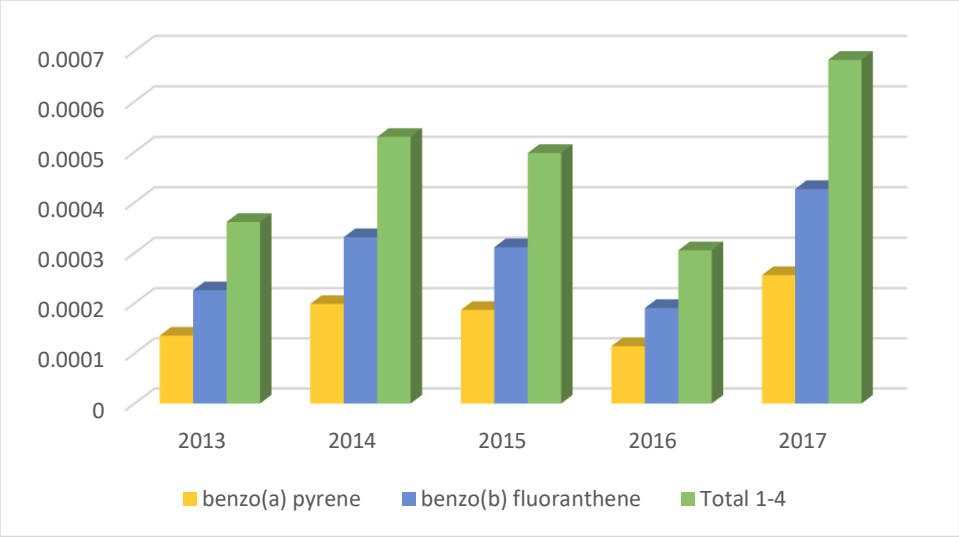


Figure 14-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NO_x	52.4	kg/tonne fuel
CO	10.7	kg/tonne fuel
NMVOC	4.65	kg/tonne fuel
NH_3	0.007	kg/tonne fuel
TSP	1.52	kg/tonne fuel
PM_{10}	1.44	kg/tonne fuel
$PM_{2.5}$	1.37	kg/tonne fuel
Cd	0.01	g/tonne fuel
Cr	0.05	g/tonne fuel
Cu	1.7	g/tonne fuel
Ni	0.07	g/tonne fuel
Se	0.01	g/tonne fuel
Zn	1	g/tonne fuel
Benzo(a)pyrene	0.03	g/tonne fuel
Benzo(b)fluoranthene	0.05	g/tonne fuel
Benzo(a)anthracene	0.08	g/tonne fuel
Dibenzo(a,h)anthracene	0.01	g/tonne fuel
BC	0.65	

Activity data

Activity data is received from the Statistical Committee web page(https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Diesel	192	281.5	264.5	162.1	362.6

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A3dii National navigation (shipping)

Source category description

Emission trend

The emissions from 1A3dii category are presented in Table 19 and in Figures 15-1,15-2,15-3.

Table 19. Emissions from National navigation

	2013	2014	2015	2016	2017
NOx	2.512	2.355	1.95465	2.25295	3.7209
NMVOC	0.0896	0.084	0.06972	0.08036	0.13272
SOx	0.64	0.6	0.498	0.574	0.948
PM2.5	0.0448	0.042	0.03486	0.04018	0.06636
PM10	0.048	0.045	0.03735	0.04305	0.0711
TSP	0.048	0.045	0.03735	0.04305	0.0711
BC	0.013888	0.01302	0.010807	0.012456	0.020572
CO	0.2368	0.222	0.18426	0.21238	0.35076
Pb	0.00416	0.0039	0.003237	0.003731	0.006162
Cd	0.00032	0.0003	0.000249	0.000287	0.000474
Hg	0.00096	0.0009	0.000747	0.000861	0.001422
As	0.00128	0.0012	0.000996	0.001148	0.001896
Cr	0.0016	0.0015	0.001245	0.001435	0.00237
Cu	0.02816	0.0264	0.021912	0.025256	0.041712
Ni	0.032	0.03	0.0249	0.0287	0.0474
Se	0.0032	0.003	0.00249	0.00287	0.00474
Zn	0.0384	0.036	0.02988	0.03444	0.05688
PCDD/ PCDF	0.00416	0.0039	0.003237	0.003731	0.006162
HCB	2.56E-09	2.4E-09	1.99E-09	2.3E-09	3.79E-09
PCBs	1.22E-09	1.14E-09	9.46E-10	1.09E-09	1.8E-09

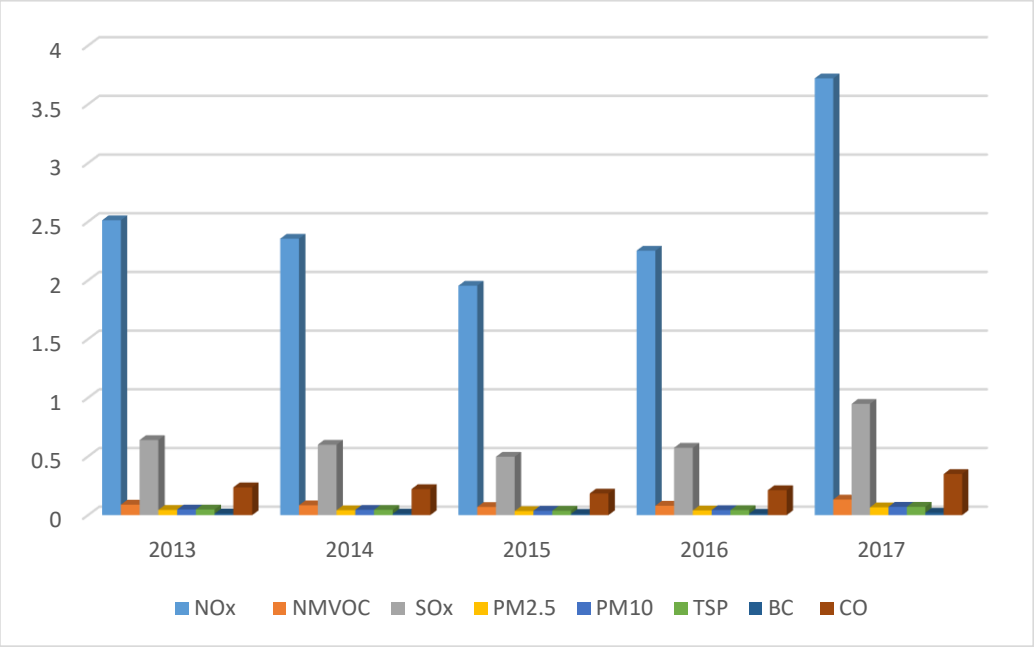


Figure 15-1

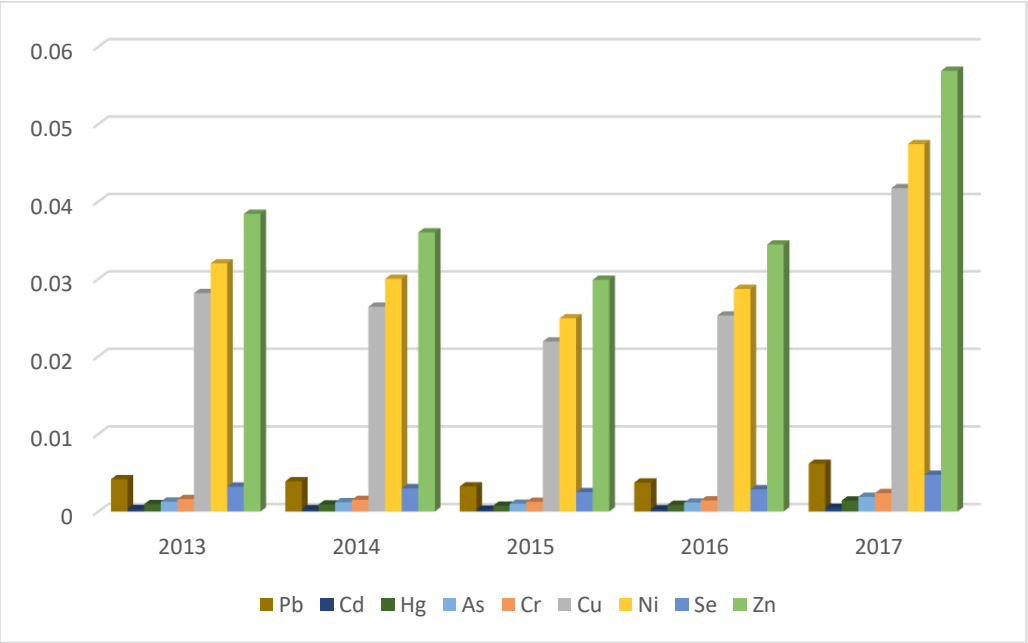


Figure 15-2

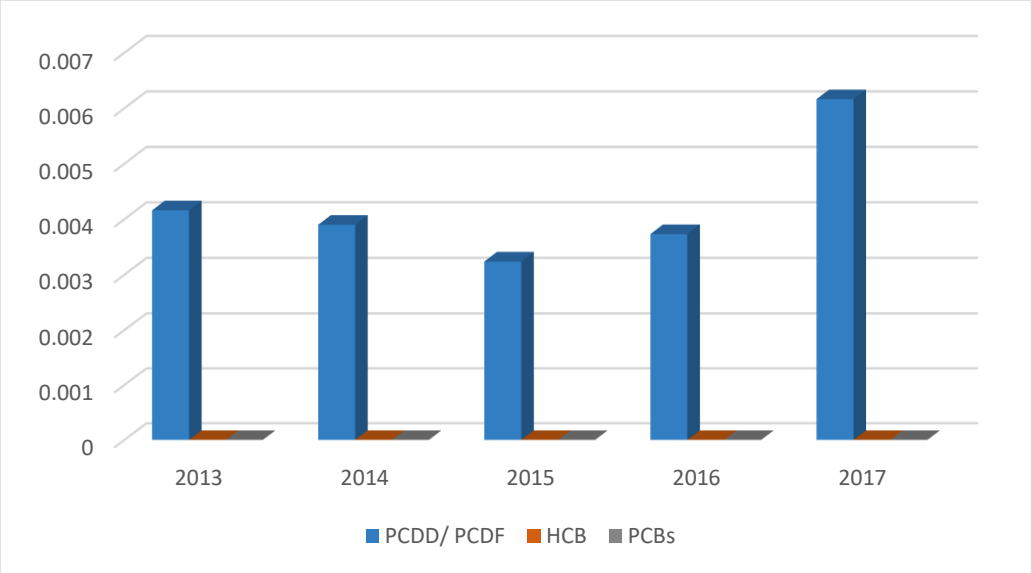


Figure 15-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NO_x	78.5	kg/tonne fuel
CO	7.4	kg/tonne fuel
NMVOC	2.8	kg/tonne fuel
SOx	20	kg/tonne fuel
TSP	1.5	kg/tonne fuel
PM_{10}	1.5	kg/tonne fuel
$PM_{2.5}$	1.4	kg/tonne fuel
Pb	0.13	g/tonne fuel
Cd	0.01	g/tonne fuel
Hg	0.03	g/tonne fuel
As	0.04	g/tonne fuel
Cr	0.05	g/tonne fuel
Cu	0.88	g/tonne fuel
Ni	1	g/tonne fuel
Se	0.1	g/tonne fuel
Zn	1.2	g/tonne fuel
PCB	0.038	mg/tonne fuel
PCDD/F	0.13	ug I-TEQ/tonne
HCB	0.08	mg/tonne fuel

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

	2013	2014	2015	2016	2017
Diesel, kt	32.0	30.0	24.9	28.7	47.4

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

6. Small combustion (1A4) and Non-road machinery (1a4 aii, bii, cii, ciii)

NFR 1A4ai Commercial/institutional: Stationary

Source category description

This source covers emissions from energy use for heating and electricity in the commercial and institutional buildings.

Emission trend

The emissions from 1A4ai category are presented in Table 20 and in Figures 16-1,16-2,16-3.
In the latest years the fuel use is increasing due to start of new activities and organizations.

Table 20. Emissions from Commercial/institutional: Stationary

	2013	2014	2015	2016	2017
NOx	0.629158	0.670634	0.74454	0.878857	0.941166
NMVOC	0.430812	0.468844	0.463834	0.384504	0.474706
SOx	0.018535	0.018241	0.018062	0.045746	0.028429
NH3	0.033592	0.036393	0.03266	0.02815	0.029863
PM2.5	0.134107	0.144574	0.131385	0.125398	0.126169
PM10	0.136831	0.147524	0.134033	0.12768	0.128591
TSP	0.143186	0.15441	0.140212	0.133006	0.13424
BC	0.036754	0.039362	0.035488	0.037957	0.035037
CO	0.720209	0.781504	0.755985	0.655143	0.762815
Pb	0.024595	0.026644	0.023932	0.020665	0.021922
Cd	0.011809	0.012794	0.011483	0.0099	0.010503
Hg	0.004189	0.004607	0.005141	0.003764	0.005784
As	0.000855	0.000938	0.001029	0.000768	0.001143
Cr	0.020987	0.02273	0.020425	0.017719	0.018746
Cu	0.005484	0.005932	0.005331	0.004737	0.004929

Ni	0.001905	0.002065	0.001878	0.001606	0.001744
Se	0.000857	0.000932	0.000946	0.000808	0.001003
Zn	0.472271	0.510557	0.459816	0.414499	0.428405
PCDD/PCDF	0.094443	0.102331	0.092816	0.080205	0.086199
benzo(a) pyrene	0.009084	0.009841	0.008833	0.007614	0.008079
benzo(b) fluoranthene	0.014547	0.01576	0.014149	0.012201	0.012946
benzo(k) fluoranthene	0.004547	0.004926	0.004423	0.003812	0.004047
Indeno (1,2,3-cd) pyrene	0.003639	0.003943	0.00354	0.003051	0.003239
Total 1-4	0.031818	0.034471	0.030945	0.026677	0.028311
HCB	0.00454	0.004918	0.004414	0.003804	0.004036
PCBs	5.45E-05	5.9E-05	5.3E-05	4.56E-05	4.84E-05

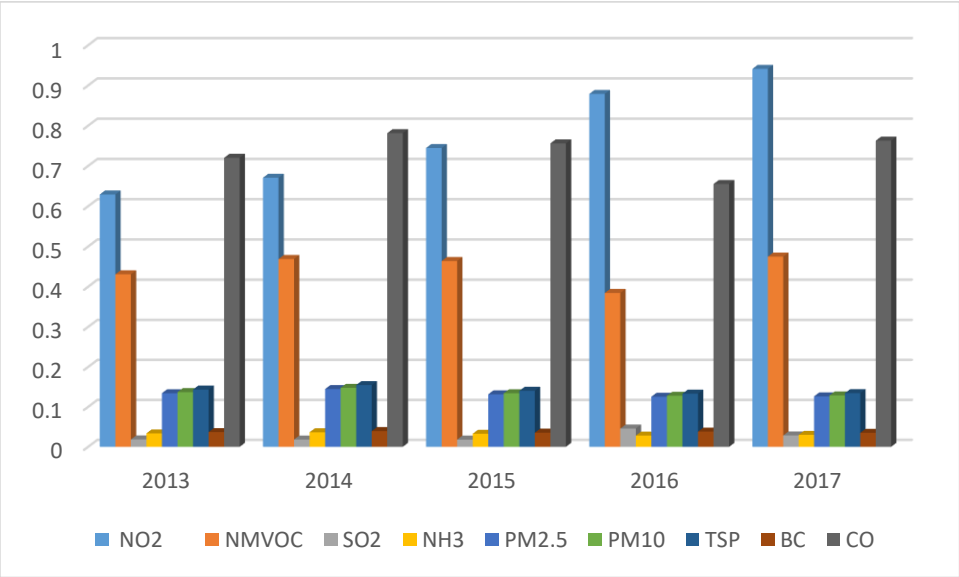


Figure 16-1

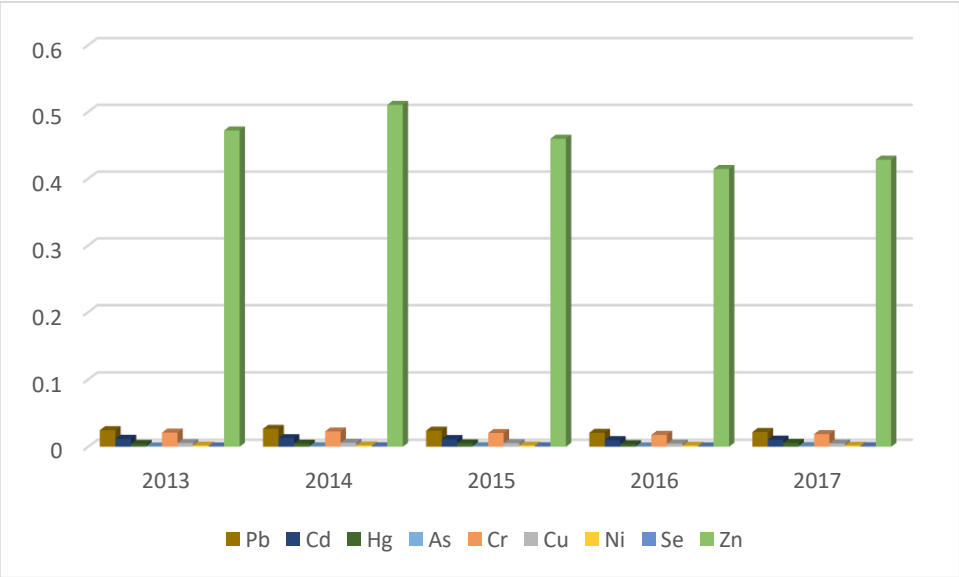


Figure 16-2

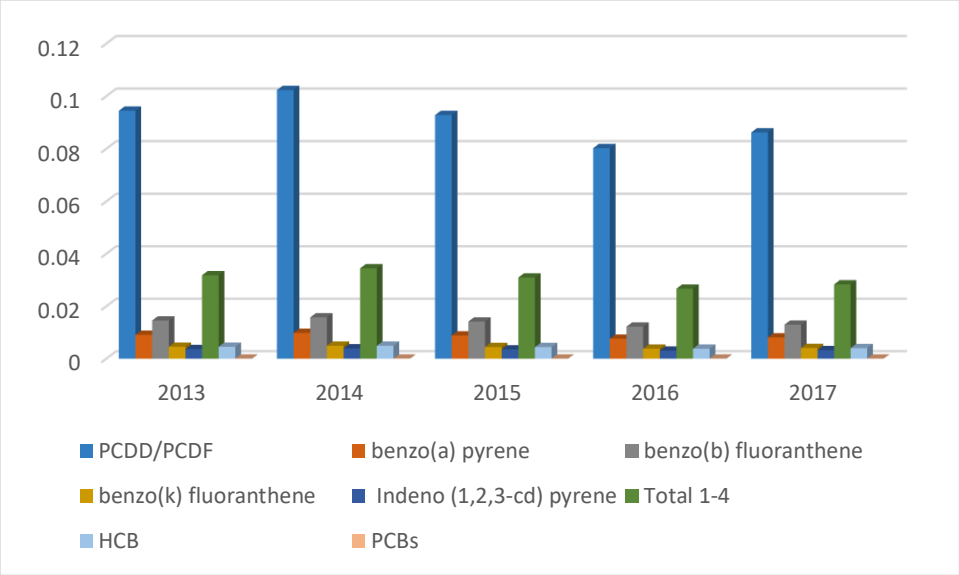


Figure 16-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	6796.4	7499.5	8593.2	6023	9811.9
Fuel oil, low sulphur	85	51	55.2	709.4	276.1
WOOD	907.9	983.6	882.7	760.8	807.1

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A4aii Commercial/institutional: Mobile

Source category description

The sector includes use of machinery in the commercial and institutional sector.

Emission trend

The emissions from 1A4aii category are presented in Table 21 and in Figures 17-1.7-2,17-3,17-4
The fuel use for this category is decreasing in the latest years without a clear indication of the reason. The issue will be further studied to the next submissions.

Table 21. Emissions from Commercial/institutional: Mobile category

	2013	2014	2015	2016	2017
NO_x	0.3228	0.33965	0.30209	0.2176	0.08688
NMVOC	0.0344	0.03609	0.03205	0.02296	0.00942
NH_3	6.6E-05	7.1E-05	6.3E-05	4.7E-05	1.6E-05
$PM_{2.5}$	0.01102	0.01245	0.01153	0.00945	0.0015
PM_{10}	0.01102	0.01245	0.01153	0.00945	0.0015
TSP	0.01102	0.01245	0.01153	0.00945	0.0015
CO	0.06615	0.07317	0.06695	0.05296	0.01174
Cd	5E-08	5.7E-08	5.3E-08	4.4E-08	6E-09
Cr	2.5E-07	2.9E-07	2.7E-07	2.2E-07	3E-08
Cu	8.5E-06	9.7E-06	9E-06	7.5E-06	1E-06
Ni	3.5E-07	4E-07	3.7E-07	3.1E-07	4.2E-08
Se	5E-08	5.7E-08	5.3E-08	4.4E-08	6E-09
Zn	5E-08	5.7E-08	5.3E-08	4.4E-08	6E-09
benzo(a) pyrene	0.00015	0.00017	0.00016	0.00013	1.8E-05
benzo(b) fluoranthene	0.00025	0.00029	0.00027	0.00022	0.00003
Total 1-4	0.0004	0.00046	0.00042	0.00035	4.8E-05

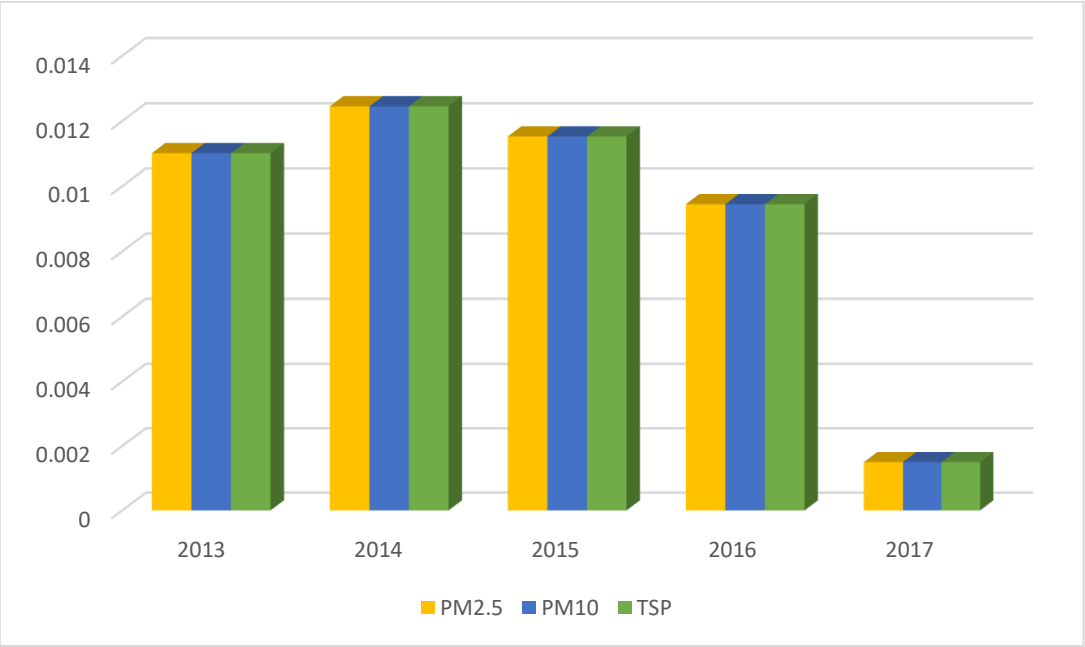


Figure 17-1

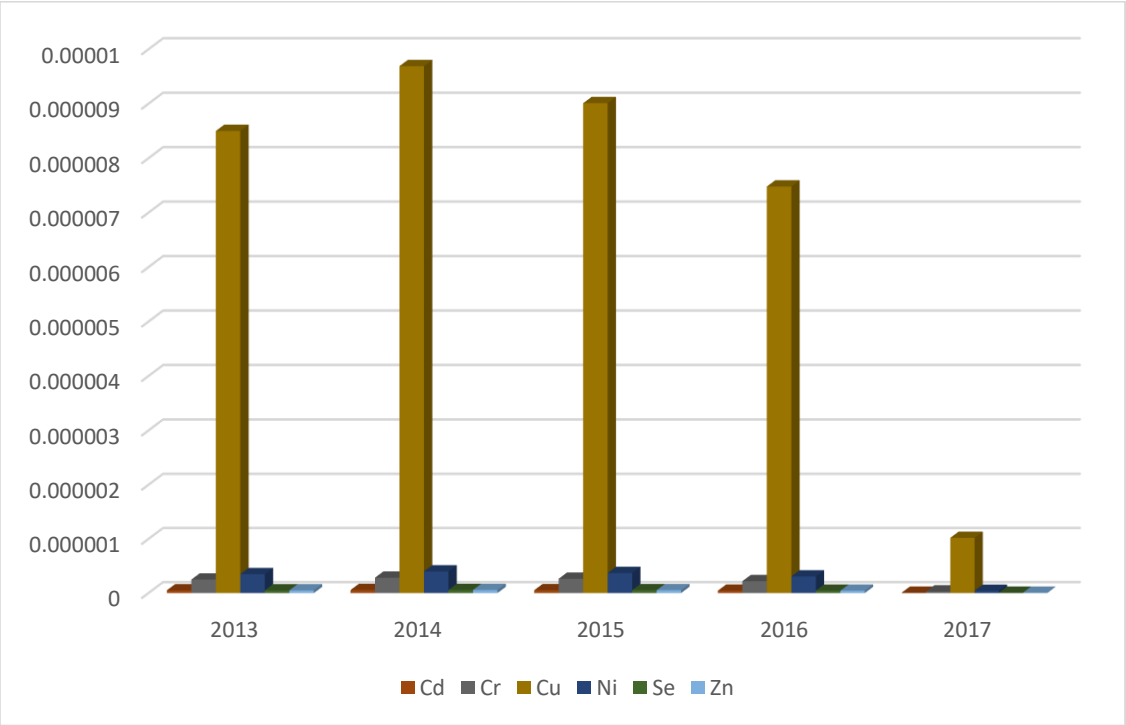


Figure 17-2

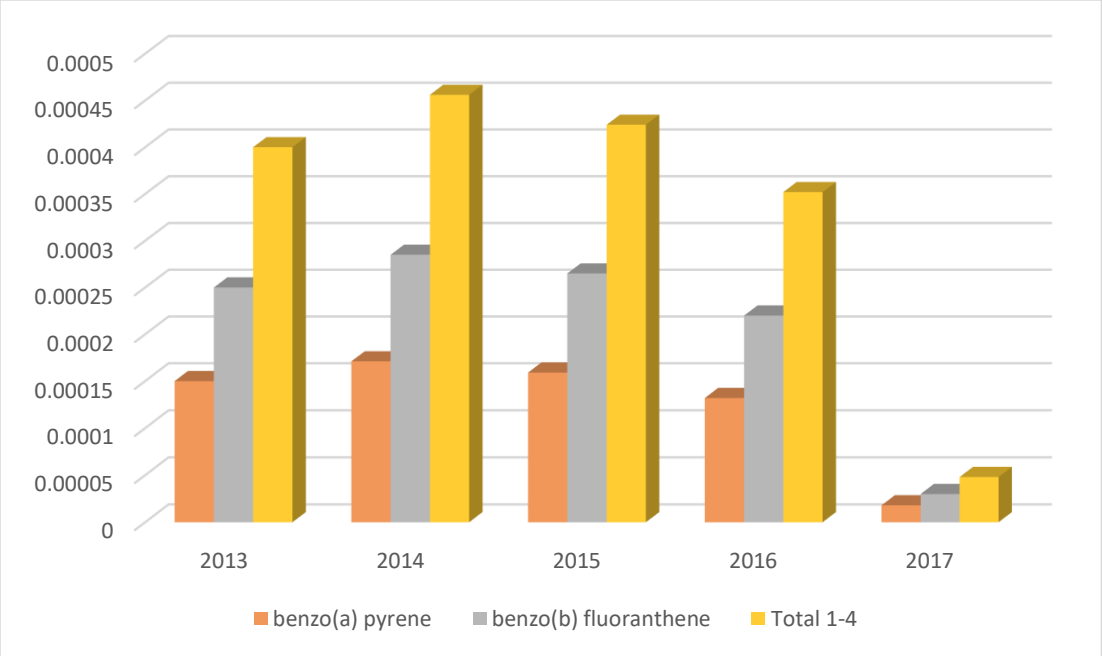


Figure 17-3

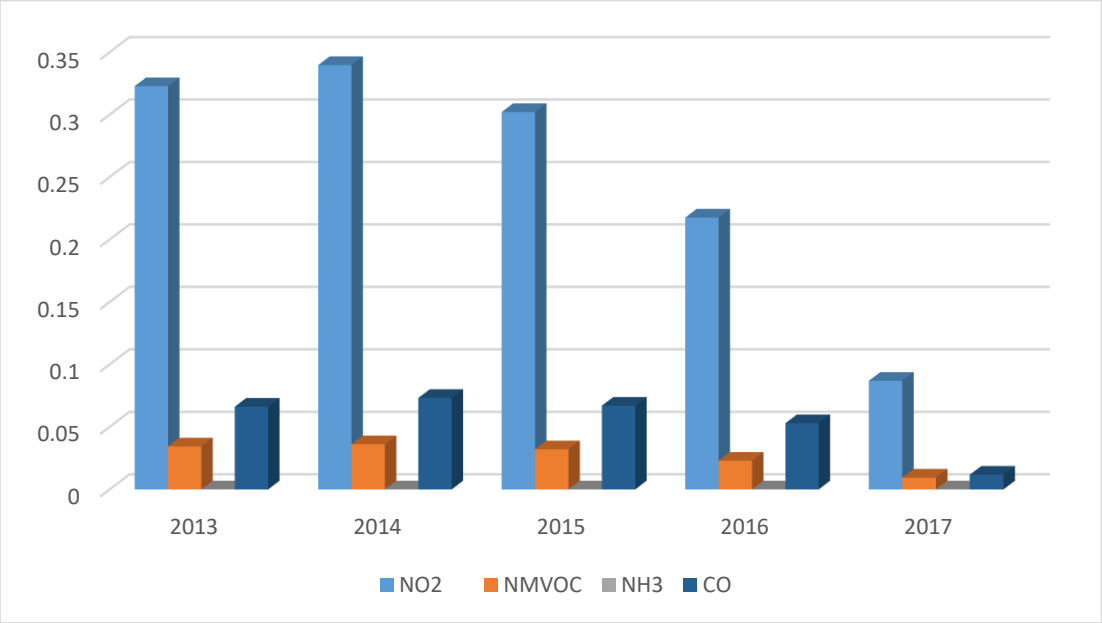


Figure 17-4

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Diesel	213.3	243.1	226.1	187.7	25.6
Liquefied petroleum gases	123.3	118.6	99.6	56.9	52.2

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A4bi Residential: Stationary

Source category description

Heat supply of residential houses and buildings in Baku city and regions of the republic is carried out by a centralized enterprise.

Emission trend

The emissions from 1A4bi category are presented in Table 22 and in Figures 18.

The emissions are decreasing due to strong decrease in combustion of wood, which as been replaced with the use of natural gas, see the table for fuel use below. The decreas of wood combustion can be seen in the emission trends.

Table 22. Emissions from Residential: Stationary category

	2013	2014	2015	2016	2017
NOx	4.98924	5.316669	5.644837	6.387167	5.674942
NMVOC	1.900872	1.579575	1.44374	0.526553	0.542646
SOx	0.059595	0.05564	0.054959	0.042661	0.039224
NH3	0.201082	0.16198	0.14462	0.033838	0.038836
PM2.5	2.237711	1.833102	1.657771	0.507092	0.543036
PM10	2.295163	1.879382	1.699091	0.51676	0.554132
TSP	2.410067	1.971942	1.781731	0.536096	0.576324
BC	0.21862	0.177756	0.159846	0.043838	0.048209
CO	13.91678	11.87208	11.0575	5.170088	5.089681
Pb	0.0777	0.062629	0.055943	0.013239	0.015145
Cd	0.037367	0.030107	0.026885	0.006315	0.00724
Hg	0.065068	0.069716	0.074218	0.084917	0.075385
As	0.011744	0.012514	0.013286	0.015029	0.013354
Cr	0.066141	0.053298	0.0476	0.011213	0.012844
Cu	0.017243	0.013892	0.012404	0.00291	0.003337
Ni	0.005793	0.004679	0.004187	0.00103	0.001166
Se	0.002463	0.002264	0.002215	0.001611	0.001492
Zn	1.470911	1.184919	1.057953	0.247688	0.284223
PCDD/PCDF	2.438063	2.002128	1.813963	0.57344	0.609445
benzo(a) pyrene	0.347637	0.28005	0.250046	0.058561	0.067193
benzo(b) fluoranthene	0.318937	0.256939	0.229416	0.053762	0.061676
benzo(k) fluoranthene	0.120728	0.097273	0.086862	0.020407	0.023394
Indeno (1,2,3-cd) pyrene	0.204033	0.164379	0.146776	0.034426	0.039484
Total 1-4	0.991334	0.79864	0.713101	0.167156	0.191746
HCB	0.014363	0.01157	0.01033	0.002417	0.002774
PCBs	0.000172	0.000139	0.000124	2.9E-05	3.33E-05

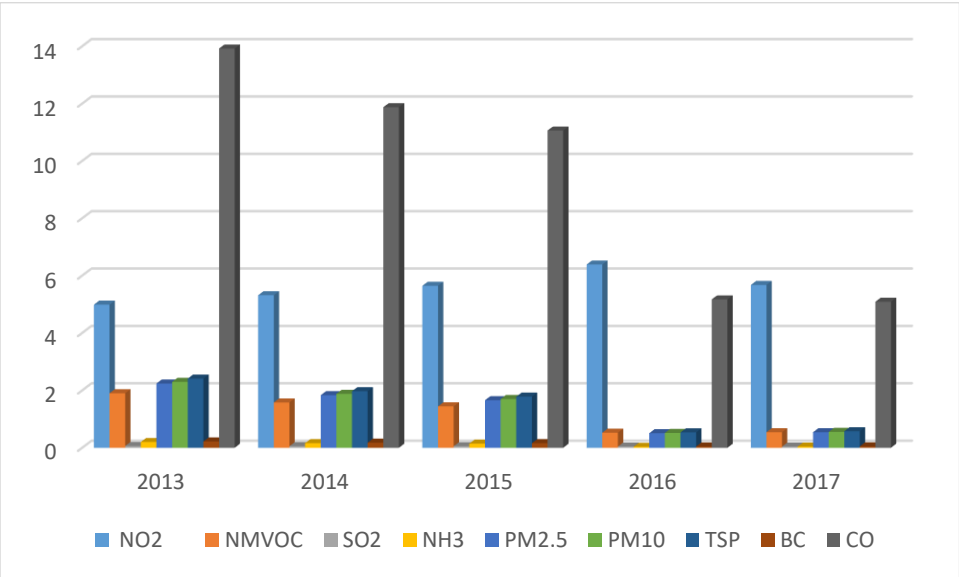


Figure 18-1

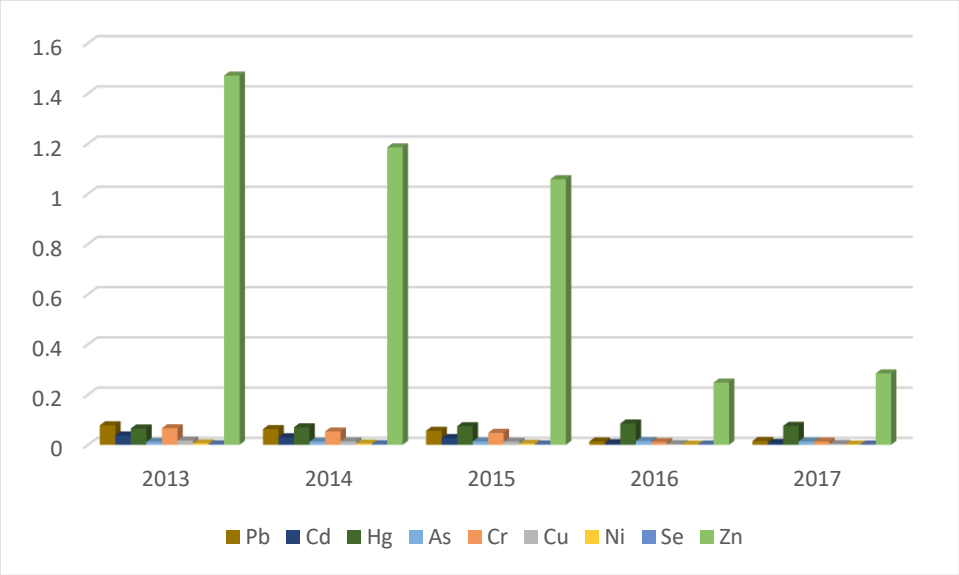


Figure 18-2

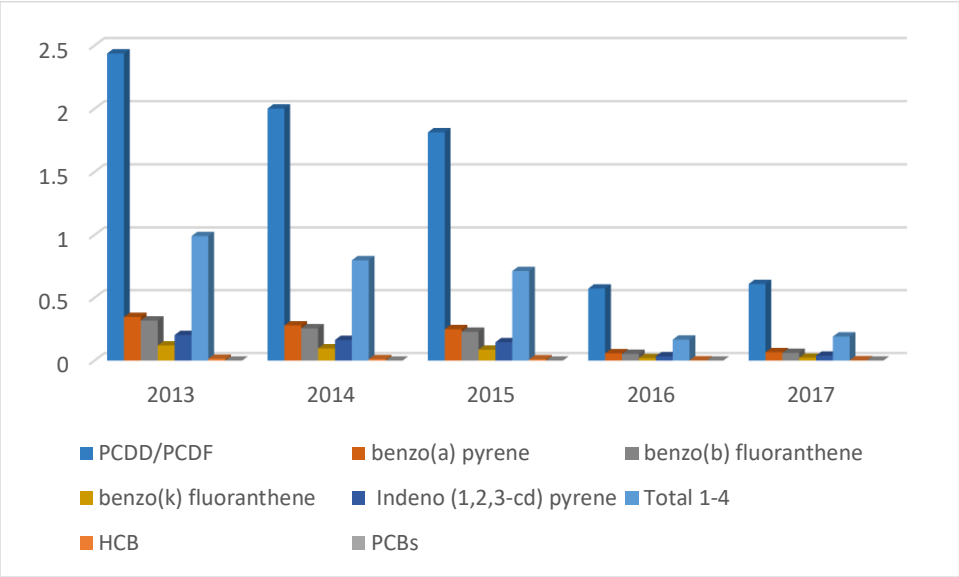


Figure 18-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	90111.4	100618.6	107442.3	124480.3	110403.1
Wood	2872.6	2314	2066	483.4	554.8

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR1A4bii Residential: Household and gardening (mobile)

Source category description

This category covers use of machinery in household and gardening activities.

Emission trend

The emissions from 1A4bii category are presented in Table 23 and in Figures 19-1,19-2,19-3,19-4.
The fuel use is decreasing in this sector and this can also be seen in the emissions. The reason for the decrease and especially in the use of motor gasoline in 2015 will be studied in the coming years.

Table 23. Emissions from Residential: Household and gardening (mobile)

	2013	2014	2015	2016	2017
NO_x	0.00445	0.00346	0.00198	0.00296	0.00346
NMVOC	0.11691	0.09093	0.05196	0.07794	0.09093
NH_3	3.2E-06	2.5E-06	1.4E-06	2.1E-06	2.5E-06
$PM_{2.5}$	0.00176	0.00137	0.00078	0.00118	0.00137
PM_{10}	0.00176	0.00137	0.00078	0.00118	0.00137
TSP	0.00176	0.00137	0.00078	0.00118	0.00137
CO	0.62602	0.48691	0.27823	0.41735	0.48691
Cd	1.3E-07	1.1E-07	9.9E-08	9.6E-08	9.2E-08
Cr	6.5E-07	5.6E-07	5E-07	4.8E-07	4.6E-07
Cu	2.2E-05	1.9E-05	1.7E-05	1.6E-05	1.6E-05
Ni	9E-07	7.8E-07	6.9E-07	6.7E-07	6.4E-07
Se	1.3E-07	1.1E-07	9.9E-08	9.6E-08	9.2E-08
Zn	1.3E-07	1.1E-07	9.9E-08	9.6E-08	9.2E-08
benzo(a) pyrene	0.0004	0.00034	0.0003	0.00029	0.00028

benzo(b) fluoranthene	0.00064	0.00055	0.00049	0.00047	0.00045
Total 1-4	0.00103	0.0009	0.00079	0.00077	0.00074

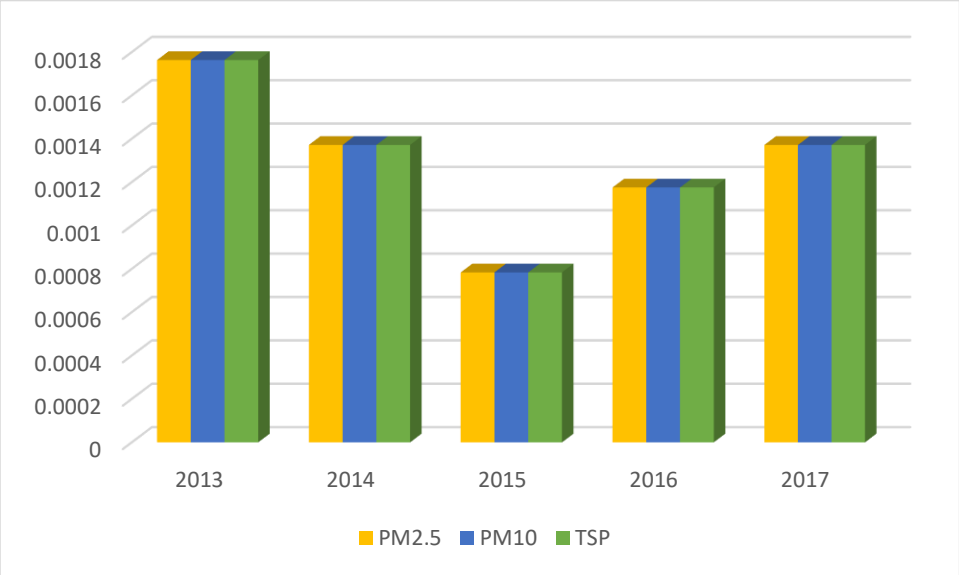


Figure 19-1

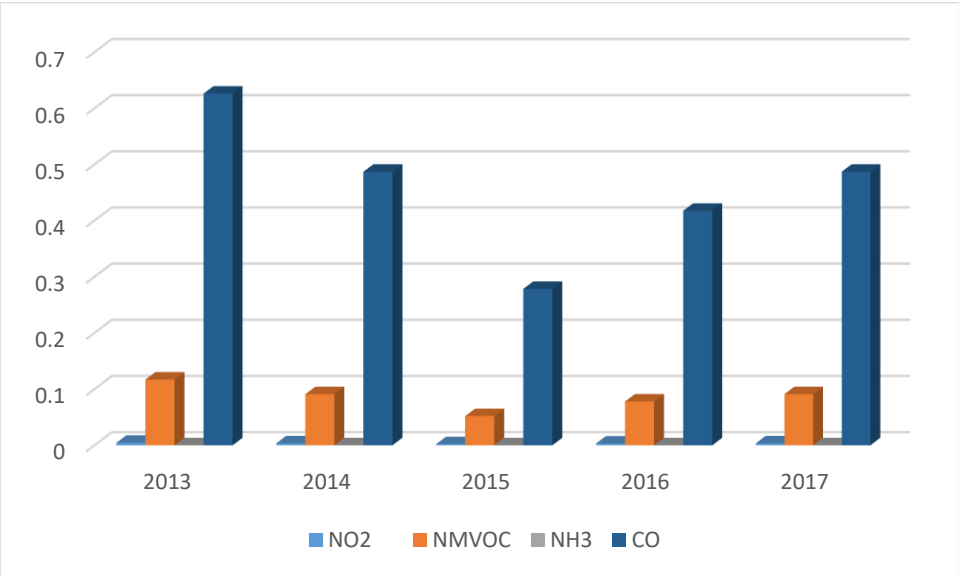


Figure 19-2

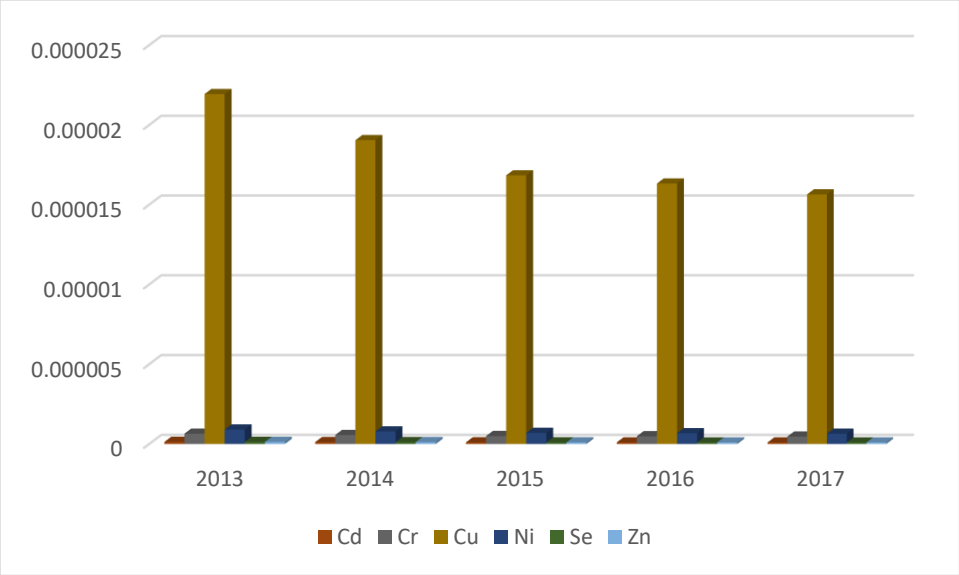


Figure 19-3

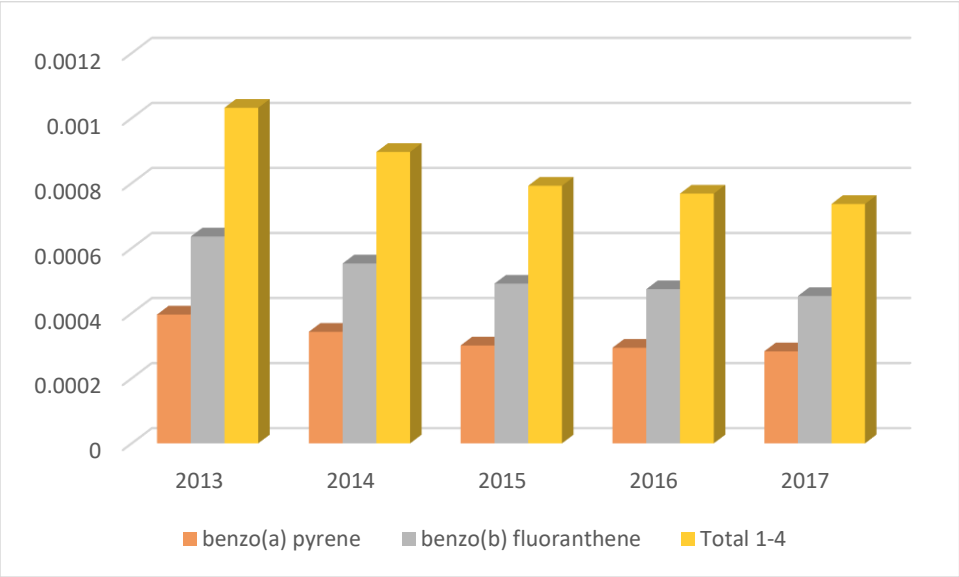


Figure 19-4

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/) .

TJ

	2013	2014	2015	2016	2017
Motor gasoline	38.9	30.2	17.3	25.9	30.2
Diesel	511.8	447.9	405.2	383.9	362.6

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A4ci Agriculture/Forestry/Fishing: Stationary

Source category description

This source covers heating and electricity use in agricultural, forestry and fishing buildings.

Emission trend

The emissions from 1A4ci category are presented in Table 24 and in Figures 20-1,20-2,20-3,20-4

Fuel use in this category has been steadily growing in the last decade. This is related to the increased agricultural activities, especially greenhouses.

Table 24. Emissions from Agriculture/Forestry/Fishing: Stationary

	2013	2014	2015	2016	2017
NOx	0.173022	0.173022	0.173022	0.240159	0.184448
NMVOC	0.069215	0.069215	0.069215	0.072921	0.076178
SOx	0.002747	0.002747	0.002747	0.00493	0.00258
NH3	0.002335	0.002335	0.002335	0.000855	0.002646
PM2.5	0.010783	0.010783	0.010783	0.006612	0.011948
PM10	0.010972	0.010972	0.010972	0.006681	0.012163
TSP	0.011414	0.011414	0.011414	0.006843	0.012663
BC	0.002684	0.002684	0.002684	0.001659	0.002925
CO	0.099808	0.099808	0.099808	0.098425	0.109908
Pb	0.001729	0.001729	0.001729	0.000659	0.001957

Cd	0.000822	0.000822	0.000822	0.000303	0.000932
Hg	0.00121	0.00121	0.00121	0.001535	0.001323
As	0.00023	0.00023	0.00023	0.000287	0.000251
Cr	0.001482	0.001482	0.001482	0.00058	0.001676
Cu	0.000387	0.000387	0.000387	0.000159	0.000436
Ni	0.000155	0.000155	0.000155	8.31E-05	0.000174
Se	0.000159	0.000159	0.000159	0.000181	0.000174
Zn	0.034261	0.034261	0.034261	0.0156	0.038466
PCDD/PCDF	0.007457	0.007457	0.007457	0.003852	0.008391
benzo(a) pyrene	0.000633	0.000633	0.000633	0.000233	0.000717
benzo(b) fluoranthene	0.001016	0.001016	0.001016	0.000379	0.001151
benzo(k) fluoranthene	0.000318	0.000318	0.000318	0.000119	0.00036
Indeno (1,2,3-cd) pyrene	0.000255	0.000255	0.000255	9.55E-05	0.000289
Total 1-4	0.002221	0.002221	0.002221	0.000826	0.002516
HCB	0.000316	0.000316	0.000316	0.000116	0.000358
PCBs	3.79E-06	3.79E-06	3.79E-06	1.39E-06	4.29E-06

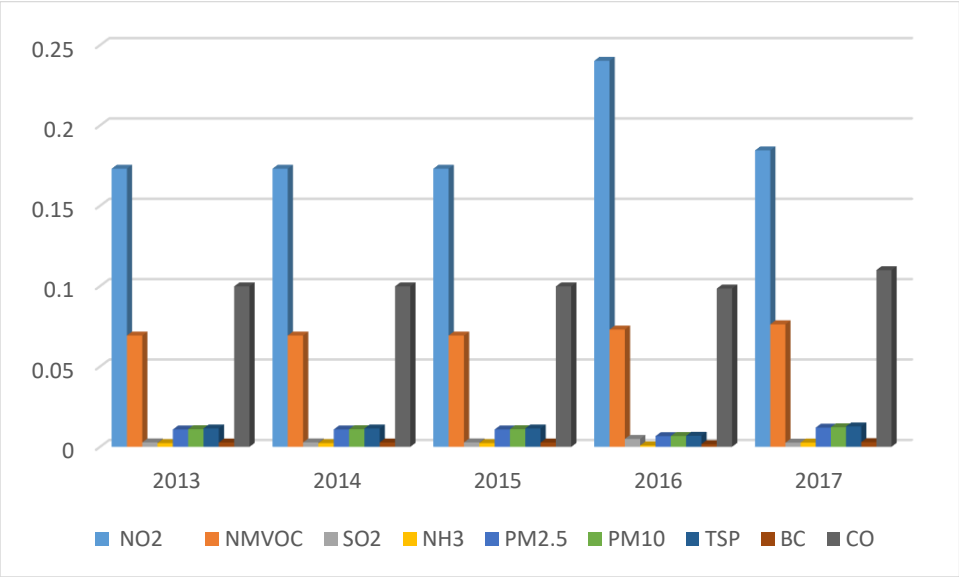


Figure 20-1

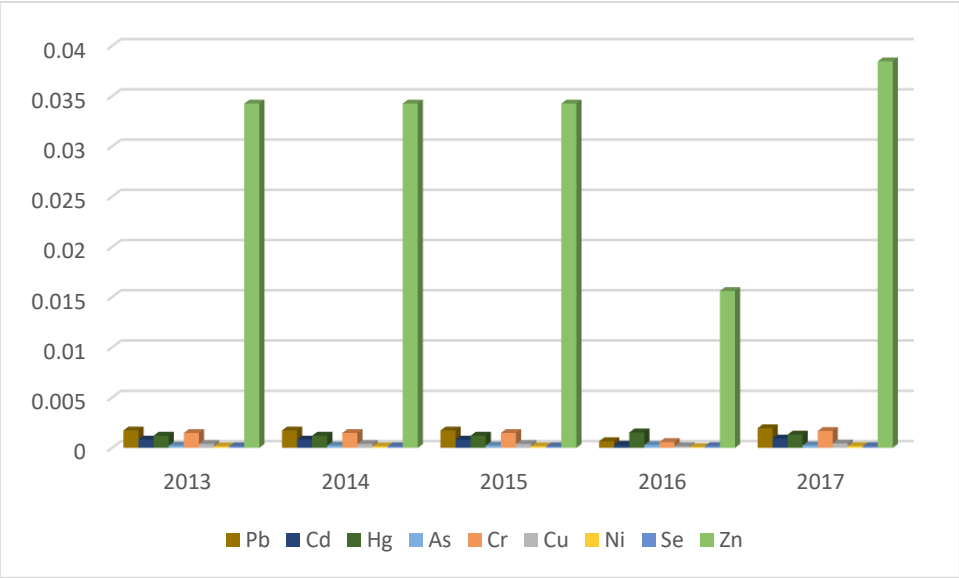


Figure 20-2

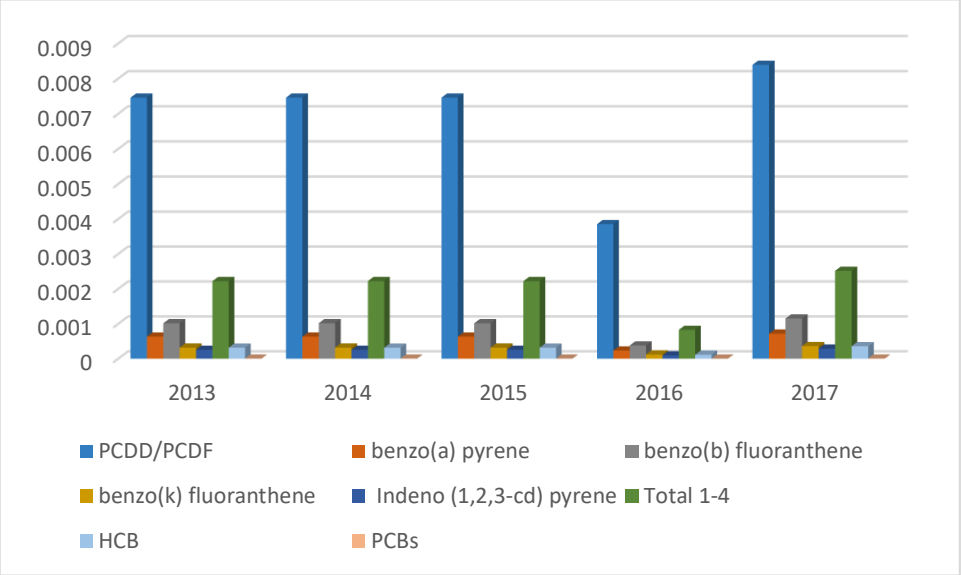


Figure 20-3

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Natural gas	1738.2	1917.8	2167.8	2804.5	2374.8
Fuel oil, low sulphur	4.2	4.2	12.7	59.5	4.3
Wood	73.6	65.2	63.1	23.1	71.5

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A4cii Agriculture/Forestry/Fishing: Off-road vehicles and other machinery

Source category description

This category includes working machines and offroad vehicles used in agriculture, forestry and fishing sectors.

Emission trend

The emissions from 1A4cii category are presented in Table 25 and in Figures 21-1,21-2,21-3,21-4.

Table 25. Emissions from Agriculture/Forestry/Fishing: Off-road vehicles and other machinery

	2013	2014	2015	2016	2017
NOx	10.61755	10.08867	9.700154	8.526717	9.196405
NMVOC	2.315969	2.193864	2.148289	2.140385	1.510356
NH3	0.002674	0.00254	0.002443	0.002152	0.002307
PM2.5	0.46855	0.44512	0.428504	0.380074	0.399135
PM10	0.46855	0.44512	0.428504	0.380074	0.399135
TSP	0.46855	0.44512	0.428504	0.380074	0.399135
CO	10.7433	10.17201	9.988877	10.1313	6.648409
Cd	3.4E-06	3.23E-06	3.11E-06	2.75E-06	2.92E-06
Cr	1.7E-05	1.62E-05	1.56E-05	1.38E-05	1.46E-05
Cu	0.000579	0.00055	0.000529	0.000468	0.000496
Ni	2.38E-05	2.26E-05	2.18E-05	1.93E-05	2.04E-05
Se	3.4E-06	3.23E-06	3.11E-06	2.75E-06	2.92E-06
Zn	3.4E-06	3.23E-06	3.11E-06	2.75E-06	2.92E-06
benzo(a) pyrene	0.010322	0.009806	0.009439	0.008366	0.008805
benzo(b) fluoranthene	0.01691	0.016066	0.015457	0.01365	0.014523
Total 1-4	0.027232	0.025872	0.024896	0.022016	0.023328

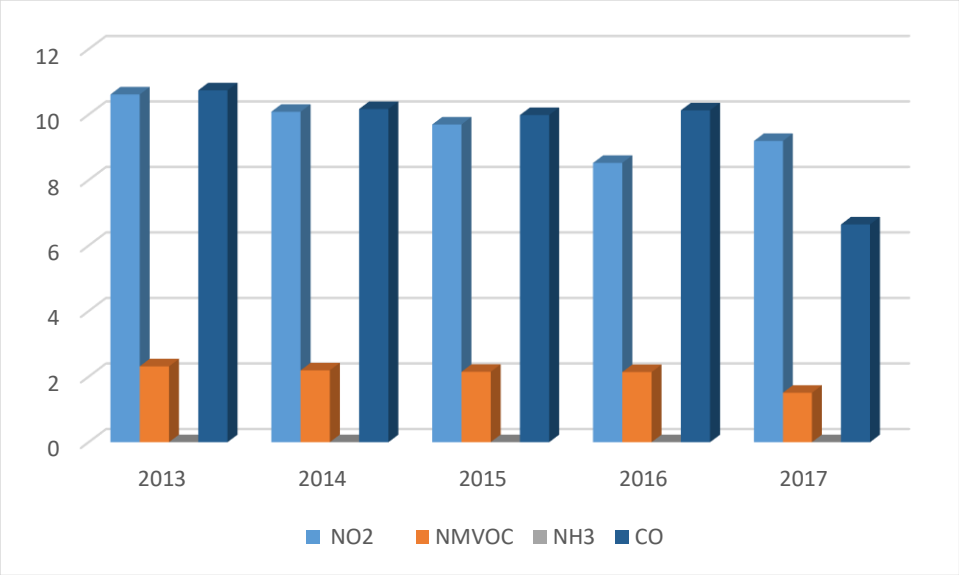


Figure 21-1

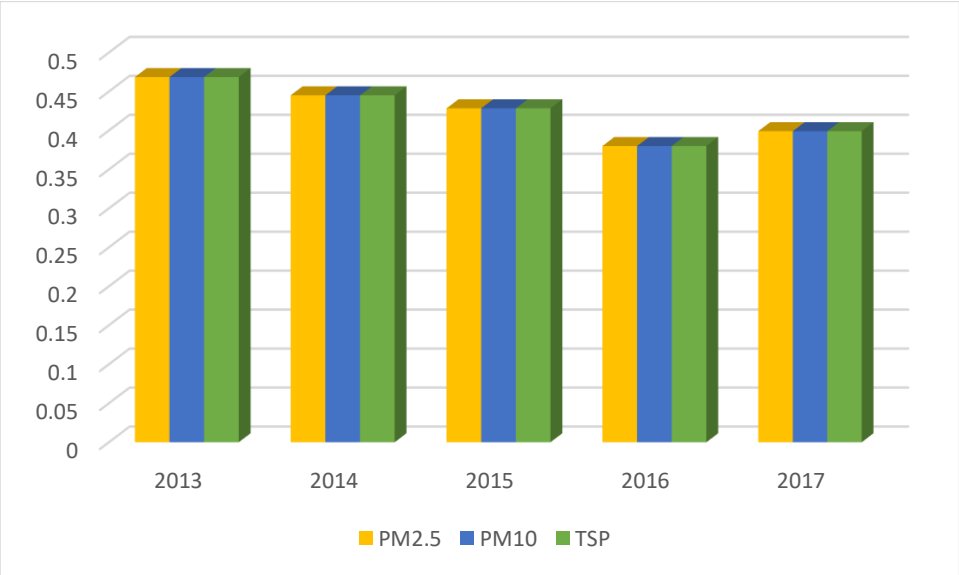


Figure 21-2

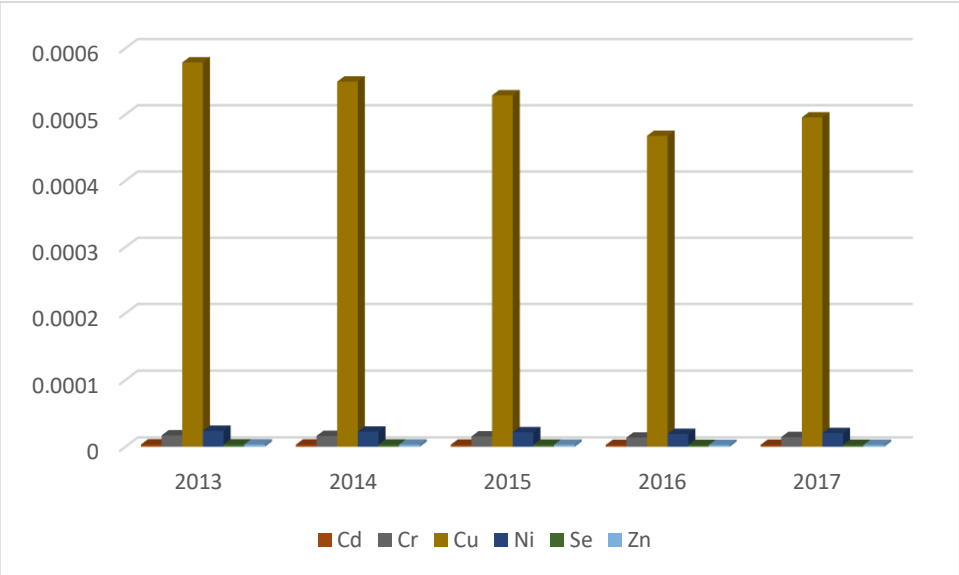


Figure 21-3

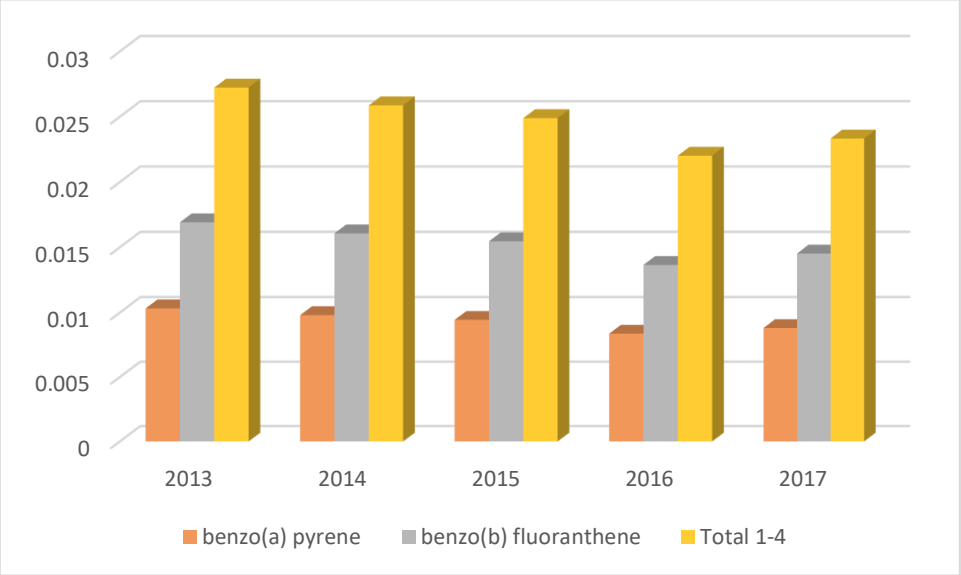


Figure 21-4

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

TJ

	2013	2014	2015	2016	2017
Diesel	14050.9	13351.3	12835.2	11269.7	12195.3
Motor gasoline	475.2	449.2	444.9	475.2	246.2

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1A4ciii Agriculture/Forestry/Fishing: National fishing

The emissions have not yet been estimated but this is planned to be carried out to the 2020 submission.

7. Fugitive emissions from fuel (1B)

NFR 1B2ai Fugitive emissions oil: Exploration, production, transport

Source category description

This source covers emissions from crude oil production. This is a key source in Azerbaijan. The emissions are currently calculated using the Tier 1 methodology, but efforts will be made to increase the accuracy of the estimates in the next years.

Emission trend

The emissions from 1B2ai category are presented in Table 26 and in Figure 22.

The emissions are decreasing due to the decreased crude oil production. However, the impact of development is not taken into account in the Tier 1 method. Possibilities to move to a more accurate method taking into account the development of the industry and technology will be studied in the next years.

Table 26. Emissions from Fugitive emissions oil: Exploration, production, transport

	2013	2014	2015	2016	2017
NMVOC	8.69148	8.41514	8.32566	8.21008	7.73768

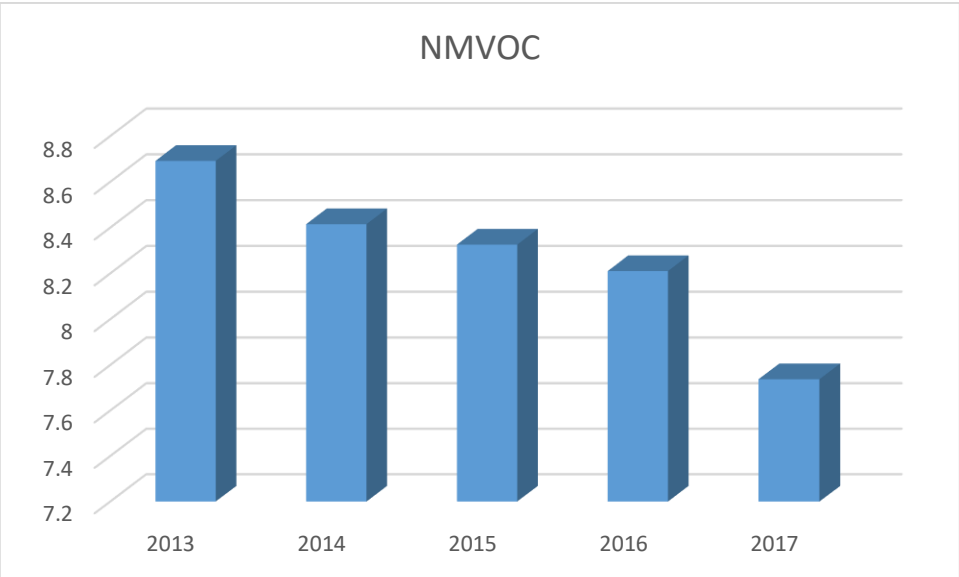


Figure 22

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NOx	0.24	kg/Mg crude oil input
CO	0.09	kg/Mg crude oil input
NMVOC	0.2	kg/Mg crude oil input
SOx	0.62	kg/Mg crude oil input
NH3	0.0011	kg/Mg crude oil input
TSP	0.016	kg/Mg crude oil input
PM10	0.0099	kg/Mg crude oil input
PM2.5	0.0043	kg/Mg crude oil input
Pb	0.0051	g/MG crude oil input
Cd	0.0051	g/MG crude oil input
Hg	0.0051	g/MG crude oil input
As	0.0051	g/MG crude oil input
Cr	0.0051	g/MG crude oil input
Cu	0.0051	g/MG crude oil input
Ni	0.0051	g/MG crude oil input
Se	0.0051	g/MG crude oil input
Zn	0.0051	g/MG crude oil input
(PCDD/F)	0.0057	µg/Mg crude oil input

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

	2013	2014	2015	2016	2017
Crude oil (thousand ton)	43457.4	42075.7	41628.3	41050.4	38688.4

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1B2aiv Fugitive emissions oil: Refining / storage
Source category description

The source covers emissions from petroleum products storages.

Emission trend

The emissions from 1B2aiv category are presented in Table 27 and in Figures 23-1,23-2,23-3,23-4.

The emissions are decreasing due to the decrease in crude oil production.

Table 27. Emissions from Fugitive emissions oil: Refining / storage

	2013	2014	2015	2016	2017
NOx	1.577112	1.609536	1.556352	1.439976	1.410744
NMVOC	1.31426	1.34128	1.29696	1.19998	1.17562
SOx	4.074206	4.157968	4.020576	3.719938	3.644422
NH3	0.007228	0.007377	0.007133	0.0066	0.006466
PM2.5	0.028257	0.028838	0.027885	0.0258	0.025276
PM10	0.065056	0.066393	0.0642	0.059399	0.058193
TSP	0.105141	0.107302	0.103757	0.095998	0.09405
CO	0.591417	0.603576	0.583632	0.539991	0.529029
Pb	0.033514	0.034203	0.033072	0.030599	0.029978
Cd	0.033514	0.034203	0.033072	0.030599	0.029978
Hg	0.033514	0.034203	0.033072	0.030599	0.029978
As	0.033514	0.034203	0.033072	0.030599	0.029978
Cr	0.033514	0.034203	0.033072	0.030599	0.029978
Cu	0.033514	0.034203	0.033072	0.030599	0.029978
Ni	0.033514	0.034203	0.033072	0.030599	0.029978
Se	0.033514	0.034203	0.033072	0.030599	0.029978
Zn	0.033514	0.034203	0.033072	0.030599	0.029978
PCDD/ PCDF (dioxins/ furans)	0.037456	0.038226	0.036963	0.034199	0.033505

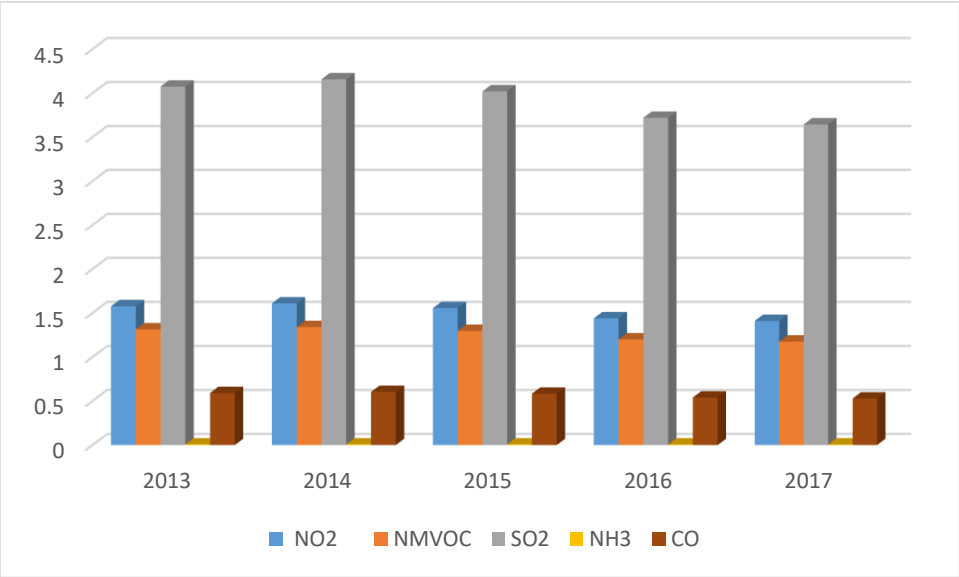


Figure 23-1

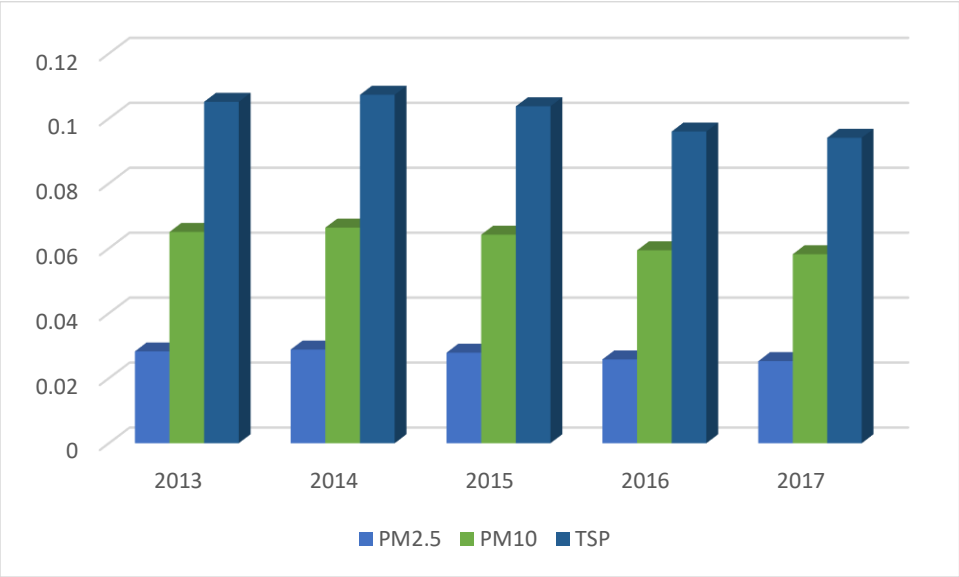


Figure 23-2

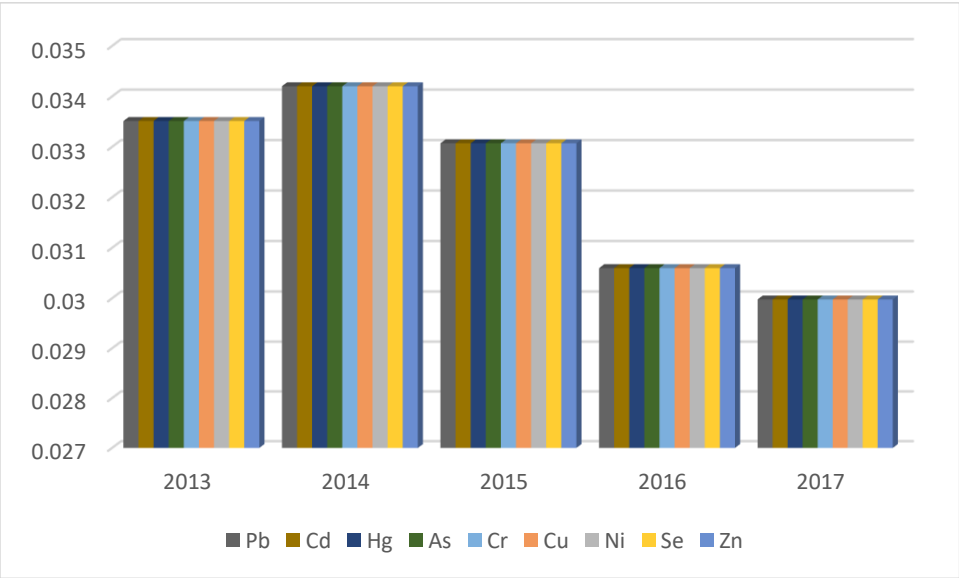


Figure 23-3

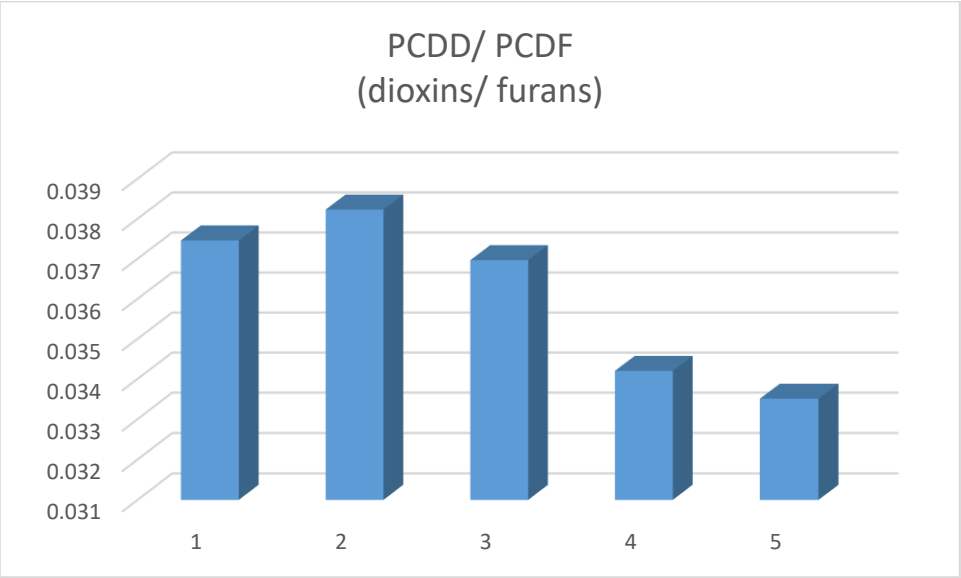


Figure 23-4

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NOx	0.24	kg/Mg crude oil input
CO	0.09	kg/Mg crude oil input
NMVOC	0.20	kg/Mg crude oil input
SOx	0.62	kg/Mg crude oil input
NH3	0.0011	kg/Mg crude oil input
TSP	0.016	kg/Mg crude oil input
PM10	0.0099	kg/Mg crude oil input
PM2.5	0.0043	kg/Mg crude oil input
Pb	0.0051	kg/Mg crude oil input
Cd	0.0051	kg/Mg crude oil input
Hg	0.0051	kg/Mg crude oil input
As	0.0051	kg/Mg crude oil input
Cr	0.0051	kg/Mg crude oil input
Cu	0.0051	kg/Mg crude oil input
Ni	0.0051	kg/Mg crude oil input
Se	0.0051	kg/Mg crude oil input
Zn	0.0051	kg/Mg crude oil input
(PCDD/F)	0.0057	µg/Mg crude oil input

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

	2013	2014	2015	2016	2017
Crude oil (thousand ton)	6571.3	6706.4	6484.8	5999.9	5878.1

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1B2av Distribution of oil products

Source category description

This source covers distribution network of fuels, such as e.g. service stations.

Emission trend

The emissions are in a steady growth. However, the reason for the peak in 2014 is not yet known and will be studied to the future submissions.

The emissions from 1B2av category are presented in Table 28 and in Figure 24.

Table 28. Emissions from Distribution of oil products

	2013	**2014**	**2015**	**2016**	**2017**
NMVOC	2.5936	2.737	2.5912	2.4914	2.5854

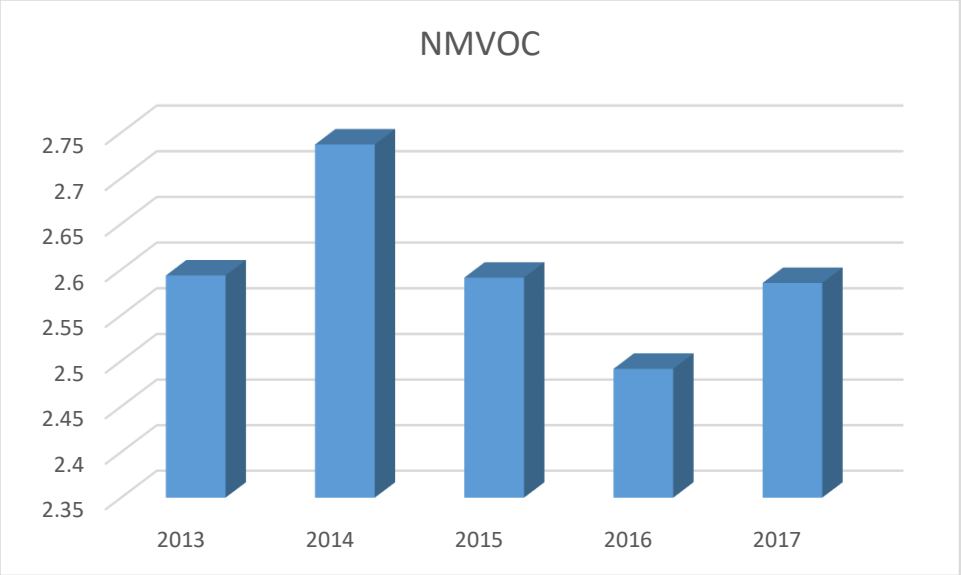


Figure 24

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NMVOC	2	kg/Mg oil

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

	2013	2014	2015	2016	2017
Motor gasoline (thousand ton)	1296.8	1368.5	1295.6	1245.7	1292.7

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

NFR 1B2b Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)

Source category description

This category includes emissionf from exploration, production , processing, storage and transmission and distribution of natural gas. Azerbaijan also exports natural gas.

Emission trend

The emissions from 1B2b category are presented in Table 29 and in Figure 25.

The emissions are growing steadily and the peak in 2015 is due to increased production that year.

Table 29. Emissions from 1B2b category

	2013	2014	2015	2016	2017
NMVOC	1.78951	1.88265	1.92361	1.87176	1.8186

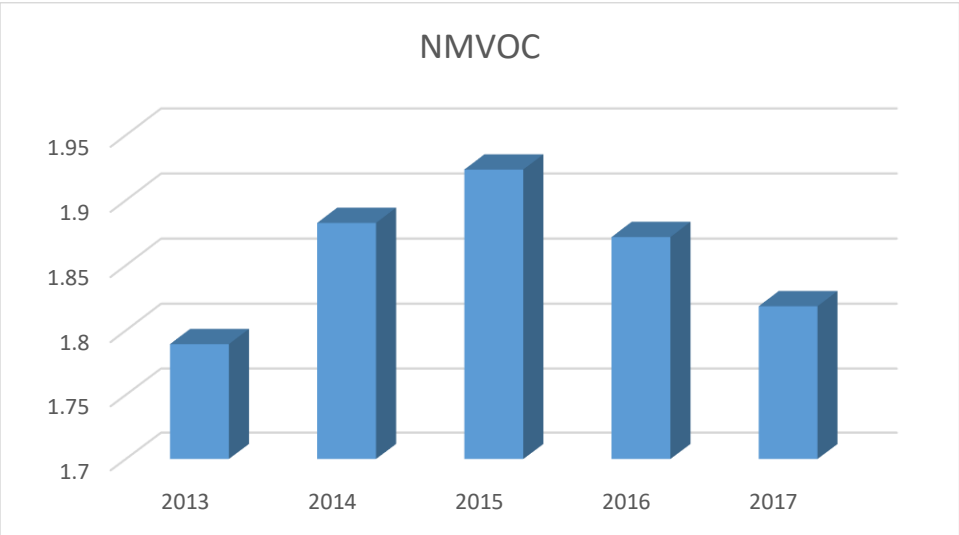


Figure 25

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NMVOC	0.1	g/m3 gas

Activity data
Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

	2013	2014	2015	2016	2017
Natural gas (million cubic metre)	17895.1	18826.5	19236.1	18717.6	18186

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2007 will be studied for the future submissions.

8. Industrial processes and product use (NFR sector 2)

NFR 2A Mineral products

The production of mineral materials in Azerbaijan is confined to the manufacture of those materials that are needed in the construction sector. The enterprises in this field are plants producing cement, lime, sodium and glass.

NFR 2.A.1 Cement production

Source category description

Production of cement has occurred all the years of the time series from 1990 while production of other construction materials in Azerbaijan is relatively low.
Due to lack of statistical data prior to year 2011 the emission trend is currently calculated only for the years 2011-2016. Possibilities to complete the time series for the earlier years is currently studied.

Emission trend

Cement production is a source of particle emissions. The trends of TSP, PM_{10}, $PM_{2.5}$ and BC emissions are presented in Table 30 and Figure 26.

Table 30 Emissions from Cement production

	2011	2012	2013	2014	2015	2016
$PM_{2.5}$	0.116272	0.164515	0.18044	0.147771	0.246233	0.166699
PM_{10}	0.20929	0.296127	0.324792	0.265988	0.443219	0.300058
TSP	0.232544	0.32903	0.36088	0.295542	0.492466	0.333398
BC	0.003488	0.004935	0.005413	0.004433	0.007387	0.005001

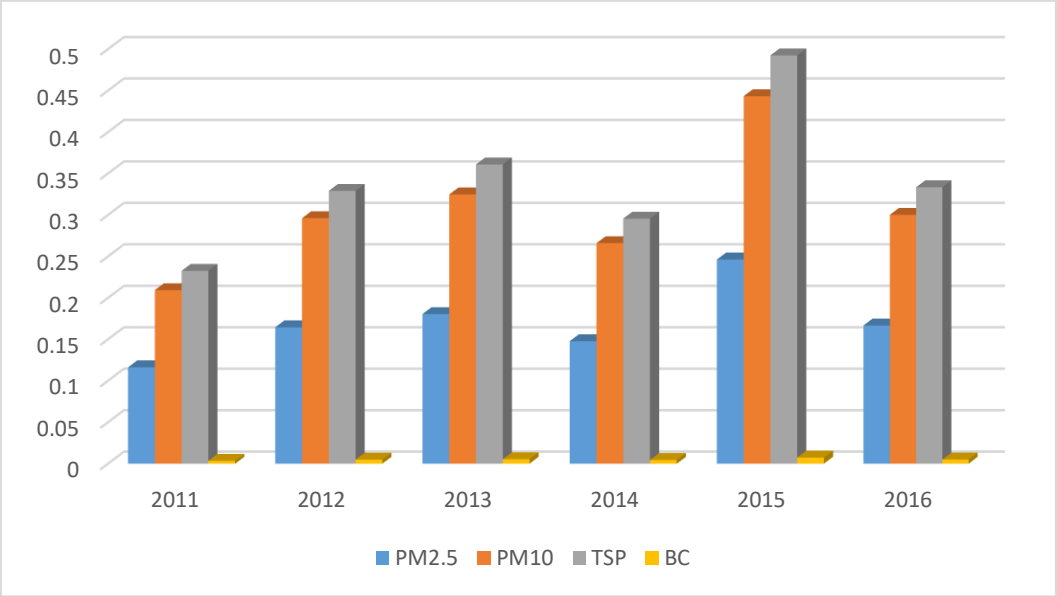


Figure 26. Particle emissions from Cement production

Methodological issues

Emission factors

Cement production is not a key source for particle emissions.

Emissions from cement production were estimated using the annual total production of clinker and Tier 1 emission factors from the 2016 Guidebook.

BC	3	% of $PM_{2,5}$
$PM_{2.5}$	130	g/Mg clincer
PM_{10}	234	g/Mg clincer
TSP	260	g/Mg clincer

Data for 2017 is based upon the following calculations.
The cement:clinker ratio used in the calculations is 1.57 tonnes of cement to produce 1 t of clinker. This was verified to correspond the national information, which is 1.5-1.6 t cement to 1 t clinker.

Clinker production volumes presented in Table 31 are available from the Ministry of Economy of Azerbaijan Republic .

Table 31. Clincer production volumes 2011-2017

Year	Clincer production (tonnes)
2011	894400
2012	1265500
2013	1388000
2014	1136700
2015	1894100
2016	1282300
2017	1865414

Activity data

Information relevant for this category from 2011-2016 has been obtained from the Ministry of Economy of Azerbaijan Republic .

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source category specific QA/QC verification

Data used for calculations are based on the official letter received by the Ministry of Economy and hereby no quality check has been conducted.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculation has been carried out from 2011 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2010 will be studied for the future submissions.

NFR 2.A.1 Lime production

Source category description

Lime production has occurred all the years during the time series since 1990. Due to lack of statistical data prior to year 2005 the emission trend is currently calculated only for the years 2005-2017. Possibilities to complete the timeseries for the earlier years is currently studied.

Emission trend

Lime production is a source of particle emissions.
Decrease in emissions during the 2008-2011 is due to falling production. Lime production is shown in quanities in the below table.
The trends of TSP, PM_{10}, $PM_{2.5}$ and BC emissions are presented in Table 32 and Figure 27.

Table 32. Particle emissions from lime production

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PM2.5	0.003	0.019	0.011	1E-03	5E-04	6E-04	0.002	0.007	0.007	0.01	0.012	0.019	0.021
PM10	0.017	0.095	0.054	0.005	0.002	0.003	0.008	0.037	0.037	0.049	0.061	0.096	0.104
TSP	0.044	0.245	0.138	0.013	0.006	0.008	0.02	0.096	0.096	0.127	0.156	0.247	0.268
BC	2E-05	9E-05	5E-05	5E-06	2E-06	3E-06	7E-06	3E-05	3E-05	5E-05	6E-05	9E-05	1E-04

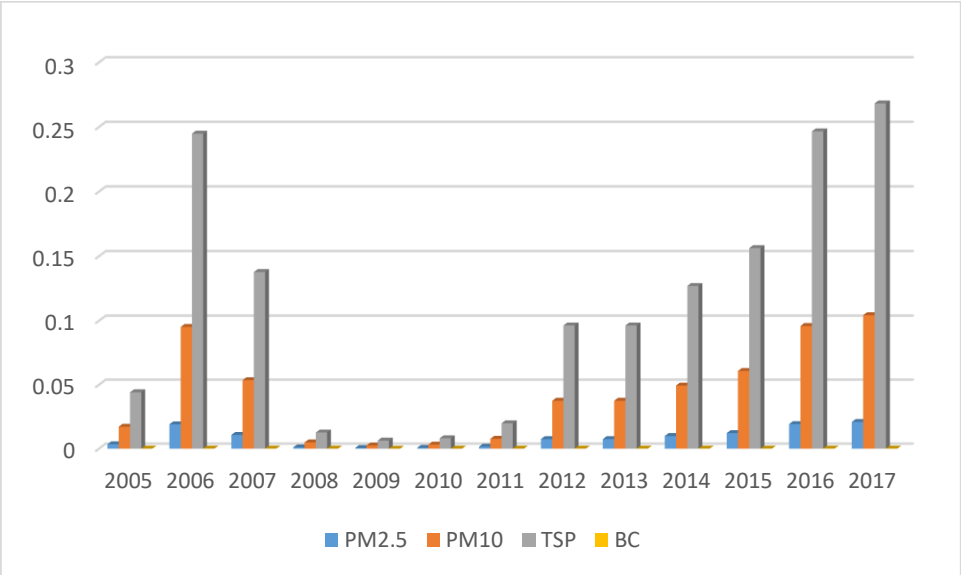


Figure 27. Particle emissions from lime production

Methodological issues

Emission factors

Emissions from lime production were estimated using the annual production of lime and Tier 1 emission factors from the 2016 Guidebook.

BC	0.46	% of $PM_{2,5}$
$PM_{2.5}$	700	g/Mg clincer
PM_{10}	3500	g/Mg clincer
TSP	9000	g/Mg clincer

Activity data

Lime production volumes are available from the Statistical Yearbook.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Lime production, kt	4.9	27.2	15.3	1.4	0.7	0.9	2.2	16.9	10.7	14.1	17.4	27.4	29.8

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification
The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculation has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2.A.3 Glass production

Source category description

There are several types of glass produced in Azerbaijan: Window glass,Toughened shatterproof glass and etc. The thickness of above types of glass is estimated at 4 mm. Statistical data about Window glass, Toughened shatterproof glass is available since 2005. But currently calculated only for the years 2013-2017. Possibilities to complete the timeseries for the earlier years is currently studied.

Emission trends

Glass production is a source of particle and heavy metal emissions. The emission trends are presented in table 33 and Figure 28-1,28-2

Table 33 emission from Glass production

	2013	2014	2015	2016	2017
$PM_{2.5}$	2.4E-07	2.14E-05	2.18E-05	4.34E-05	9.53E-05
PM_{10}	2.7E-07	2.4E-05	2.46E-05	4.89E-05	0.000107
TSP	3E-07	2.67E-05	2.73E-05	5.43E-05	0.000119
BC	1.49E-10	1.32E-08	1.35E-08	2.69E-08	5.91E-08
Pb	1.7E-06	0.000151	0.000155	0.000308	0.000675
Cd	1.3E-07	1.16E-05	1.18E-05	2.35E-05	5.16E-05
Hg	3E-09	2.67E-07	2.73E-07	5.43E-07	1.19E-06

As	1.9E-07	1.69E-05	1.73E-05	3.44E-05	7.54E-05
Cr	2.3E-07	2.05E-05	2.09E-05	4.16E-05	9.13E-05
Cu	7E-09	6.23E-07	6.37E-07	1.27E-06	2.78E-06
Ni	4.9E-07	4.36E-05	4.46E-05	8.87E-05	0.000195
Se	8E-07	7.12E-05	7.28E-05	0.000145	0.000318
Zn	3.7E-07	3.29E-05	3.37E-05	6.7E-05	0.000147

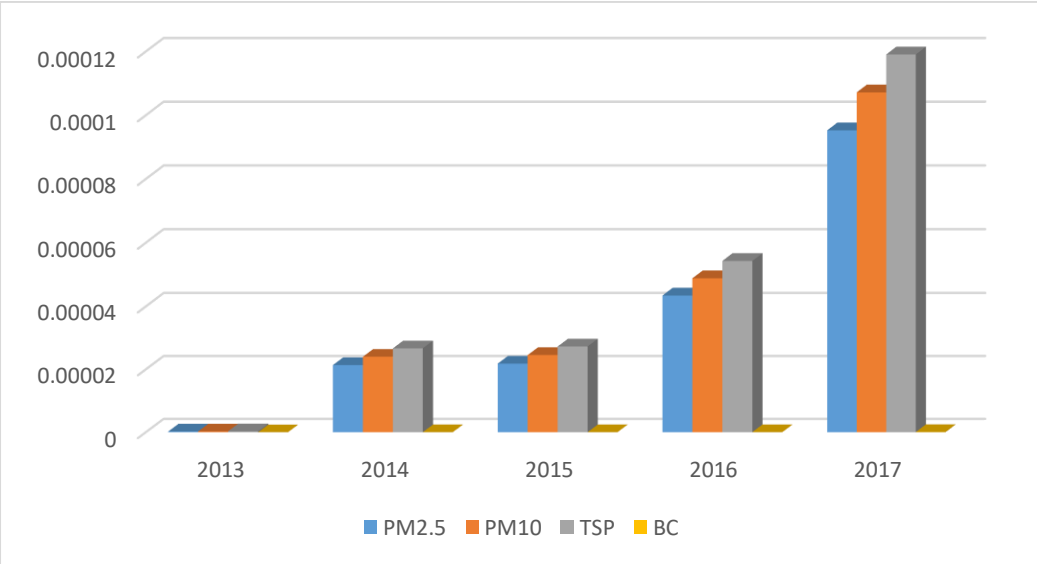


Figure 28-1

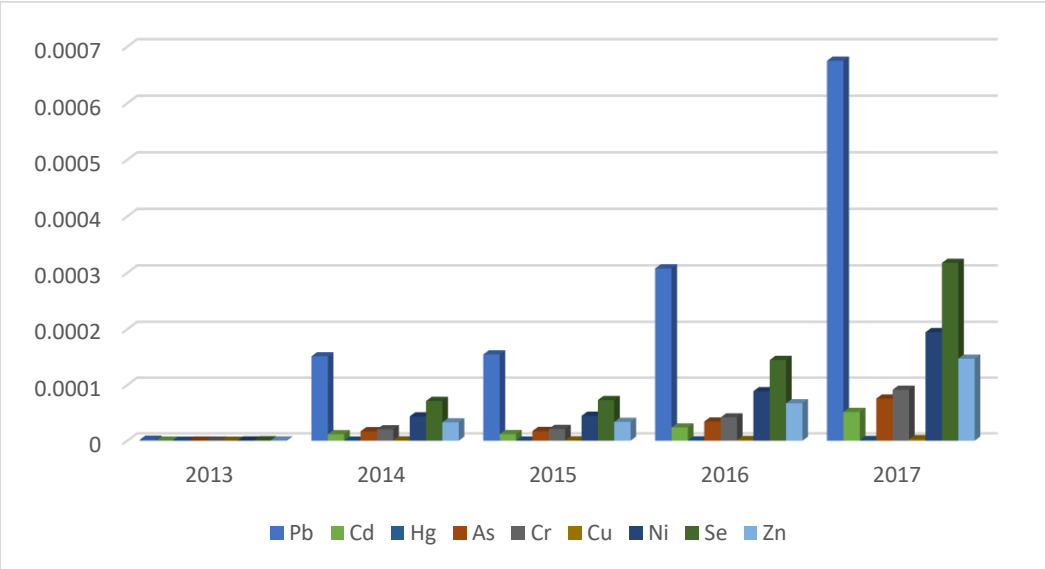


Figure 28-2. Emissions from glass manufacturing

Methodological issues

Emisssion factors

Glass production is not a key category of particle emissions or heavy metals.
Emissions from glass production were estimated using the annual production of the different glass types and Tier 1 emission factors from the 2016 Guidebook. Glass production volumes presented in Table 34 are available from the Statistical Yearbook.
Activity data used in calculation of glass production is estimated in accordance with the following rule.
Thickness of windowpane, toughened shatterproof glass produced in the country is 4 mm. 1 m^2 area of the 4 mm thick glass is 10 kg.

Table 34. Glass production volumes 2011-2017

	2013	2014	2015	2016	2017
Windowpane, thsd.sq. m	0.1	-	-	-	0
Toughened shatterproof glass, thsd. sq.m	-	8.9	9.1	18.1	39.7

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculation has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2.A.5.a Quarrying and mining of other minerals than coal

Source category description

Azerbaijan is rich with minerals. Ore takes the second place for significance among the other mining minerals (oil-gas being the first).

In Azerbaijan there is quarrying and mining of the following minerals: iron ore, copper ore and etc.
Due to lack of statistical data prior to year 2005 the emission trend is currently calculated only for the years 2005-2017. Possibilities to complete the time series for the earlier years is currently studied.

Emission trends

Quarrying and mining activities are sources of particle emissions. The emission trends are presented in Table 35 and Figure 29.

Table 35 Emissions from quarrying and mining

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PM2.5	0.005	0.008	0.012	0.02	0.02	0.04	0.15	0.099	0.145	0.064	0.09	0.019	0.001
PM10	0.026	0.04	0.062	0.098	0.098	0.202	0.75	0.495	0.727	0.322	0.45	0.096	0.007
TSP	0.066	0.102	0.158	0.253	0.253	0.52	1.929	1.273	1.869	0.829	1.157	0.247	0.019
BC	2E-05	4E-05	6E-05	9E-05	9E-05	2E-04	7E-04	5E-04	7E-04	3E-04	4E-04	9E-05	7E-06

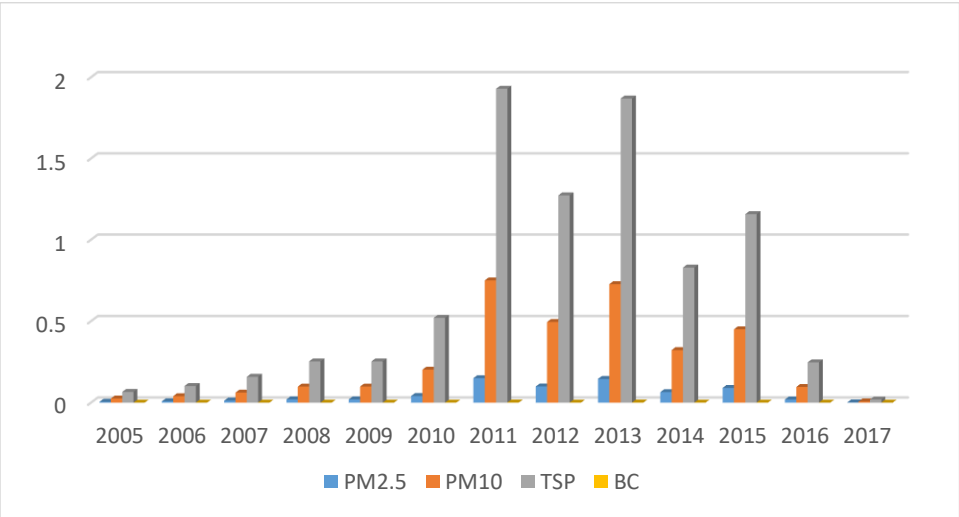


Figure 29. Emissions from quarrying and mining

Methodological issues

Emission factors

Emissions from quarrying and mining activities were estimated using the annually mined volumes of iron and copper ore. For calculations were used Tier 1 emission factors from the 2016 Guidebook. The volumes mined presented in Table 36 are available from the Statistical Yearbook.

	İron ore (ton)	Copper ore (ton)
2005	7300	
2006	11300	
2007	17600	
2008	28100	

2009	-	
2010	57800	
2011	214300	
2012	141400	
2013	207300	329
2014	91400	674.6
2015	127600	969.2
2016	25500	1946.7
2017	0	2062.5

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculation has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source-specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2.A.5.b Construction and demolition

Source category description

Construction and demolitions of different house types as well as road construction activities are covered by this category.
Total area of residential buildings and houses is available in Statistic Committee since 1990. However no data about demolition exists. We will try to obtain data about deconstructed buildings (hospitals, schools and etc) until next submission.

Emission trends

Construction and demolition is a source of particle emissions. The emission trends are presented in Figure 30.

Table 37 emission from Construction and demolition

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PM2.5	0.031	0.031	0.031	0.036	0.029	0.04	0.039	0.041	0.046	0.042	0.037	0.041	0.039
PM10	0.307	0.306	0.312	0.356	0.29	0.395	0.392	0.414	0.464	0.424	0.373	0.409	0.389
TSP	1.027	1.021	1.042	1.19	0.968	1.322	1.311	1.385	1.55	1.417	1.246	1.368	1.301

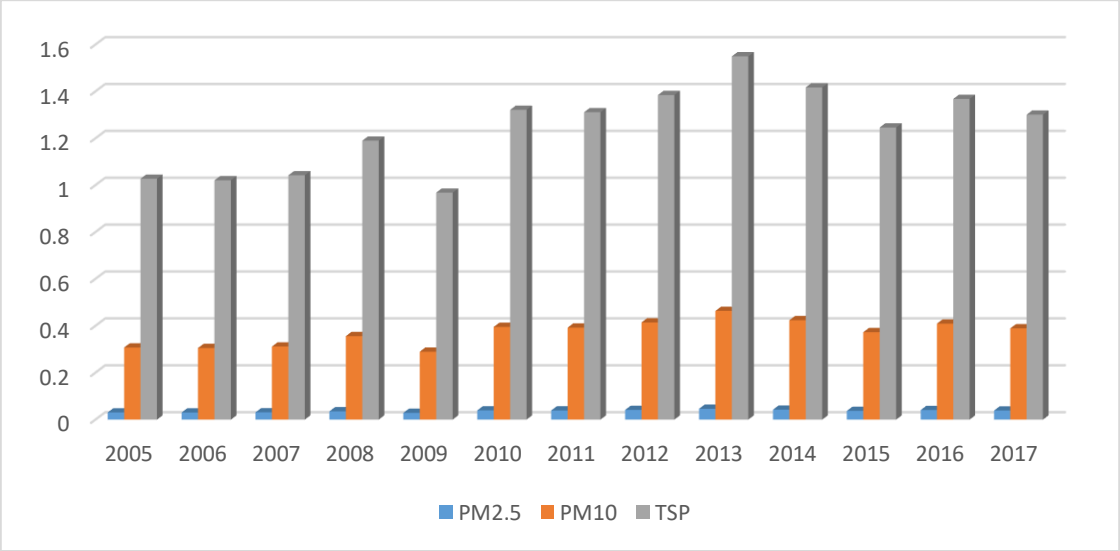


Figure 30. Emissions from construction and demolition

Methodological issues

Construction and demolition is not a key category of particle emissions.

Emissions from construction activities were estimated using the annually built floor area of houses. As there is only data about general residential buildings in statistics, this category was calculated in accordance with 2016 Guidebook Tier 1 using average emission factor.

Pollutant	Construction of houses	Construction of apartment buildings	Average EF	Unit
$PM_{2.5}$	0.0086	0.030	0.0193	kg/[m2· year]
PM_{10}	0.086	0.30	0.1930	kg/[m2· year]
TSP	0.29	1.0	0.6450	kg/[m2· year]

Activity data

The annual areas presented in Table 38 are available from the Statistical Yearbook.

Table 38. Floor areas of annually constructed houses 2005-2017

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Dwelling houses total area, thsd. sq.m	1593	1583	1616	1845	1501	2049	2033	2147	2403	2197	1932	2121	2017

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

When it will be possible to use higher tier methods to calculate emissions from construction and demolition emissions will be reviewed and recalculated using higher tier methodology.

NFR 2.A.5.c Storage, handling and transport of mineral products

Source category description

Emissions from storage, handling and transport of mineral products are included in the emissions of the production processes emissions calculated with the Tier 1 methodology.
Refinery of minerals was only calculated in this category.

Emission trends

The emission trends are presented in Figure 31

Table 39 emission from storage, handling and transport of mineral products

	2013	2014	2015	2016	2017
$PM_{2.5}$	0.001384	0.001773	0.00162	0.001402	0.001775
PM_{10}	0.01384	0.017731	0.016202	0.014024	0.017753
TSP	0.02768	0.035461	0.032405	0.028049	0.035506

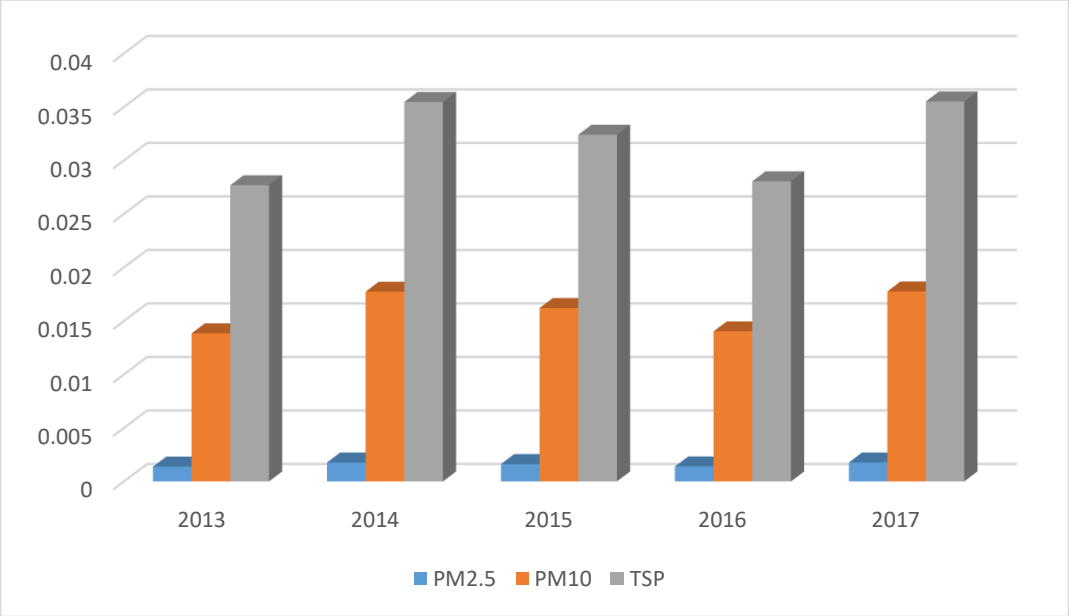


Figure 31

Methodological issues

Emission factors

Emissions from handling of mineral products activities were estimated using the Tier 1 emission factors from the 2016 Guidebook.

$PM_{2.5}$	0.600	g/ton
PM_{10}	6	g/ton
TSP	12	g/ton

Activity data

The annual volumes presented below are available from the Statistical Yearbook.

	2013	2014	2015	2016	2017
Cement and lime kt	2306.7	2955.1	2700.4	2337.4	2958.8

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

When it will be possible to use higher tier methods to calculate emissions from mineral products manufacturing processes, also the storage, handling and transport emissions will be reviewed and recalculated using higher tier methodology.

NFR 2.A.6 Other mineral products

No other mineral products manufacturing occur in Azerbaijan.

9. Chemical industries (2B)

NFR 2B1 Ammonia production

Source category description

Ammonia production has not occurred in Azrbaijan during the years 1990-2017.
The notation key is therefore NO.

NFR 2B2 Nitric acid production

Source category description

Nitric production has not occurred in Azerbaijan during the years 1990-2017.
The notation key is therefore NO.

NFR 2B3 Adipic acid production

Source category description

Adipic acid production has not occurred in Azerbaijan during the years 1990-2017.
The notation key is therefore NO.

NFR 2B5 Carbide production

Source category description

Carbide production has not occurred in Azerbaijan during the years 1990-2017.
The notation key is therefore NO.

NFR 2B6 Titanium dioxide production

Source category description

Titanium dioxide production has not occurred in Azerbaijan during the years 1990-2017. The notation key is therefore NO.

NFR 2B7 Soda ash production

Source category description

Will be studied for submission in coming years.

NFR 2B10a Other Chemical industry

Source category description

Under “Other chemical industry” Azerbaijan reports the following: production of ethylene, polyethylene, propylene and sulfuric acid

The processes have been occurring as follows :
production of ethylene
production of polyethylene
production propylene
production of sulfuric acid

Emission trend

Emissions from ethylene, polyethylene and propylene production are presented in Table 40 and in Figures 32

Table 40 emission from ethylene, polyethylene and propylene production

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NMVOC	1.246	1.622	0.812	1.13	0.624	1.186	1.703	1.421	1.566	2.092	2.133	2.047	1.901
TSP	7.785	10.14	5.075	7.065	3.9	7.41	10.65	8.88	9.785	13.08	13.33	12.8	11.88

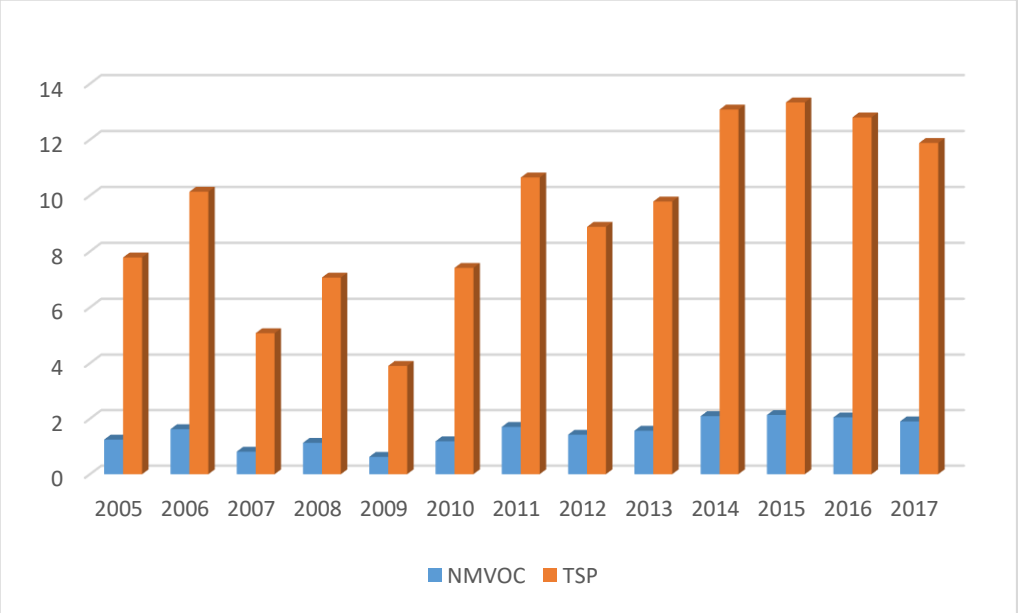


Figure 32

Methodological issues

Emission factors

Emissions from 2B10a category (other chemical industries) were estimated using the annual total production of ethylene, polyethylene, propylene and sulfuric acid for 2017 and Guidebook 2016 emission factors.

NMVOC	8	kg/ton
TSP	50	kg/ton

Activity data

Production volumes of the chemicals are available from the Statistical Committee's Industry Yearbook.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sulfuric acid ,kt	18.8	21.2	25.3	40.7	12.8	10.9	19.8	6.2	0.2				
Etilenethylene,kt	54.7	72.6	2.4			55	77.6	69.2	78.5	104	106.7	103.4	96
Polyethylene , kt	53	70.4	47.2	65.1	42.2	53.7	75.3	67.2	76.2	101	103.5	100.3	93.2
Propylene , kt	29.2	38.5	26.6	35.5	23	28.6	40.2	35	40.8	56.5	56.4	52.2	48.4

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2B10b Storage, handling and transport of chemical products

Source category description

The source category includes processes in storage and handling of inorganic and and organic chemical products.The emissions are related to tank losses and evaporative emissions due to loading and unloading of containers and vessels (NMVOCs and particles).

Source specific planned improvements

Calculations on the data available for the existing years will be carried out until the next submission.

10. Metal Production (2.C)

In Azerbaijan, the production of metals in the primary and secondary form is carred out.

NFR 2C1 Iron and Steel Industry

Source category description

Main ferrous industrial centers are in Sumgait, Baku and Dashkasan. There are a few large ferrous industrial plants in the country.

Emission trend

The emission trends are presented in Table 41 and Figure 33-1,33-2,33-3,33-4

Lead and Cr emissions are low in 2009 due to low production volumes that year as can be seen in Table 41 below.

Table 41

	2005	2006	2007	2008	2009	2010
NMVOC	0.042915	0.050295	0.0702	0.041715	0.022545	0.045975
PM2.5	0.040054	0.046942	0.06552	0.038934	0.021042	0.04291
PM10	0.051498	0.060354	0.08424	0.050058	0.027054	0.05517
TSP	0.08583	0.10059	0.1404	0.08343	0.04509	0.09195

BC	0.000144	0.000169	0.000236	0.00014	7.58E-05	0.000154
Pb	1.31606	1.54238	2.1528	1.27926	0.69138	1.4099
Cd	0.005722	0.006706	0.00936	0.005562	0.003006	0.00613
Hg	0.02861	0.03353	0.0468	0.02781	0.01503	0.03065
As	0.11444	0.13412	0.1872	0.11124	0.06012	0.1226
Cr	1.28745	1.50885	2.106	1.25145	0.67635	1.37925
Cu	0.020027	0.023471	0.03276	0.019467	0.010521	0.021455
Ni	0.040054	0.046942	0.06552	0.038934	0.021042	0.04291
Se	0.005722	0.006706	0.00936	0.005562	0.003006	0.00613
Zn	1.1444	1.3412	1.872	1.1124	0.6012	1.226
PCB	0.8583	1.0059	1.404	0.8343	0.4509	0.9195
PCDD/F	0.137328	0.160944	0.22464	0.133488	0.072144	0.14712
Total 4 PAHs	0.008583	0.010059	0.01404	0.008343	0.004509	0.009195
HCB	0.71525	0.83825	1.17	0.69525	0.37575	0.76625

2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
0.056865	0.06663	0.03828	0.048615	0.0453	0.051795	0.058095
0.053074	0.062188	0.035728	0.045374	0.04228	0.048342	0.054222
0.068238	0.079956	0.045936	0.058338	0.05436	0.062154	0.069714
0.11373	0.13326	0.07656	0.09723	0.0906	0.10359	0.11619
0.000191	0.000224	0.000129	0.000163	0.000152	0.000174	0.000195
1.74386	2.04332	1.17392	1.49086	1.3892	1.58838	1.78158
0.007582	0.008884	0.005104	0.006482	0.00604	0.006906	0.007746
0.03791	0.04442	0.02552	0.03241	0.0302	0.03453	0.03873
0.15164	0.17768	0.10208	0.12964	0.1208	0.13812	0.15492
1.70595	1.9989	1.1484	1.45845	1.359	1.55385	1.74285
0.026537	0.031094	0.017864	0.022687	0.02114	0.024171	0.027111
0.053074	0.062188	0.035728	0.045374	0.04228	0.048342	0.054222
0.007582	0.008884	0.005104	0.006482	0.00604	0.006906	0.007746
1.5164	1.7768	1.0208	1.2964	1.208	1.3812	1.5492
1.1373	1.3326	0.7656	0.9723	0.906	1.0359	1.1619
0.181968	0.213216	0.122496	0.155568	0.14496	0.165744	0.185904
0.011373	0.013326	0.007656	0.009723	0.00906	0.010359	0.011619
0.94775	1.1105	0.638	0.81025	0.755	0.86325	0.96825

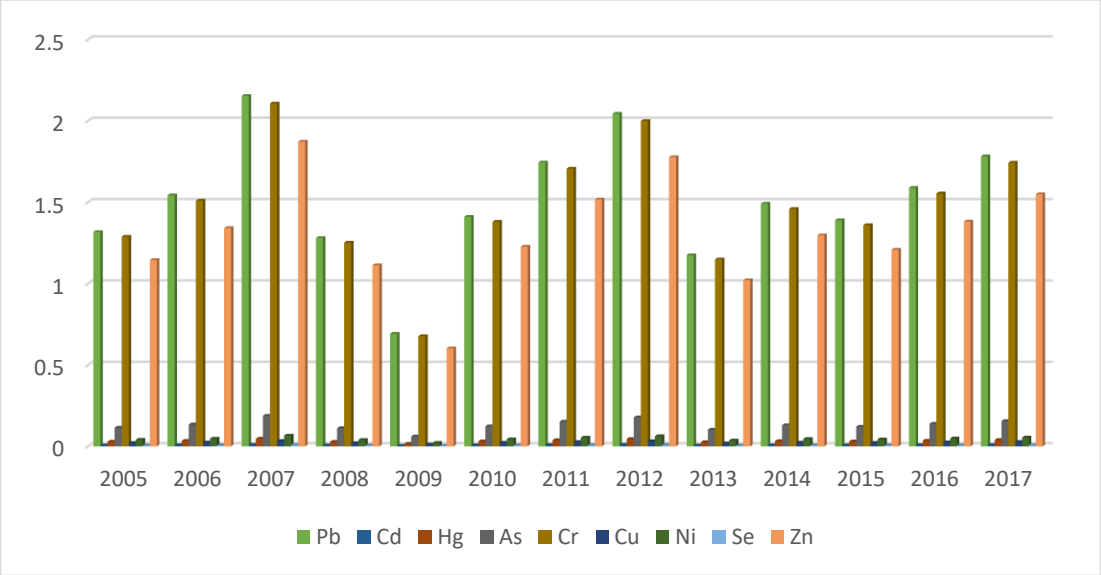


Figure 33-1

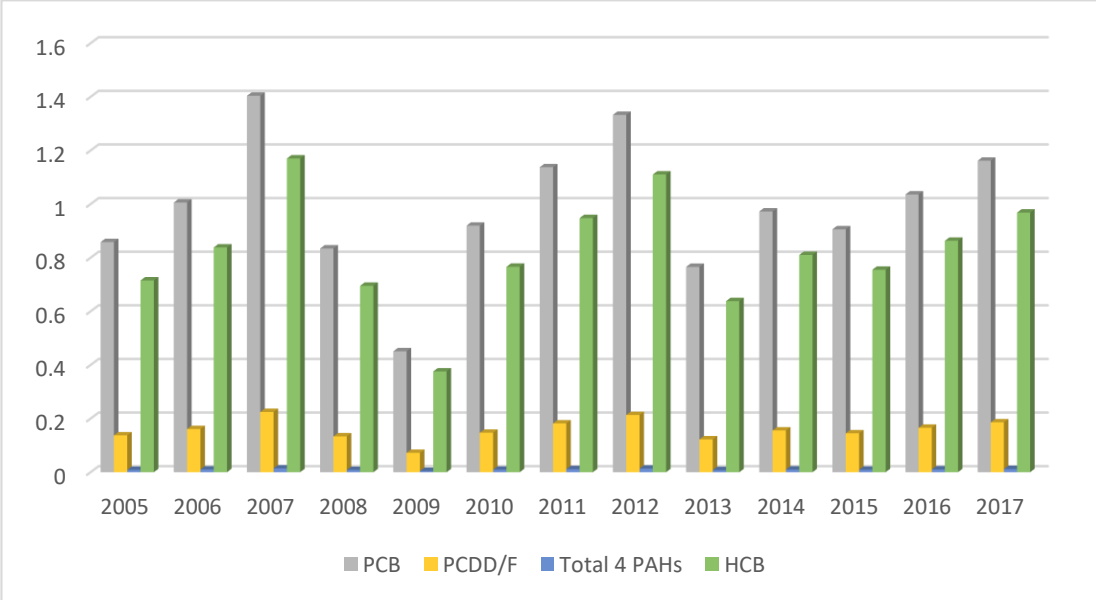


Figure 33-2

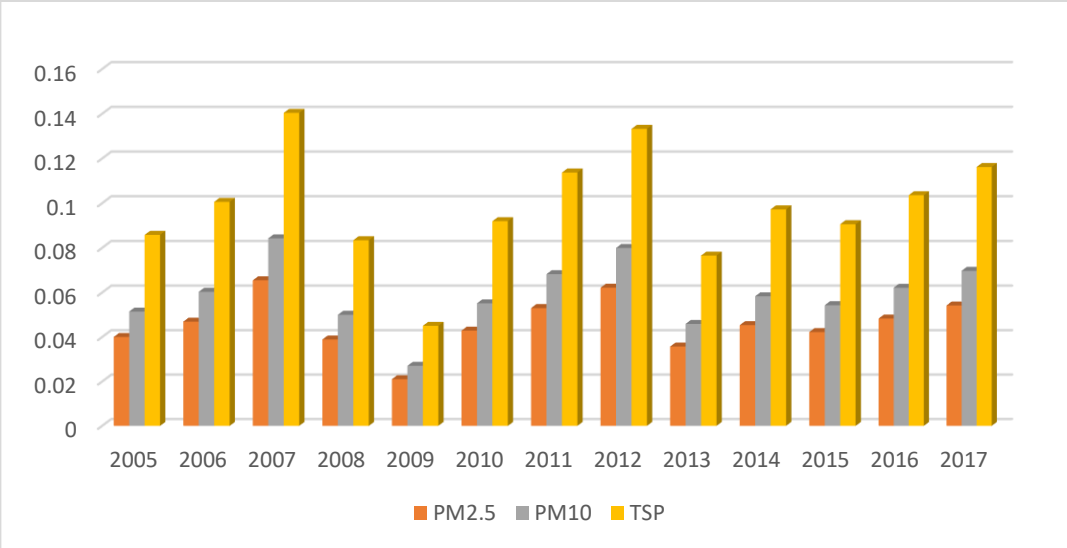


Figure 33-3

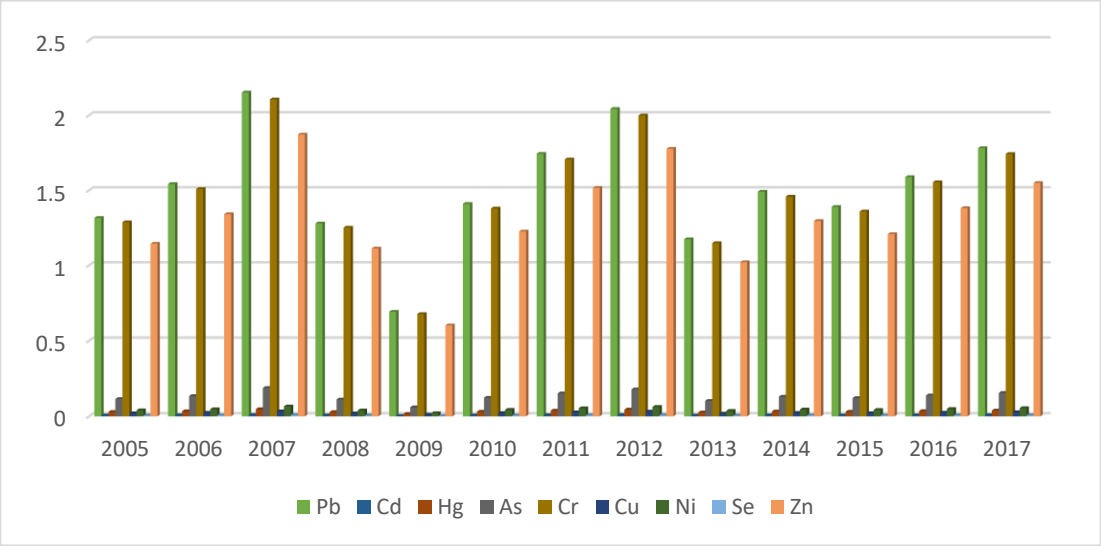


Figure 33-4 Emission trends in 2005-2017 (2C)

Methodological issues

Emission factors

Emissions from 2C1 category covering (secondary iron and steel production) were estimated using the annual total production of steel and pig iron and Guidebook 2016 Tier 1 emission.

NMVOC	150	g/Mg steel
$PM_{2.5}$	140	g/Mg steel
PM_{10}	180	g/Mg steel
TSP	300	g/Mg steel
BC	0.36	% of $PM_{2.5}$
Pb	4.6	g/Mg steel
Cd	0.02	g/Mg steel
Hg	0.1	g/Mg steel
As	0.4	g/Mg steel
Cr	4.5	g/Mg steel
Cu	0.07	g/Mg steel
Ni	0.14	g/Mg steel
Se	0.02	g/Mg steel
Zn	4	g/Mg steel
PCB	2.5	mg/Mg steel
PCDD/F	3	µg I-TEQ/Mg steel
Total 4 PAHs	0.48	g/Mg steel
HCB	0.03	mg/Mg steel

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Relculations has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2C2 Ferroalloys production

The possibility to include these emissions in the next submission is studied.

NFR 2C3 Aluminium production

Source category description

Aluminium is produced in primary and secondary form.

Emission trend

The emission trends are presented in Table 42 and Figure 34-1, 34-2.

Table 42 emission from Aluminium production

	2011	2012	2013	2014	2015	2016	2017
NOx	0.0068	0.0548	0.0532	0.0532	0.0532	0.0367	0.0332
CO	0.816	6.576	6.384	6.384	6.384	4.404	3.984
SOx	0.0306	0.2466	0.2394	0.2394	0.2394	0.16515	0.1494
$PM_{2.5}$	0.00408	0.03288	0.03192	0.03192	0.03192	0.02202	0.01992
PM_{10}	0.00476	0.03836	0.03724	0.03724	0.03724	0.02569	0.02324
TSP	0.00612	0.04932	0.04788	0.04788	0.04788	0.03303	0.02988

BC	9.38E-05	0.000756	0.000734	0.000734	0.000734	0.000506	0.000458
Benzo(a)pyrene	0.0612	0.4932	0.4788	0.4788	0.4788	0.3303	0.2988
Benzo(b)fluoranthene	0.0612	0.4932	0.4788	0.4788	0.4788	0.3303	0.2988
Benzo(k)fluoranthene	0.0612	0.4932	0.4788	0.4788	0.4788	0.3303	0.2988
Indeno(1,2,3-cd)pyrene	0.00748	0.06028	0.05852	0.05852	0.05852	0.04037	0.03652

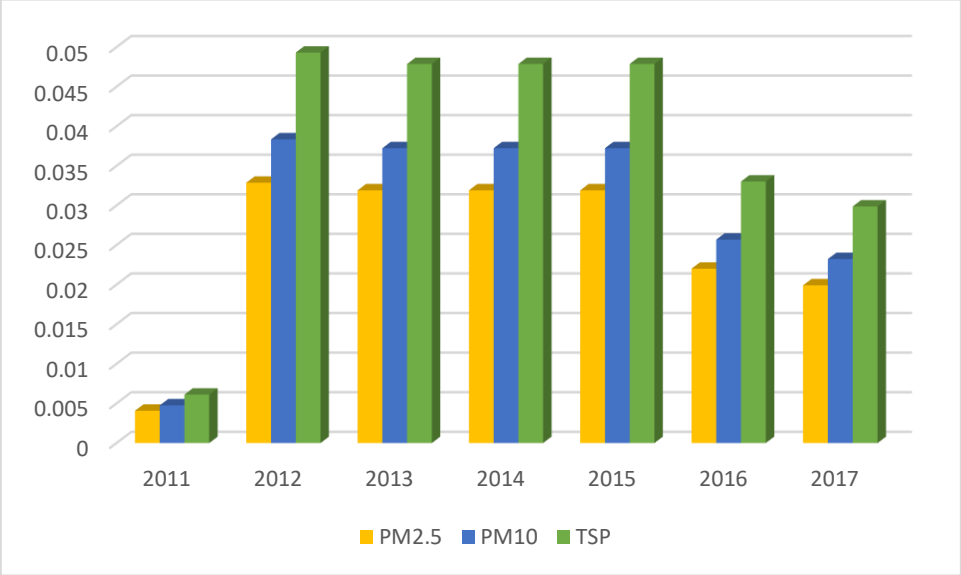


Figure 34-1

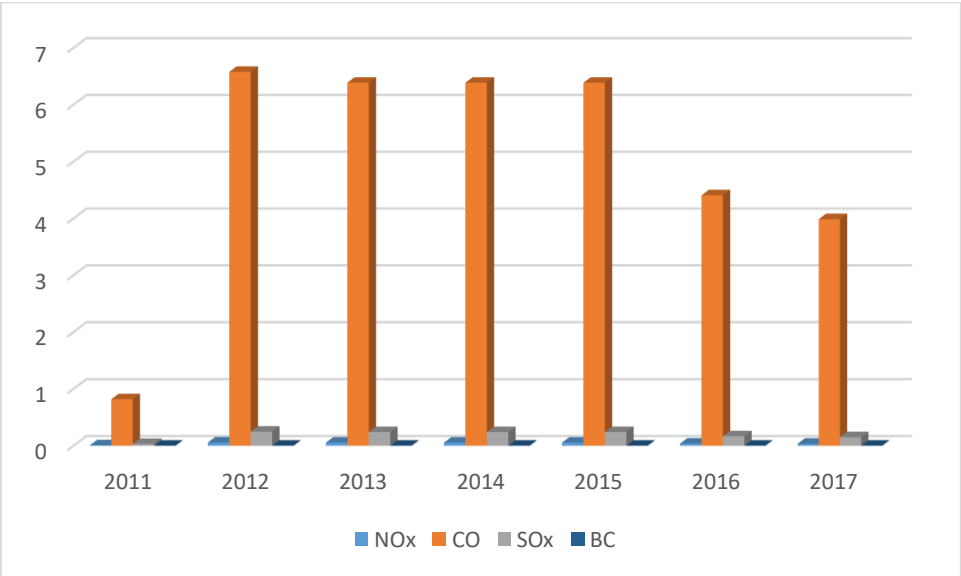


Figure 34-2 Emission trends in 2011-2016 (2C)

Methodological issues

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

NOx	1	kg/Mg aluminium
CO	120	kg/Mg aluminium
SOx	4.5	kg/Mg aluminium

PM2.5	0.6	kg/Mg aluminium
PM10	0.7	kg/Mg aluminium
TSP	0.9	kg/Mg aluminium
BC	2.3	% of PM2.5
Benzo(a)pyrene	9	g/Mg aluminium
Benzo(b)fluoranthene	9	g/Mg aluminium
Benzo(k)fluoranthene	9	g/Mg aluminium
Indeno(1,2,3-cd)pyrene	1.1	g/Mg aluminium

Activity data

Production volumes presented below are available from Ministry of Economy.

	2011	2012	2013	2014	2015	2016	2017
Unprocessed aluminium, produced in primary form kt	6.8	54.8	53.2	50.3	49	33.2	33.2
Unprocessed aluminium, produced in secondary form kt					4.2	3.5	

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

Data used for calculations are based on information received by the Ministry of Economy and hereby no quality check has been conducted.

Source-specific recalculations including changes made in response to the review Process

2019

- Calculations has been carried out from 2011 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2011 will be studied for the future submissions.

NFR 2C4 Magnesium production

Not occurring in Azerbaijan during the years 1990-2017, therefore the emissions are reported as NO.

NFR 2C5 Lead production

Source category description

The possibility to include these emissions in the next submission is studied.

NFR 2C6 Zinc production

Not occurring in Azerbaijan during the years 1990-2017, therefore the emissions are reported as NO.

NFR 2C7a Copper production

Source category description

Emission trend

Since 2015 the emissions are lower due to change in methodology to the Guidebook 2016. For the previous years there is no activity data currently available to recalculate the emissions.

The emission trends are presented in Table 43 and Figure 35-1,35-2,35-3

Table 43 emission from copper production

	2013	2014	2015	2016	2017
PM2.5	0.001	0.002	0.0029	0.0058	0.0062
PM10	6E-05	0.0001	0.0002	0.0004	0.0004
TSP	8E-05	0.0002	0.0002	0.0005	0.0005
BC	0.0001	0.0002	0.0003	0.0006	0.0007
Sox	6E-08	1E-07	2E-07	4E-07	4E-07
Pb	0.0063	0.0128	0.0184	0.037	0.0392
Cd	0.0036	0.0074	0.0107	0.0214	0.0227
Hg	8E-06	2E-05	2E-05	4E-05	5E-05
As	0.0013	0.0027	0.0039	0.0078	0.0083
Cr	0.0053	0.0108	0.0155	0.0311	0.033
Cu	0.0105	0.0216	0.031	0.0623	0.066
Ni	0.0046	0.0094	0.0136	0.0273	0.0289
PCB	0.0016	0.0034	0.0048	0.0097	0.0103
PCDD/F	3E-07	6E-07	9E-07	2E-06	2E-06

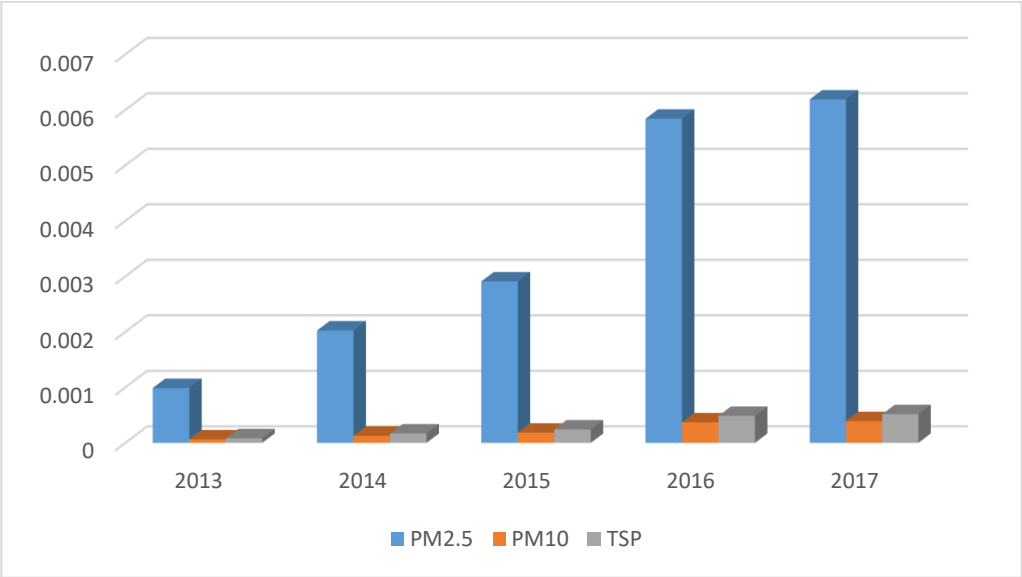


Figure 35-1

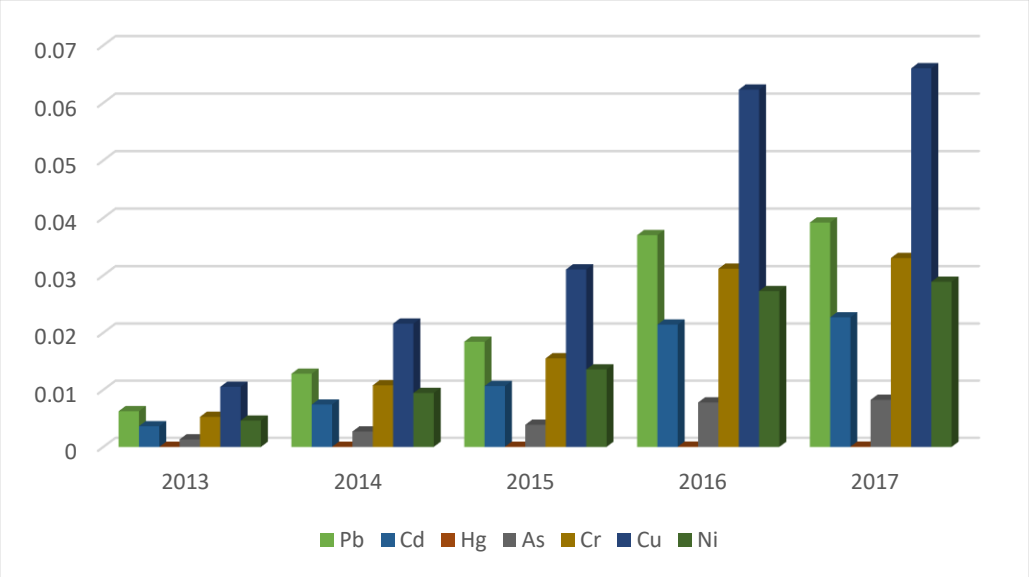


Figure 35-2

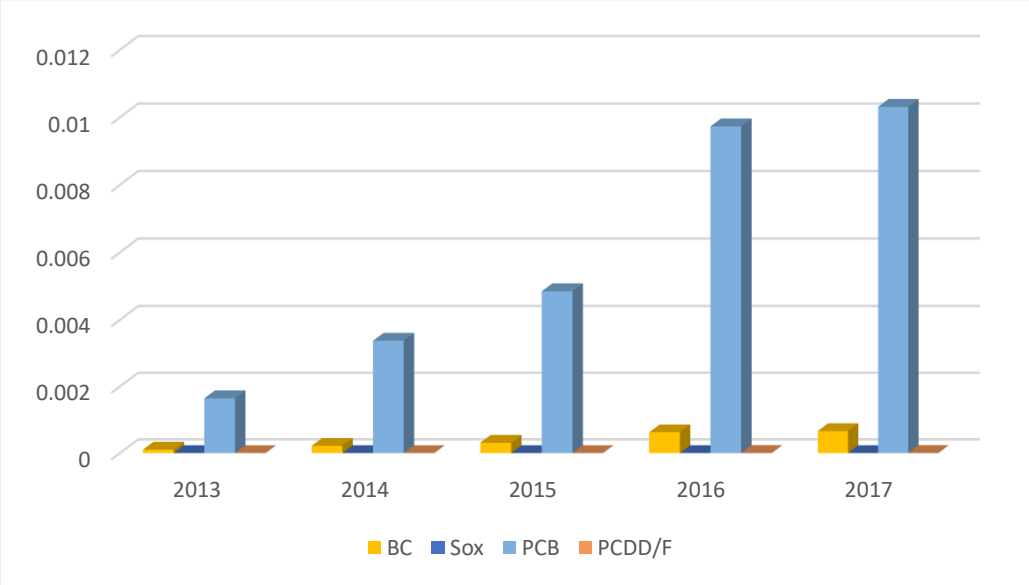


Figure 35-3 Emission trends in 2013-2017

Methodological issues

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

Emission factors

$PM_{2.5}$	190	g/Mg copper
PM_{10}	250	g/Mg copper
TSP	320	g/Mg copper
BC	0.1	% of PM2.5
SOx	3000	g/Mg copper
Pb	19	g/Mg copper
Cd	11	g/Mg copper
Hg	0.023	g/Mg copper
As	4	g/Mg copper
Cr	16	g/Mg copper
Cu	32	g/Mg copper
Ni	14	g/Mg copper
PCB	0.9	µg/Mg copper
PCDD/F	5	µg I-TEQ/Mg

Activity data

Production volumes presented below are available from the Statistical Committee's Industry Yearbook (https://www.stat.gov.az/)

	2013	2014	2015	2016	2017
Copper ore kt	329	674.6	969.2	1946.7	2062.5

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission.

Source specific planned improvements

Possibilities to collect information from 1990 to 2013 will be studied for the future submissions.

NFR 2C7b Nickel production

Not occurring in Azerbaijan in the years 1990-2017, therefore the emissions are reported as NO.

NFR 2C7c Other metal production

Not occurring in Azerbaijan in the years 1990-2017, therefore the emissions are reported as NO.

NFR 2C7d Storage, handling and transport of metal products

The possibility to include these emissions in the next submission is studied.

11. Other (2.D - 2.L)

NFR 2D3a Domestic solvent use

Source category description

Emissions from this category come from the use of solvent containing products in the households.

Emission trend

The emission trends are presented in Table 44 and Figure 36-1,36-2

Table 44 emission from Domestic solvent use

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NMVOC	10.399	10.536	10.707	10.797	10.933	11.082	11.228	11.373	11.512	11.647	11.772
Hg	0.0485	0.0492	0.05	0.0504	0.051	0.0517	0.0524	0.0531	0.0537	0.0544	0.0549

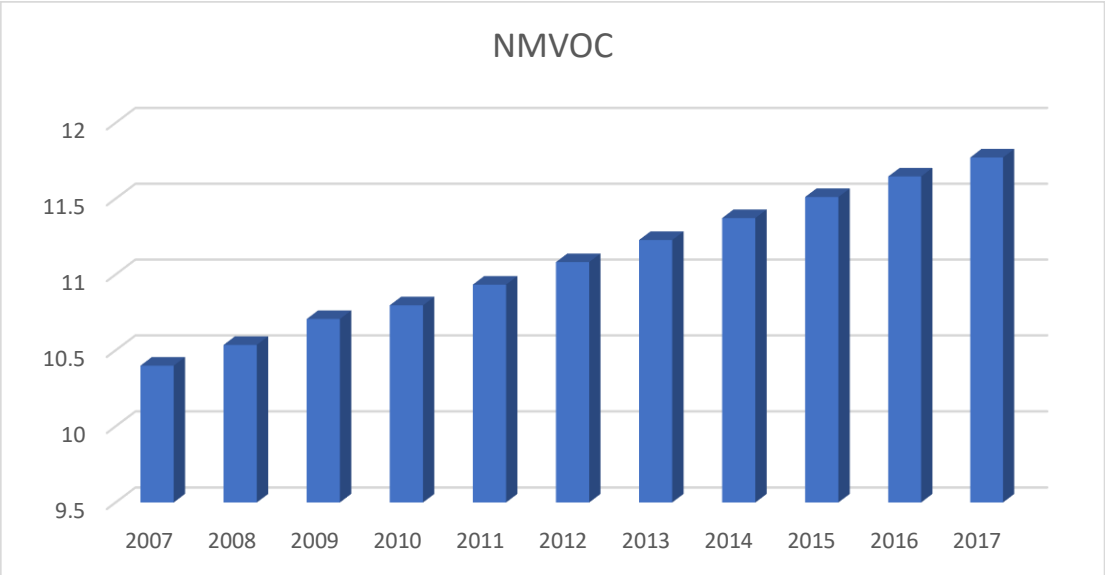


Figure 36-1

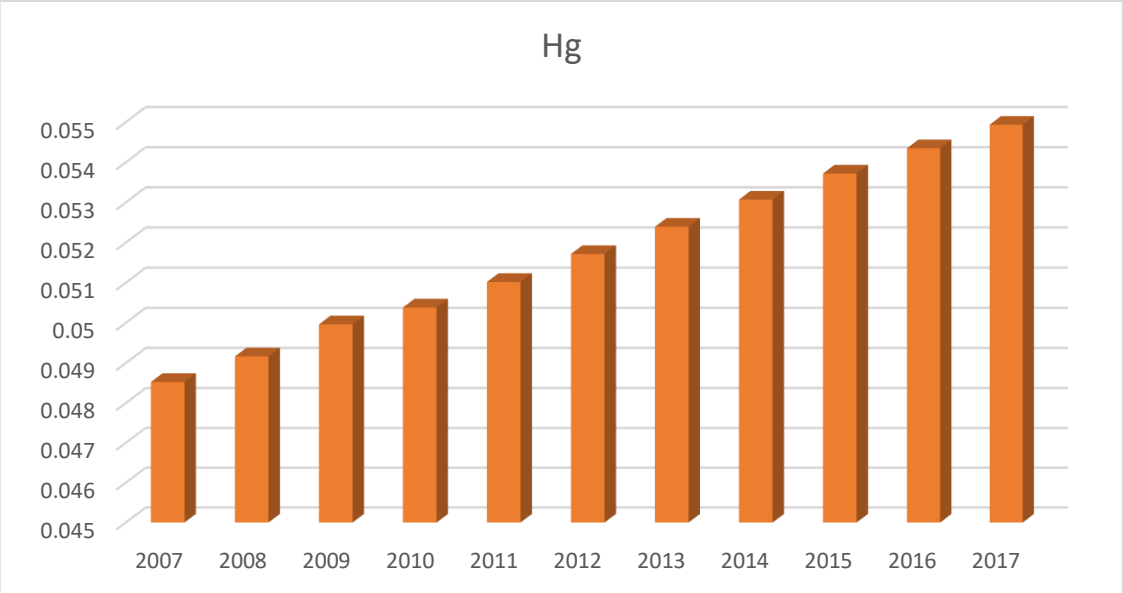


Figure 36-2 Emission trends in 2007-2017 (2C)

Methodological issues

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission .

Emission factors

The emission factors from Guidebook 2016

NMVOC	1.2	kg/capita
Hg	5.6	mg/capita

Activity data

Activity data is received from the Statistical Committee web page (https://www.stat.gov.az/).

Years	Number of population (thousand)
2007	8666.1
2008	8779.9
2009	8922.4
2010	8997.6
2011	9111.1
2012	9235.1
2013	9356.5
2014	9477.1
2015	9593.0
2016	9705.6
2017	9810000.0
2018	9898100.0

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process
2019

- Recalculations has been carried out from 2007 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None

NFR 2D3b Road paving with asphalt

Source category description

There are asphalt producing enteprises in various regions of Azerbaijan that meet international quality standards for technical specifications.

Emission trend

The emission trends are presented in Table 45 and Figure 37.

Table 45 emission from Road paving with asphalt category

	2013	2014	2015	2016	2017
NMVOC	0.018208	0.017648	0.015643	0.011378	0.008872
PM2.5	0.4552	0.4412	0.39108	0.28444	0.2218
PM10	3.414	3.309	2.9331	2.1333	1.6635
TSP	15.932	15.442	13.6878	9.9554	7.763
BC	0.025946	0.025148	0.022292	0.016213	0.012643

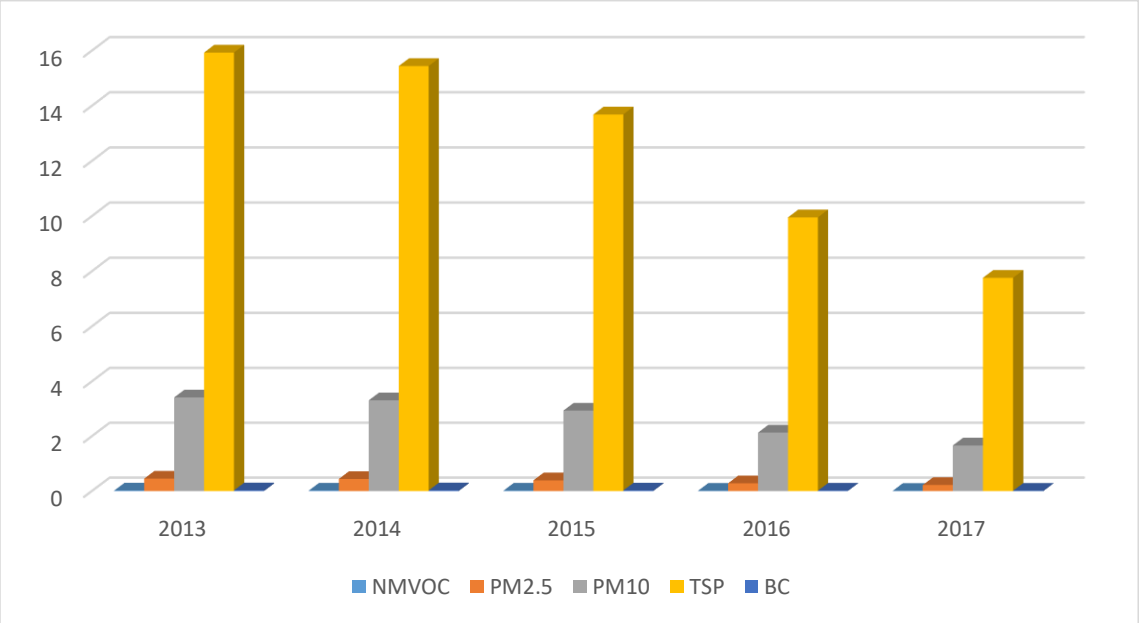


Figure 37 Emission trends in 2013-2017 (2C)

Methodological issues

Emission factors
Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

NMVOC	16	g/Mg asphalt
$PM_{2.5}$	400	g/Mg asphalt
PM_{10}	3000	g/Mg asphalt
TSP	14000	g/Mg asphalt
BC	5.7	% of $PM_{2.5}$

Activity data

Production volumes presented below are available from the Statistical Committee's Industry Yearbook (/www.stat.gov.az/).

	2013	2014	2015	2016	2017
Asphalt, kt	1138	1103	977.7	711.1	554.5

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2D3c Asphalt roofing

The possibility to include these emissions in the next submission is studied.

NFR 2D3d Coating applications

The possibility to include these emissions in the next submission is studied.

NFR 2D3e Degreasing

The possibility to include these emissions in the next submission is studied.

NFR 2D3f Dry cleaning

The possibility to include these emissions in the next submission is studied.

NFR 2D3g Chemical products

Source category description

High quality chemical substances such as polyethylene, pyrolysis tar, propylene, isopropyl alchohol, propylene oxide, propylene glycol, polyester for domestic need and mostly for export to abroad.

Emission trend

The emission trends are presented in Table 46 and Figure 38.

Table 46 emissions from chemical products

	2013	2014	2015	2016	2017
NMVOC	2.739	3.332	3.457	3.329	3.311

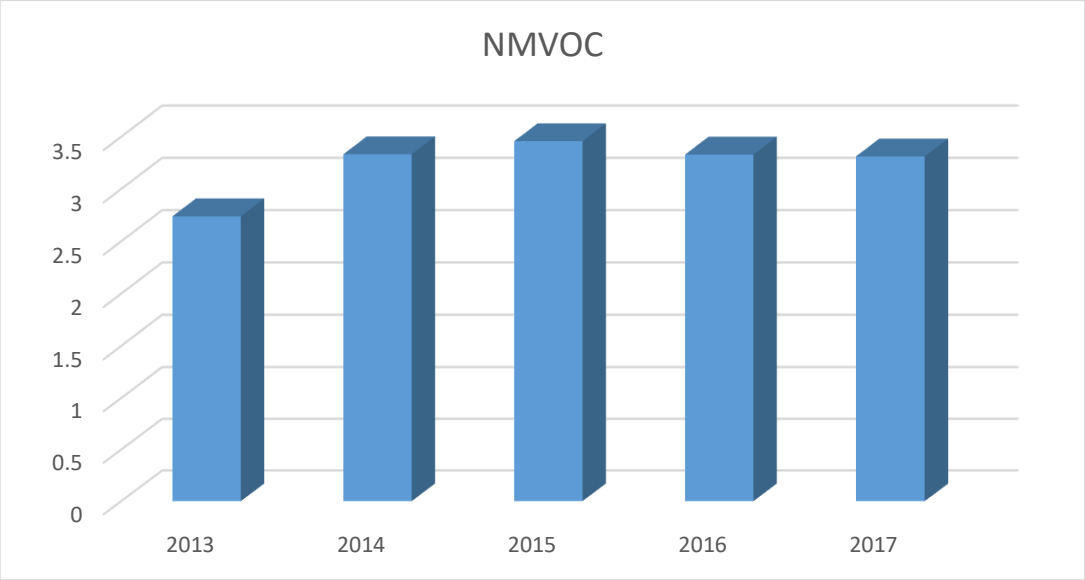


Figure 38 Emission trends in 2013-2017 (2C)

Methodological issues

Emission factors

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

NMVOC	10	g/kg product

Activity data

Production volumes presented below are available from the Statistical Committee's Industry Yearbook (/www.stat.gov.az/).

	2013	2014	2015	2016	2017
Propylene, thsd.ton	40.8	56.4	56.4	52.2	48.4
Ethylene, thsd.ton	78.5	104	106.7	103.4	96
Polyethylene, thsd.ton	76.2	101	103.5	100.3	93.2
Izopropyl alcohol, thsd.ton	13.8	10.6	12.3	8.9	11.9
Paint and lacquer materials, thsd.ton	5.2	4.3	5.5	8.4	11.5
Hidrochloric acid, thsd. ton	-	0.2	0.3	0.3	0.3
Sulphuric acid, thsd.ton	0.2	-	-	0	0
Barium sulfate, thsd. ton	59.2	56.7	61	59.4	69.8

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2D3h Printing

The possibility to include these emissions in the next submission is studied.

NFR 2D3i Other solvent use

The possibility to include these emissions in the next submission is studied.

NFR 2G Other product use

Source category description

Tobacco producing and processing enterprise is operating in Zagatala.This enterprise cultivates fermented tobacco seedlings.

Emission trend

The emission trends are presented in Table 47 and Figure 39.

Table 47 Emisssions from category other product use

	2013	2014	2015	2016	2017
NMVOC	0.004224	0.00486	0.003384	0.003894	0.006832

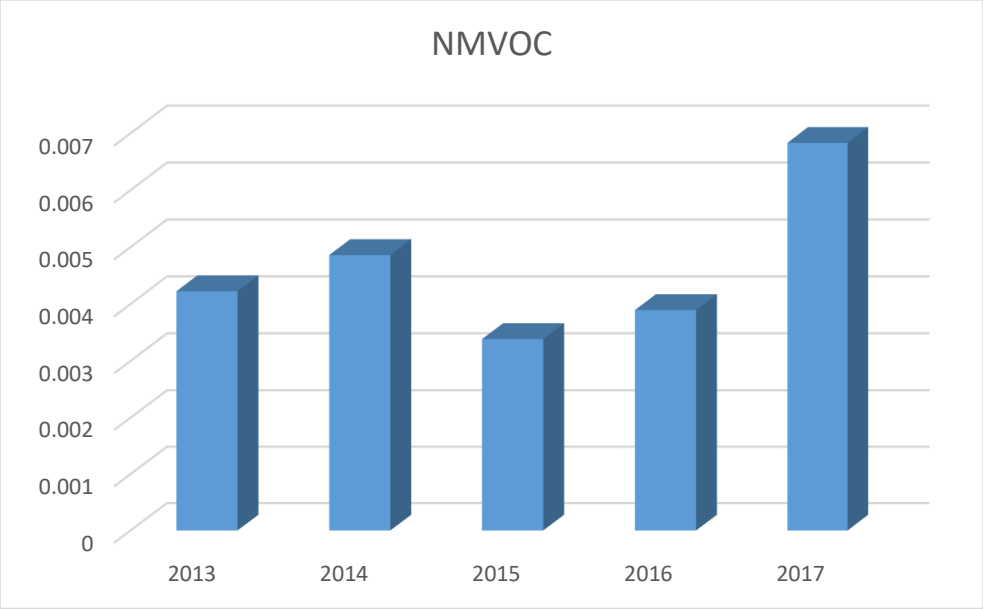


Figure 39 Emission trends in 2013-2017 (2C)

Methodological issues

Emission factors

NMVOC	2	kg/Mg product used

Emissions were estimated using Guidebook 2016 Tier 1 emission factors.

Activity data

Tobacco use are presented below are available from the Statistical Committee's Industry Yearbook (www.stat.gov.az/)

	2013	2014	2015	2016	2017
Fermented tobacco, ton	2112	2430	1692	1947	3415.9

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2H1 Pulp and paper

In Azerbaijan there is only paper production, not pulp production. Therefore all emissions from this category are assumed to be energy production related and are reported under NFR 1A2d in the Energy Sector.

NFR 2H2 Food and beverages industry

Source category description

Food industry combining dozens of subfields is one of the largest in the country. Food producing enterprises are dealing with a range of processes starting from pre-processing of the raw materials (sugar, vegetable, milk, tobacco and etc.) to reprocessing (bread bakery, sweets, beer production and etc).

Emission trend

The emission trends are presented in Table 48 and Figure 40.

Table 48 emissions from category food and beverages industry

	2012	2013	2014	2015	2016	2017
NMVOC	10.14084	11.14313	10.76958	10.02397	10.62225	7.990054

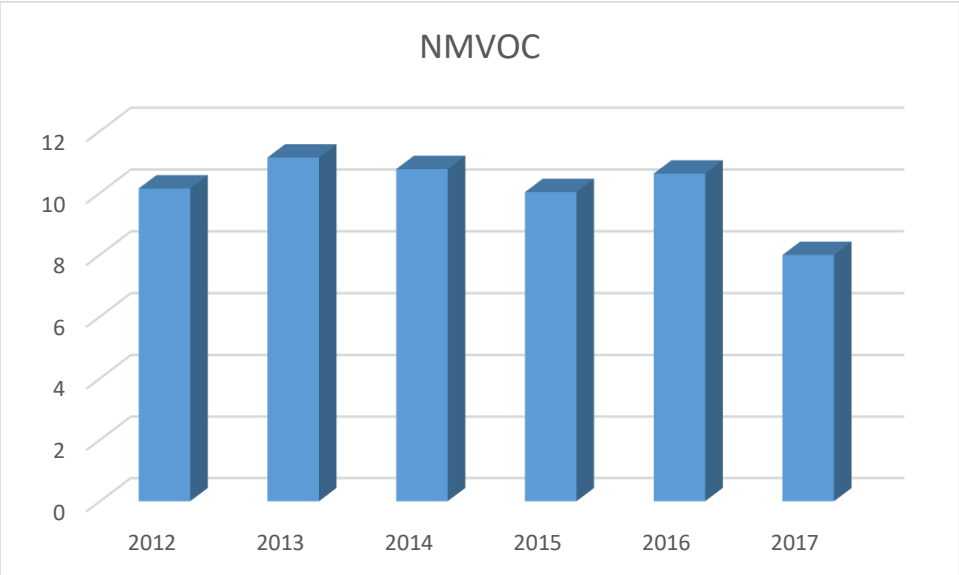


Figure 40 Emission trends in 2012-2017

Methodological issues

Emission factors

Bread	NMVOC	4.5	kg/Mg bread
Meat	NMVOC	0.3	kg/Mg product
Sugar	NMVOC	10	kg/Mg sugar
Wine	NMVOC	0.08	kg/hl wine
Beer	NMVOC	0.035	kg/hl beer
Spirits	NMVOC	15	kg/hl alcohol

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

Activity data

Production volumes presented below are available from the Statistical Committee's Industry Yearbook (/www.stat.gov.az/)

	2013	2014	2015	2016	2017
Wine, thsd. decalitre	835.5	1003	1035	1049	1130.5
Bear, thsd. decalitre	5215	5149	4197	3263	4100
Spirits thsd. decalitre	993.7	811.4	779	589.2	556.7
Meat , thsd.ton	273.8	278.1	285	288.8	302.6
Sugar, thsd.ton	423.1	410.6	335.6	418.7	228.4
Bread, thsd.ton	1,181	1,186	1,198	1,210	1,223

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2012 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2H3 Other industrial processes

Not occurring in Azerbaijan in the years 1990-2017, therefore the emissions are reported as NO.

NFR 2I Wood processing

Source category description

Emission trend

The emission trends are presented in Table 49 and Figure 41.

Table 49 Emisssions from wood processing

	2013	2014	2015	2016	2017
TSP	0.000256	0.00223	0.001377	0.000868	0.000868

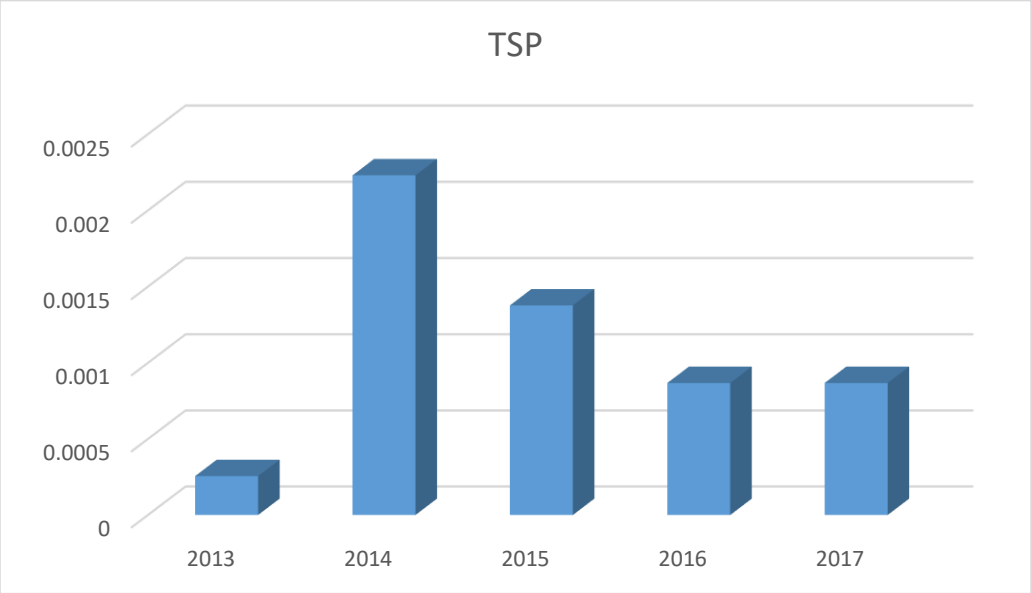


Figure 41 Emission trends in 2013-2017

Methodological issues

Emission factors

Emissions were estimated using the annual total production volumes and Guidebook 2016 Tier 1 emission factors.

TSP	1	kg/Mg wood product

Activity data

Production volumes presented below are available from the Statistical Committee's Industry Yearbook (/www.stat.gov.az/).

	2013	2014	2015	2016	2017
Wooden packing, ton	256	2230	1377	868	101

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review Process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 2J Production of POPs

Not occurring in Azerbaijan in the years 1990-2017, therefore emissions are reported as NO.

NFR 2K Consumption of POPs and heavy metals

Not occurring in Azerbaijan in 1990-2017, therefore emissions are reported as NO.

NFR 2L Other production, consumption, storage and transportation

Not occurring in Azerbaijan in 1990-2017, therefore emissions are reported as NO.

12. Agriculture (NFR sector 3)

About 54,9 percent of Azerbaijan is agricultural lands.

NFR 3B1a Manure management - Dairy cattle

Source category description

Almost 2698500 million heads of cattle are maintained on private and large livestock farms and 44.6% of them are dairy cows.
Animal husbandry is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 50 and in Figure 42.

Table 50. Emissions from category 3B1a

	2013	2014	2015	2016	2017
NOx	0.145442	0.145683	0.146673	0.147733	0.14717
NMVOC	9.476678	9.492394	9.556923	9.62599	9.589264
NH3	40.04064	40.10705	40.37969	40.67151	40.51634
PM2.5	0.482843	0.483644	0.486932	0.490451	0.488579
PM10	0.74193	0.74316	0.748212	0.753619	0.750744
TSP	1.625179	1.627874	1.63894	1.650785	1.644487

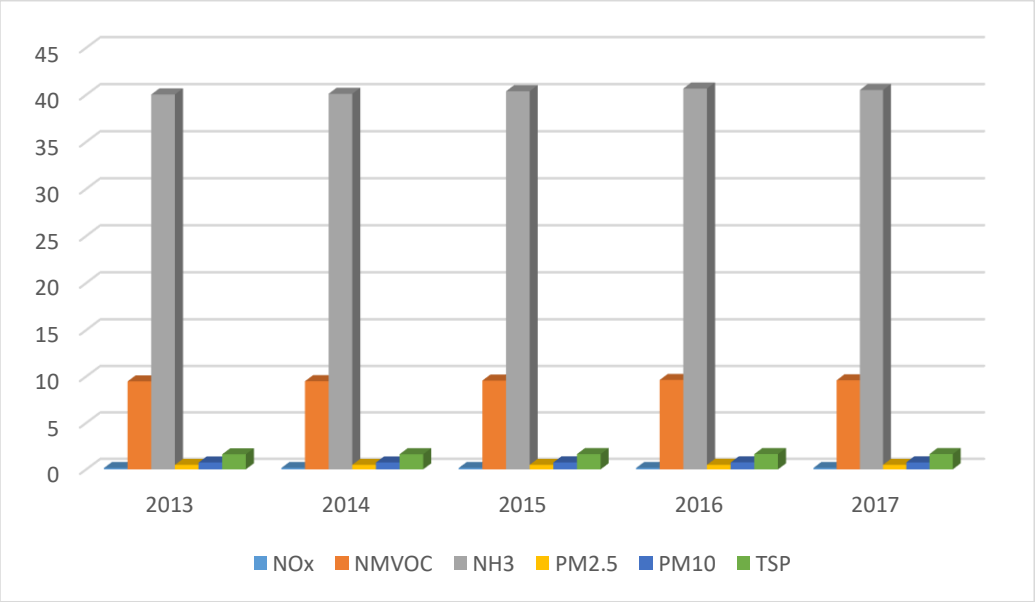


Figure 42. Emission trends from NFR 3B1a

As can be seen from the graphs, the number of animals is rather steady over the years

Methodological issues

Emission factors

Dairy Cattle is a key source for ammonia emissions.

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B1a	Manure management - Dairy cattle	34	0.1235	0.63	0.41	1.38	8.047

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Dairy cow statistics 2011-2017

Year	Number of dairy cows
2011	1143700
2012	1162606
2013	1177666
2014	1179619
2015	1187638
2016	1196221
2017	1191657

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Improving the method to Tier 2 because dairy cattle is a key source for ammonia emissions.

NFR 3B1b Manure management - Non-dairy cattle

Source category description

Almost 2698500 million heads of cattle are maintained on private and large livestock farms and 47.6% of them are none-dairy cattle.

Animal husbandry is a source of ammonia, NMVOC and particle emissions.
Emission trends

Emission trends are presented in Table 51 and in Figure 43.

Table 51. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.092956	0.093019	0.093959	0.094672	0.094424
NMVOC	4.555475	4.558544	4.604649	4.63956	4.627425
NH3	14.29119	14.30082	14.44546	14.55498	14.51691
PM2.5	0.227647	0.227801	0.230105	0.231849	0.231243
PM10	0.341471	0.341701	0.345157	0.347774	0.346864
TSP	0.746177	0.74668	0.754232	0.75995	0.757962

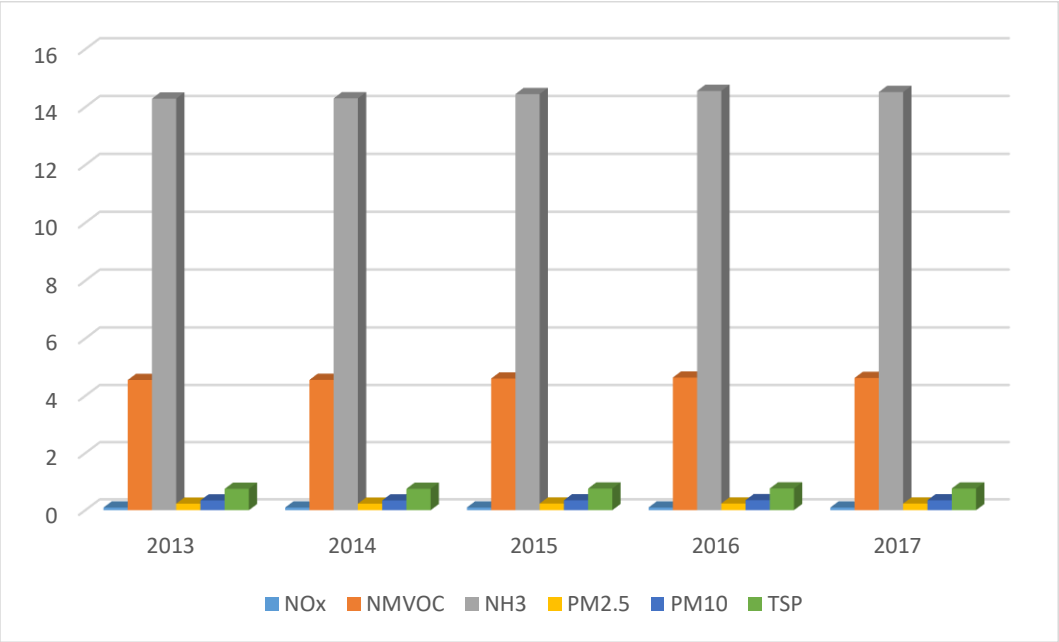


Figure 43. Emission trends from NFR 3B1b

Methodological issues

Emission factors

Non-Dairy Cattle is a key source for ammonia emissions.
The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B1b	Manure management - Non-dairy cattle	11.3	0.0735	0.27	0.18	0.59	3.602

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Non-dairy cattle statistics 2013-2017

Year	Number of non-dairy cattle
2013	1264707
2014	1265559
2015	1278359
2016	1288051
2017	1284682

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Improving the method to Tier 2 because non-dairy cattle is a key source for ammonia emissions.

NFR 3B2 Manure management – Sheep

Source category description

Almost 7820981 million sheep are maintained on private and large livestock farms. The sheep are kept for hide and meat production.

Sheep husbandry is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 52 and in Figure 44

Table 52. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.063835	0.063899	0.064205	0.063732	0.062568
NMVOC	1.348523	1.349856	1.356328	1.346331	1.321746
NH3	11.17119	11.18224	11.23585	11.15304	10.94937
PM2.5	0.159588	0.159746	0.160512	0.159329	0.15642
PM10	0.478765	0.479239	0.481536	0.477987	0.469259
TSP	1.117119	1.118224	1.123585	1.115304	1.094937

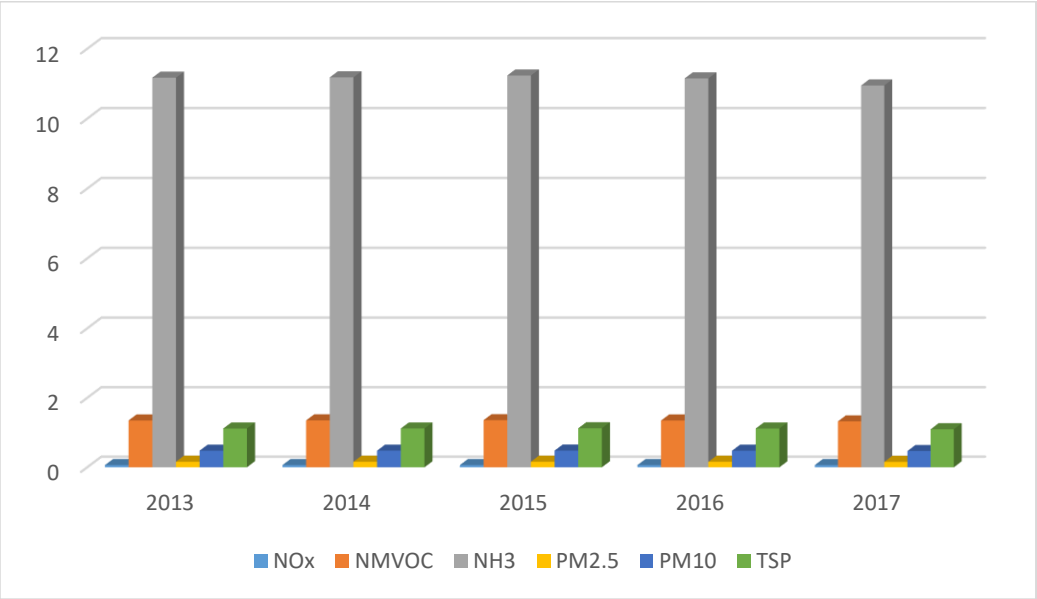


Figure 44. Emission trends from NFR 3B2

Methodological issues
Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016..

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B2	Manure management - Sheep	1.4	0.008	0.06	0.02	0.14	0.169

Activity data

Activity data is received from the Statistical Committee Animal numbers used in the calculation are presented below.

Sheep statistics 2013-2017

Year	Number of sheep
2013	7979424
2014	7987313
2015	8025608

2016	7966456
2017	7820981

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Improving the method to Tier 2 because sheep is a key source for ammonia emissions.

NFR 3B3 Manure management - Swine

Source category description

Swine are not commonly kept domestic animals in Azerbaijan, the current number of heads is 4856.

The swine are kept for meat production.
Swine husbandry is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 53 and in Figure 45

Table 53. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.000474	0.000432	0.000366	0.00031	0.000341
NMVOC	0.007606	0.006926	0.005882	0.004968	0.005475
NH3	0.073531	0.066959	0.056865	0.048025	0.05293
PM2.5	4.05E-05	3.69E-05	3.13E-05	2.64E-05	2.91E-05
PM10	0.00081	0.000737	0.000626	0.000529	0.000583
TSP	0.004362	0.003972	0.003374	0.002849	0.00314

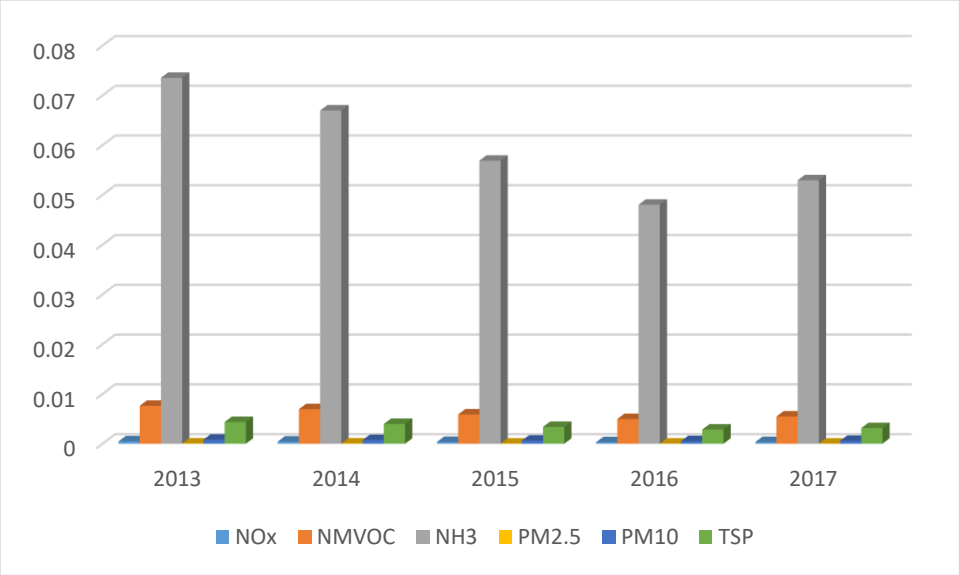


Figure 45. Emission trends from NFR 3B3

Methodological issues

Emission factors

Due to the low number of swine this is not a key category for air pollutant emissions in Azerbaijan.
As no data on the number of swine exists the emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B43	Manure management - Swine	10.9	0.07025	0.12	0.006	0.6467	1.1275

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Swine statistics 2013-2017

Year	Number of swine
2013	6746
2014	6143
2015	5217
2016	4406
2017	4856

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.
Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None.

NFR 3B4a Manure management – Buffalo

Source category description

94127 buffaloes are maintained on farms for hide and meat production.
Buffalo husbandry is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 54 and in Figure 46.

Table 54. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.008177	0.007894	0.007611	0.006786	0.006212
NMVOC	0.526942	0.50871	0.490477	0.437259	0.400322
NH3	1.115091	1.076508	1.037925	0.925308	0.847143
PM2.5	0.054516	0.052629	0.050743	0.045237	0.041416
PM10	0.083012	0.08014	0.077268	0.068884	0.063065
TSP	0.179654	0.173437	0.167221	0.149077	0.136484

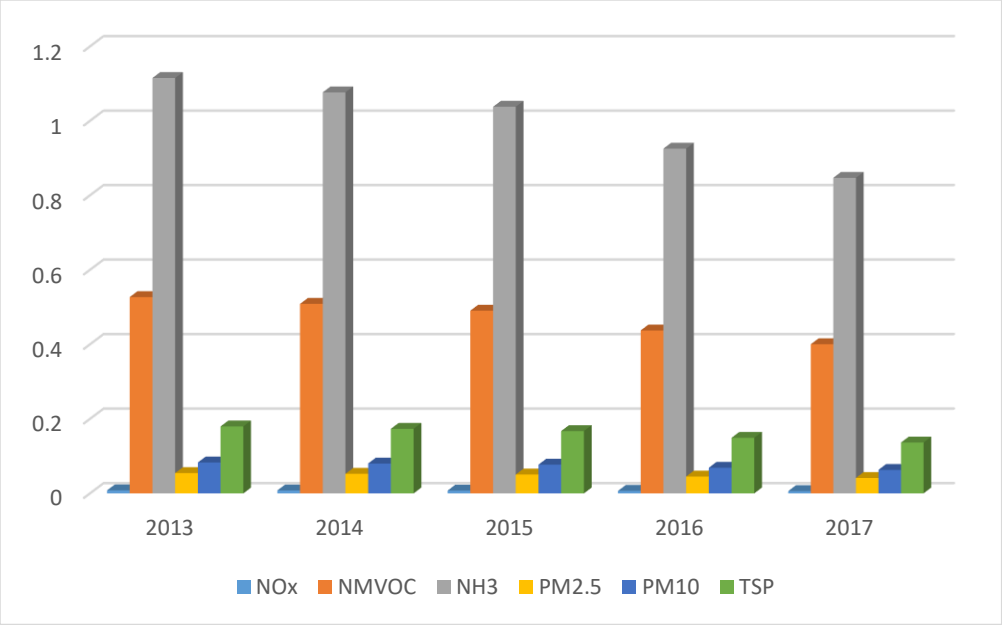


Figure 46. Emission trends from NFR 3B4a

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4a	Manure management - Buffalo	9	0.066	0.67	0.44	1.45	4.253

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Buffalo statistics 2013-2017

Year	Number of buffaloes
2013	123899
2014	119612
2015	115325
2016	102812
2017	94127

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None

NFR 3B4d Manure management – Goats

Source category description

633327 goats are kept on livestock farms for hide and meat production.
Goat husbandry is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 55 and in Figure 47.

Table 55. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.005209	0.005265	0.005212	0.005187	0.005067
NMVOC	0.352904	0.356694	0.353102	0.351403	0.343263
NH3	0.911561	0.92135	0.912071	0.907683	0.886658
PM2.5	0.010874	0.01099	0.01088	0.010827	0.010577
PM10	0.036202	0.036591	0.036222	0.036048	0.035213
TSP	0.090505	0.091477	0.090556	0.09012	0.088032

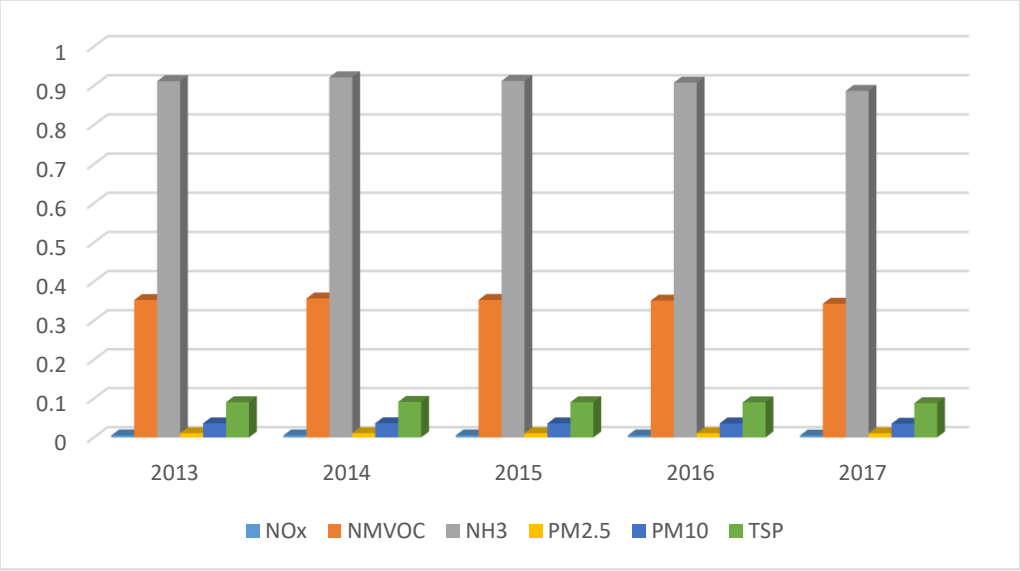


Figure 47. Emission trends from NFR 3B4d

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented in below.

Goat statistics 2013-2017

Year	Number of goats
2013	651115
2014	658107
2015	651479
2016	648345
2017	633327

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None

NFR 3B4e Manure management – Horses

Source category description

Horses are kept on farms.
Horse keeping is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 56 and in Figure 48.

Table 56. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.015387	0.015161	0.014822	0.014393	0.013773
NMVOC	0.32726	0.322455	0.315243	0.306116	0.292923
NH3	1.13297	1.116334	1.091367	1.059769	1.014096
PM2.5	0.010717	0.01056	0.010324	0.010025	0.009593
PM10	0.016841	0.016594	0.016223	0.015753	0.015074
TSP	0.036745	0.036205	0.035396	0.034371	0.03289

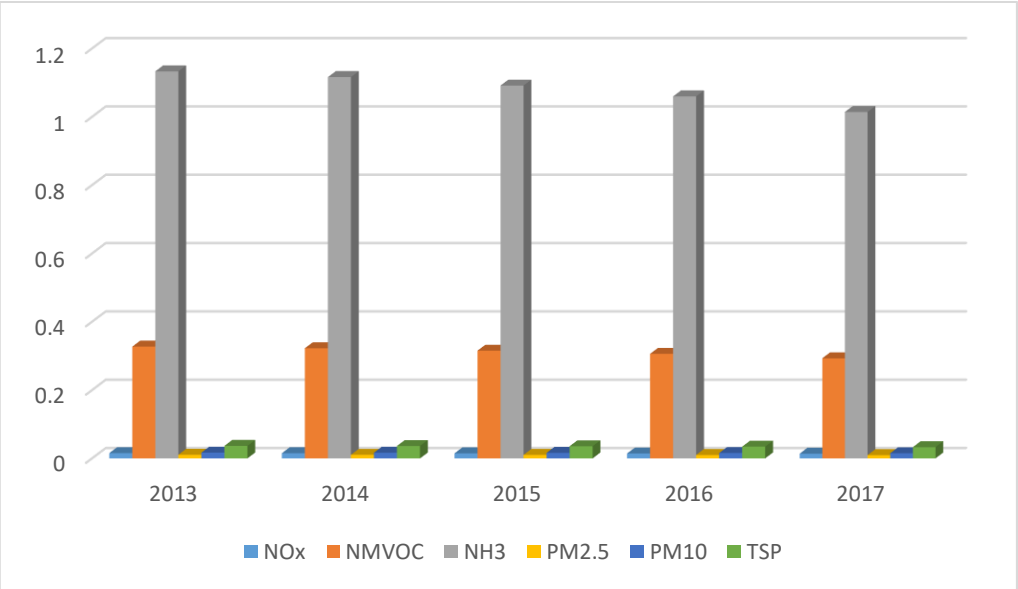


Figure 48. Emission trends from NFR 3B4e

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4e	Manure management - Horses	14.8	0.201	0.22	0.14	0.48	4.275

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Horse statistics 2013-2017

Year	Number of horses
2013	76552
2014	75428
2015	73741
2016	71606
2017	68520

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Improving the method to Tier 2 because Horse keeping is a key source for ammonia emissions.

NFR 3B4f Manure management - Mules and asses

Source category description

Mules and asses are kept on farms.
Mules and asses keeping is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 57 and in Figure 49.

Table 57. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.008746	0.008055	0.00722	0.006864	0.006214
NMVOC	0.063964	0.058909	0.052801	0.050196	0.045447
NH3	0.643992	0.593095	0.531601	0.505376	0.457557
PM2.5	0.004351	0.004007	0.003592	0.003415	0.003092
PM10	0.006962	0.006412	0.005747	0.005464	0.004947
TSP	0.014794	0.013625	0.012212	0.01161	0.010511

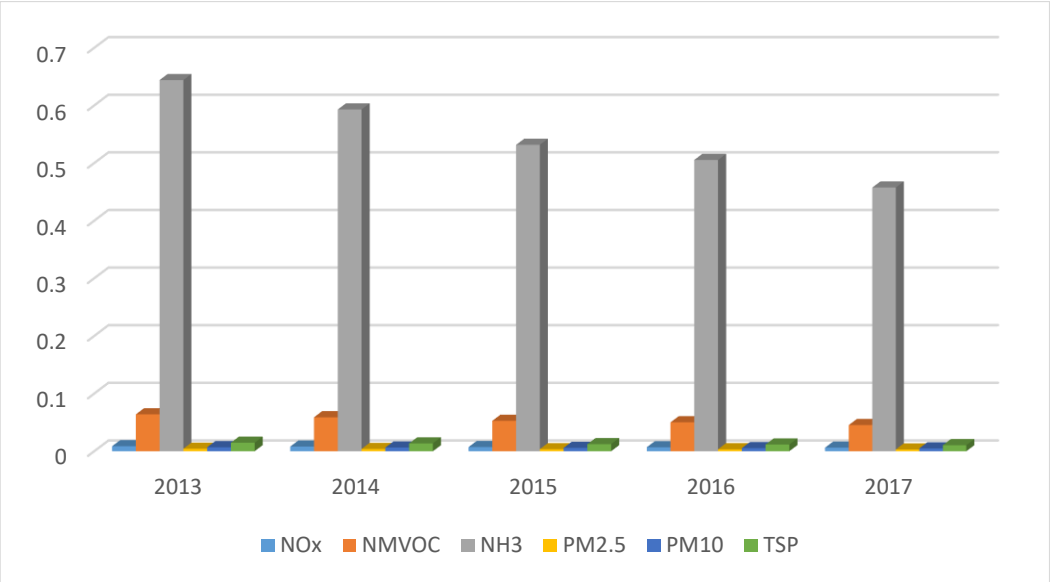


Figure 49. Emission trends from NFR 3B4e

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4f	Manure management – Mules and asses	14.8	0.201	0.16	0.10	0.34	1.470

Activity data
Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Mules and asses statistics 2013-2017.

Year	Number of Mules and asses
2013	43513
2014	40074
2015	35919
2016	34147
2017	30916

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

Improving the method to Tier 2 because Mules and asses keeping is a key source for ammonia emissions.

NFR 3B4gi Manure mangement - Laying hens

Source category description

Laying hens are kept on farms for egg and meat production.
Laying hens keeping is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 58 and in Figure 50.

Table 58 Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.005931	0.00909	0.008689	0.009012	0.011503

NMVOC	0.376406	0.576887	0.551405	0.571909	0.729997
NH3	1.095	1.678217	1.604088	1.663735	2.123627
PM2.5	0.006844	0.010489	0.010026	0.010398	0.013273
PM10	0.09125	0.139851	0.133674	0.138645	0.176969
TSP	0.433437	0.664294	0.634951	0.658562	0.840602

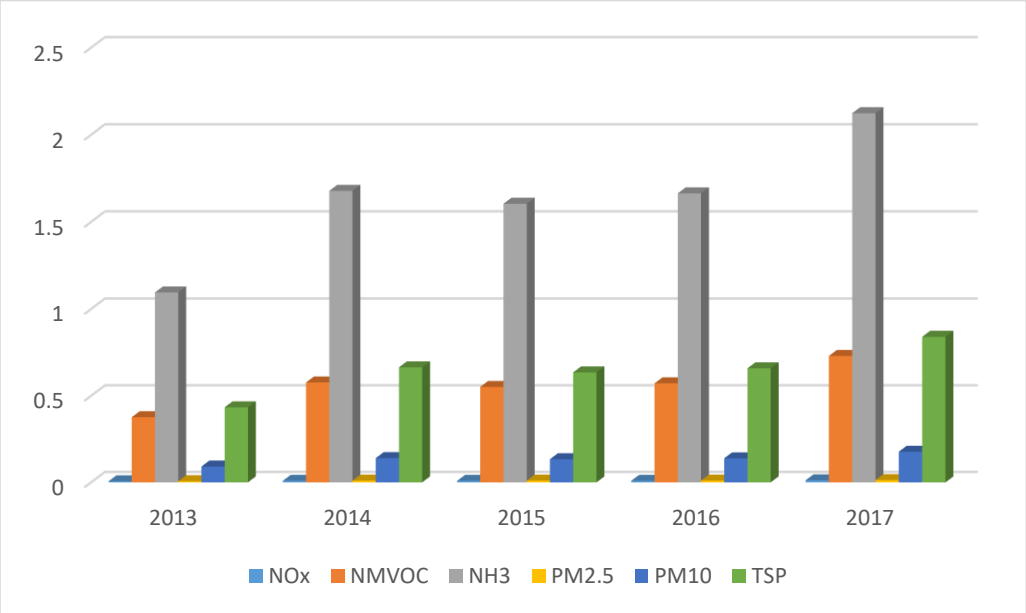


Figure 50. Emission trends from NFR 3B4gi

Methodological issues

Emission factors

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4gi	Manure management – Laying hens	0.48	0.0026	0.04	0.003	0.19	0.165

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below

Laying hens statistics 2013-2017.

Year	Number of Laying hens
2013	2281249
2014	3496285
2015	3341849
2016	3466114
2017	4424223

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2008 will be studied for the future submissions.

NFR 3B4gii Manure mangement - Broilers

Source category description

Broilers are kept on farms for meat production.
Broilers keeping is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 59 and in Figure 51

Table 59. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.016609	0.023445	0.019256	0.01997	0.024938
NMVOC	0.896877	1.266033	1.039843	1.078371	1.34665
NH3	1.826971	2.578956	2.1182	2.196681	2.743176
PM2.5	0.016609	0.023445	0.019256	0.01997	0.024938
PM10	0.166088	0.234451	0.192564	0.199698	0.24938
TSP	0.332177	0.468901	0.385127	0.399397	0.498759

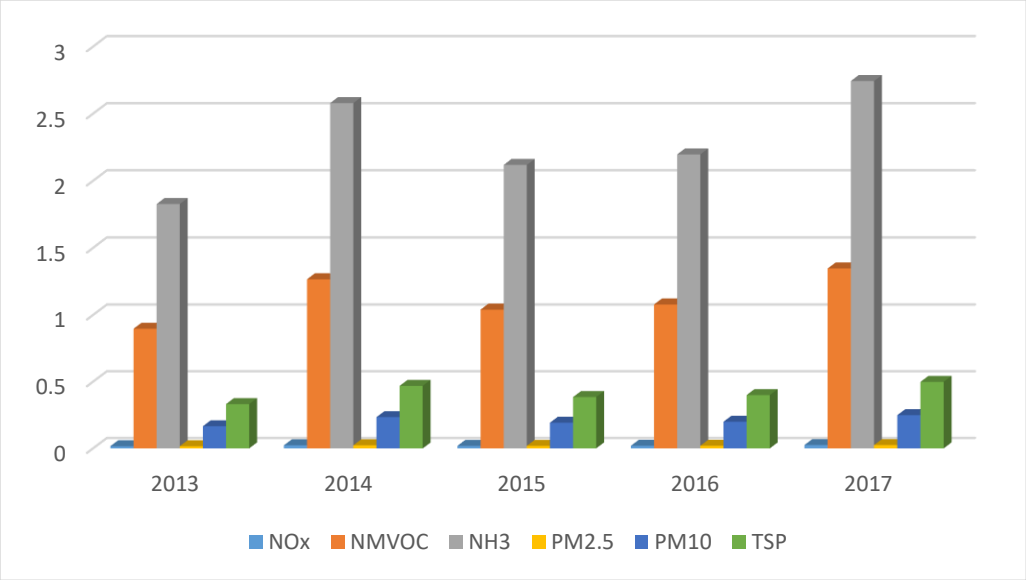


Figure 51. Emission trends from NFR 3B4gii

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4gii	Manure management – Broilers	0.22	0.002	0.02	0.002	0.04	0.108

Activity data

Activity data is received from the Statistical Committee . Animal numbers used in the calculation are presented in below.

Broilers statistics 2013-2017.

Year	Number of Broilers
2013	25172690
2014	28851734
2015	27559384
2016	28009469
2017	30473379

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2008 will be studied for the future submissions.

NFR 3B4giii Manure mangement - Turkeys

Source category description

Turkeys are kept on farms for meat production.
Turkeys keeping is a source of ammonia, NMVOC and particle emissions.

Emission trends

Emission trends are presented in Table 60 and in Figure 52.

Table 60. Emission trends 2013-2017.

	2013	2014	2015	2016	2017
NOx	0.010568	0.010568	0.010568	0.010568	0.009336
NMVOC	0.645969	0.645969	0.645969	0.645969	0.570663
NH3	1.25495	1.25495	1.25495	1.25495	1.10865
PM2.5	0.02642	0.02642	0.02642	0.02642	0.02334
PM10	0.14531	0.14531	0.14531	0.14531	0.12837
TSP	0.14531	0.14531	0.14531	0.14531	0.12837

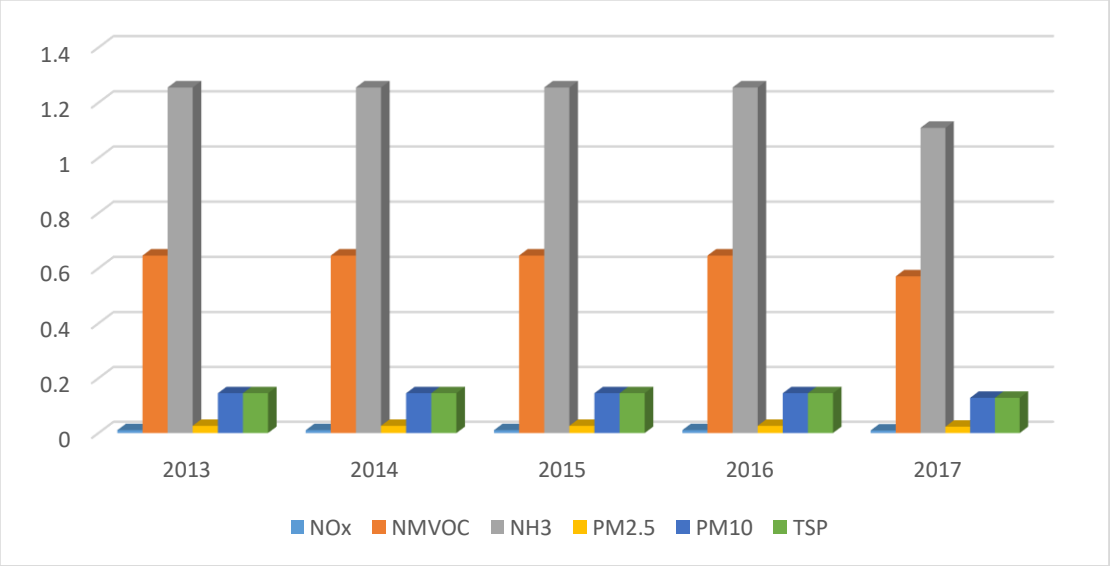


Figure 52. Emission trends from NFR 3B4giii

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4giii	Manure management – Turkeys	0.95	0.008	0.11	0.02	0.11	0.489

Activity data
Information on the number of Turkeys was obtained from the FAO (Food and Agriculture Organization of the United Nations). Animal numbers used in the calculation are presented below.

Turkeys statistics 2013-2017

Year	Number of Turkeys
2013	956000
2014	900000
2015	1293000
2016	1321000
2017	1167000

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

No quality check has been conducted.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission.

Source specific planned improvements

Possibilities to collect information from 1990 to 2008 will be studied for the future submissions.

NFR 3B4giv Manure management - Other poultry

Source category description

This category includes ducks and geese.
Ducks and geese are kept on farms for meat production.

Emission trends

Emission trends are presented in Table 61 and in Figure 53.

Table 61. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.040893	0.038199	0.039889	0.039712	0.03724
NMVOC	6.665573	6.226398	6.501918	6.473109	6.070042
NH3	7.019979	6.557454	6.847623	6.817283	6.392784
PM2.5	0.340776	0.318323	0.332409	0.330936	0.310329
PM10	2.589895	2.419255	2.526307	2.515114	2.358503
TSP	2.589895	2.419255	2.526307	2.515114	2.358503

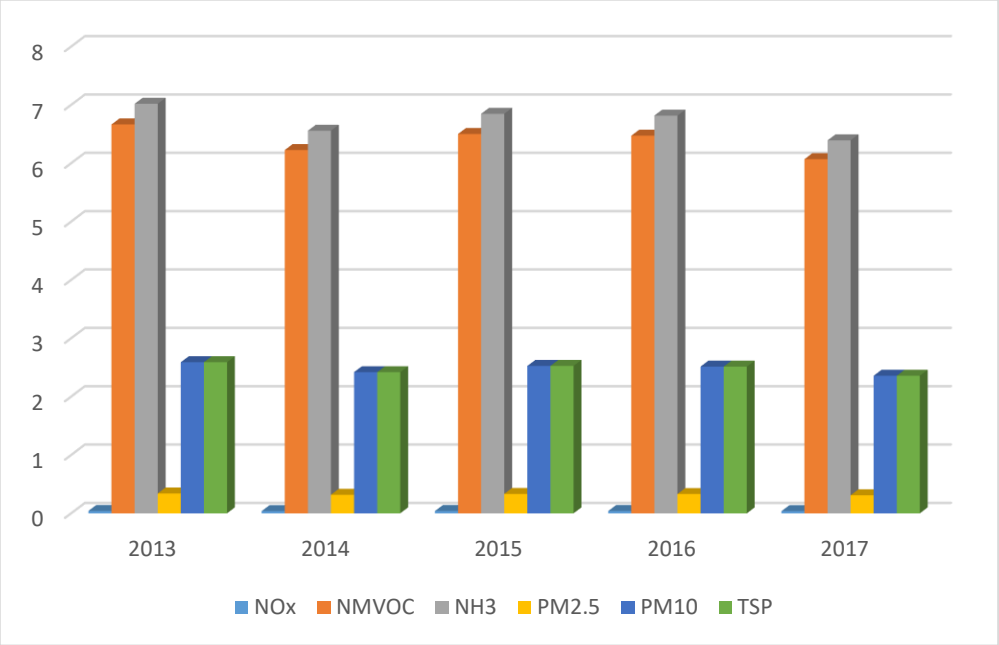


Figure 53. Emission trends from NFR 3B4giv

Methodological issues

Emission factors

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

		NH3	NOx	PM10	PM2,5	TSP	NMVOC
3B4giv	Manure management – other poultry	0.515	0.0030	0.1900	0.0250	0.190	0.489

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.

Other poultry statistics 2013-2017

Year	Number of ducks and geese
2013	13631028
2014	12732920
2015	13296355
2016	13237442
2017	12413173

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None

NFR 3B4h Manure management - Other animals

Source category description

This includes camels.
There are smaller camel farms in some regions of Azerbaijan. Mainly stored in individual farms. Camels are currently being kept in the meat sector in Azerbaijan.

Emission trends

Emission trends are presented in Table 62 and in Figure 54.

Table 62. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NOx	0.96256	1.11008	1.062428	1.10652	1.150612
NH3	1.2032	1.3876	1.328035	1.38315	1.438265

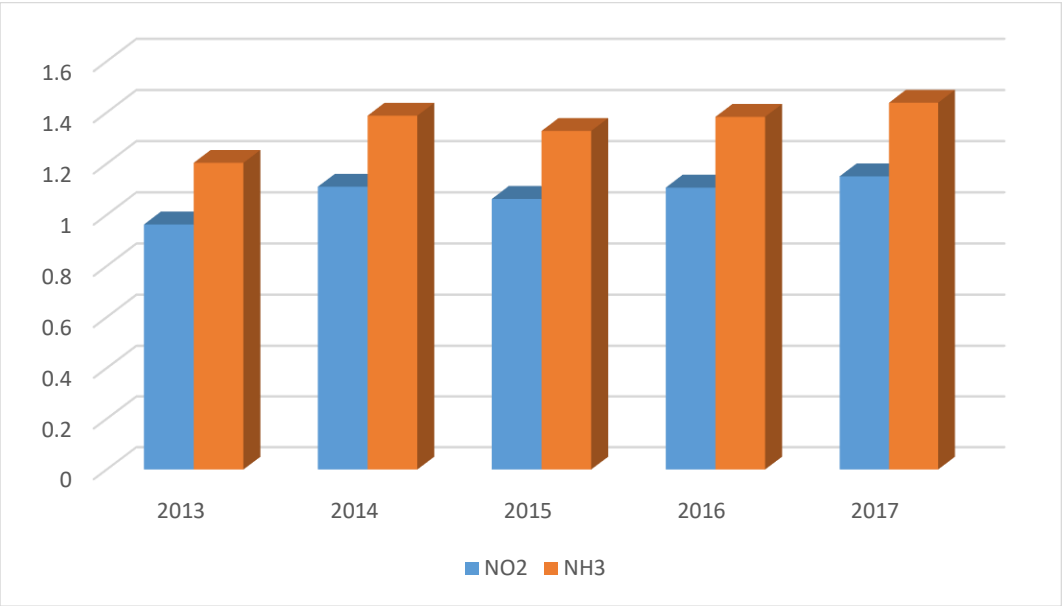


Figure 54. Emission trends from NFR 3B4h

Methodological issues

Emisssion factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

		NH3	NMVOC
3B4h	Manure management – camels	10.5	0.271

Activity data

Activity data is received from the Statistical Committee. Animal numbers used in the calculation are presented below.
Camels statistics 2013-2017

Year	Number of camels
2013	288
2014	258
2015	242
2016	236
2017	222

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2008 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements

None

NFR 3Da1 Inorganic N-fertilizers (includes also urea application)

Source category description

Nitrogen fertilizers is widely used in Azerbaijan. Until now nitrogen fertilizers mainly were imported. It is envisaged that plant openned in Azerbaijan in 2019 shall meet the need for nitrogen fertilizers.

Emission trends

Emission trends are presented in Table 63 and in Figure 55.

Table 63. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NO2	0.96256	1.11008	1.062428	1.10652	1.150612
NH3	1.2032	1.3876	1.328035	1.38315	1.438265

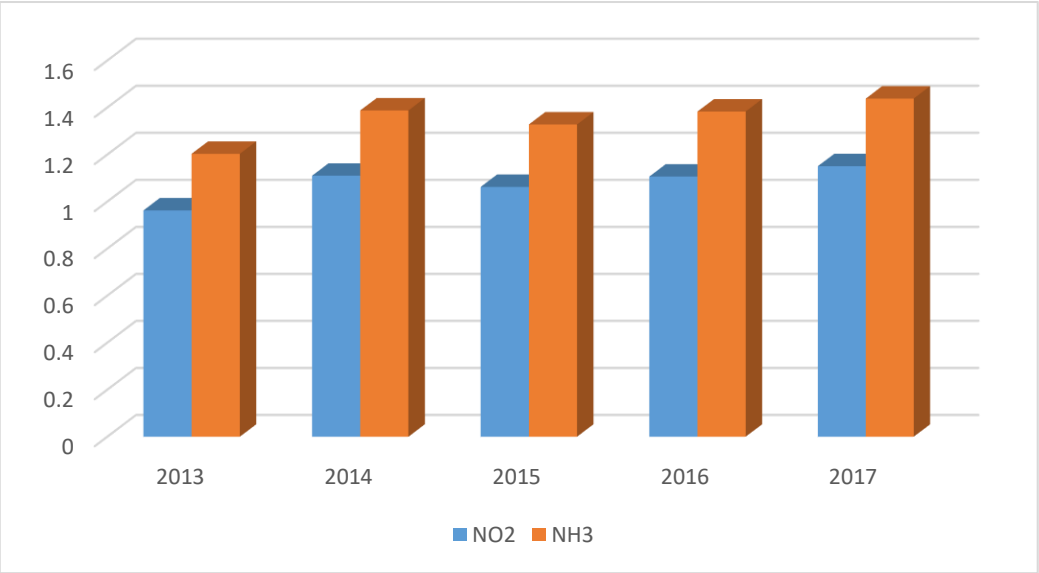


Figure 55. Emission trends from NFR 3Da1

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NH_3	0.05	kg NH3 kg–1 fertiliser N applied
NO	0.04	kg kg–1 fertiliser and manure N applied

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Recalculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.

Source specific planned improvements
None

NFR 3Da2a Animal manure applied to soils

Source category description

Emission trends

Emission trends are presented in Table 64 and in Figure 56.

Table 64. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NH3	23.77842	24.21935	24.19538	24.35889	24.49604

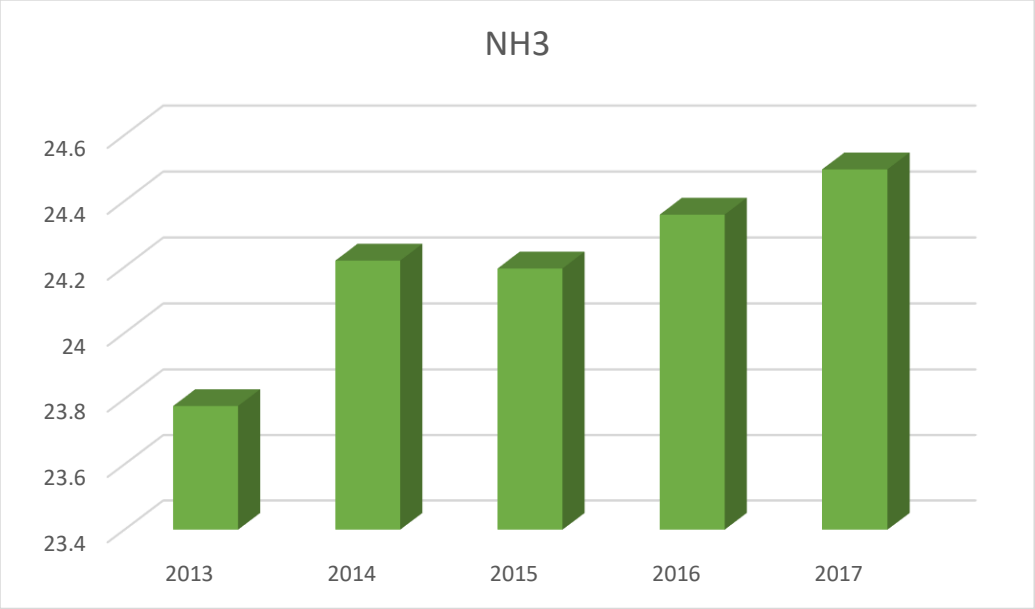


Figure 56. Emission trends from NFR 3Da2a

Methodological issues

Emission factors

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

3B1a	Manure management - Dairy cattle	13
3B1b	Manure management - Non-dairy cattle	3.95
3B2	Manure management - Sheep	0.2
3B3	Manure management - Swine	0.2
3B4a	Manure management - Buffalo	2.6
3B4d	Manure management - Goats	0.7
3B4e	Manure management - Horses	1.7
3B4f	Manure management - Mules and asses	1.7
3B4gi	Manure mangement - Laying hens	0.15
3B4gii	Broilers (broilers and parents)	0.07
3B4giii	Turkeys	0.39
3B4giv	Manure management - Other poultry	0.14
3B4h	Manure management - Other animals (please specify in IIR)	0

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

None

NFR 3Da2b Sewage sludge applied to soils

The possibility to include these emissions in the next submission is studied.

NFR 3Da3 Urine and dung deposited by grazing animals

Source category description

26% of arable land is hay fields and pastures. Hayland and pastures are state owned.

Emission trends

Emission trends are presented in Table 65 and in Figure 57

Table 65. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NH3	12.56927	12.54166	12.54635	12.4541	12.23715

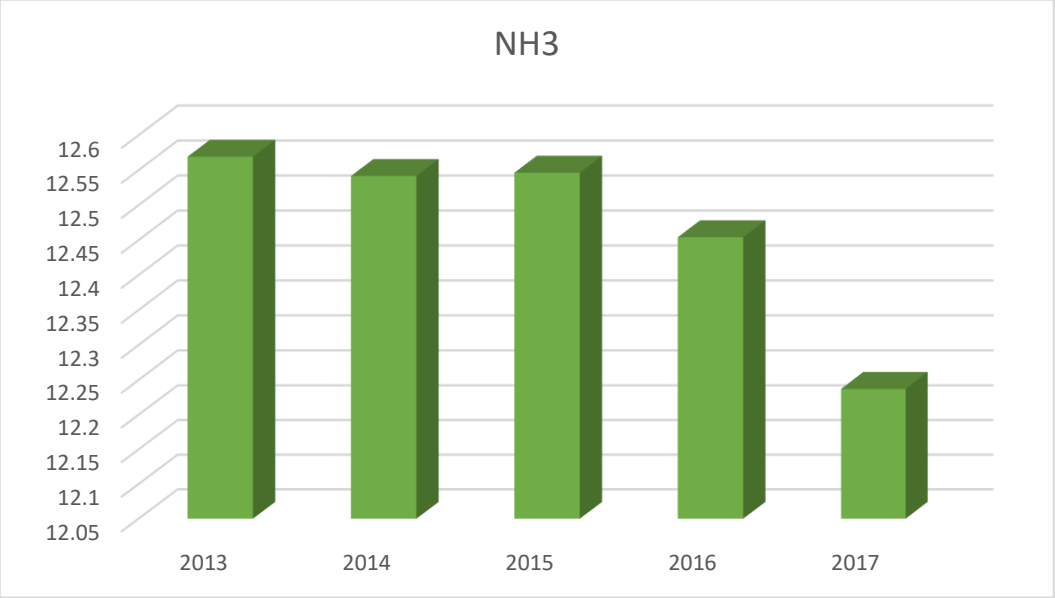


Figure 57. Emission trends from NFR 3Da3

Methodological issues

Emission factors

The emissions are calculated using an average emission factors (Tier 1) from the EMEP/EEA Emission Inventory Guidebook.

3B1a	Manure management - Dairy cattle	2.9
3B1b	Manure management - Non-dairy cattle	0.8
3B2	Manure management - Sheep	0.8
3B3	Manure management - Swine	0.8
3B4a	Manure management - Buffalo	1.46
3B4d	Manure management - Goats	4
3B4e	Manure management - Horses	6.1
3B4f	Manure management - Mules and asses	6.1
3B4gi	Manure mangement - Laying hens	0
3B4gii	Broilers (broilers and parents)	0
3B4giii	Turkeys	0
3B4giv	Manure management - Other poultry	0
3B4h	Manure management - Other animals (please specify in IIR)	0

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

None

NFR 3Da4 Crop residues applied to soils

The possibility to include these emissions in the next submission is studied.

NFR 3Db Indirect emissions from managed soils
The possibility to include these emissions in the next submission is studied.

NFR 3Dc Farm-level agricultural operations including storage, handling and transport of agricultural products

Source category description
Agriculture products are stored in modern warehouses and stationary storehouses with specially equipped cooling facilities. The products are kept in-area built storerooms in relatively smaller and privately owned economies.

Emission trends

Emission trends are presented in Table 66 and in Figure 58.

Table 66. Emission trends 2013-2017

	2013	2014	2015	2016	2017
PM2.5	0.101052	0.096828	0.095124	0.097698	0.099942
PM10	2.627352	2.517528	2.473224	2.540148	2.598492
TSP	2.627352	2.517528	2.473224	2.540148	2.598492

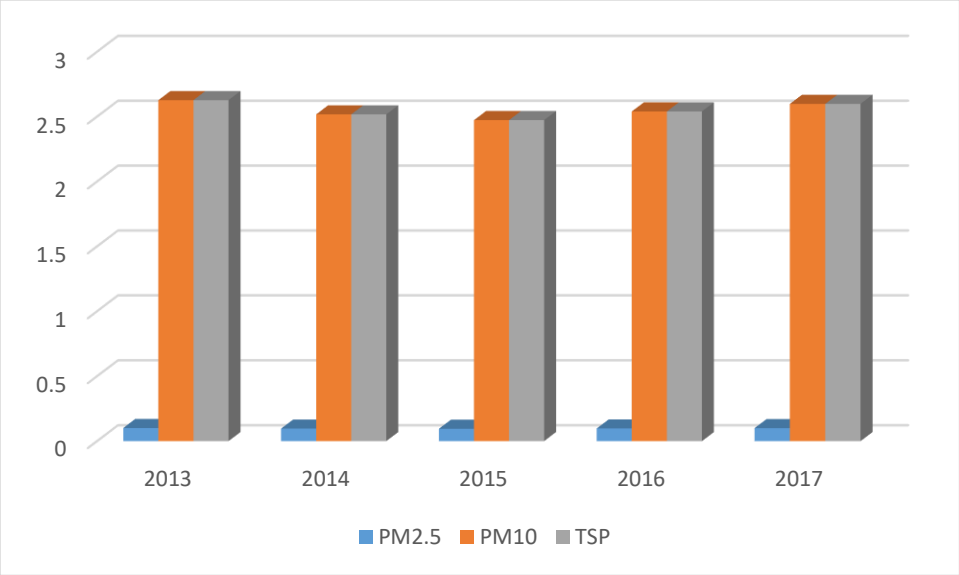


Figure 58. Emission trends from NFR 3Dc

Methodological issues

Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

PM10 from agricultural operations	1.56	kg ha–1
PM2.5 from agricultural operations	0.06	kg ha–1
TSP	1.56	kg ha–1

Activity data

Activity data are presented below.

	2013	2014	2015	2016	2017
Total cropland hectar	1684200	1613800	1585400	1628300	1665700

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2000 will be studied for the future submissions.

NFR 3Dd Off-farm storage, handling and transport of bulk agricultural products

The possibility to include these emissions in the next submission is studied.

NFR 3De Cultivated crops

Source category description

Emission trends

Emission trends are presented in Table 67 and in Figure 59.

Table 67. Emission trends 2013-2017

	2013	2014	2015	2016	2017
NMVOC	1.448412	1.387868	1.363444	1.400338	1.432502

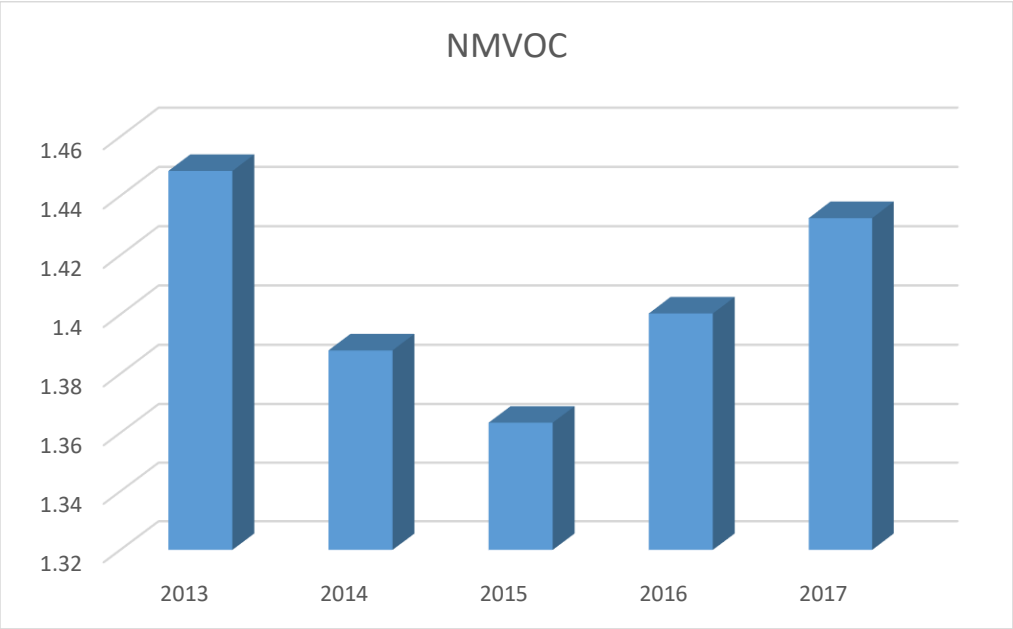


Figure 59. Emission trends from NFR 3De

Methodological issues
Emission factors

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NMVOC	0.86	kg ha−1

Activity data
Activity data is received from the Statistical Committee. Activity data are presented below.

	2013	2014	2015	2016	2017
Total planting areas ha	1684200	1613800	1585400	1628300	1665700

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Calculations has been carried out from 2013 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2000 will be studied for the future submissions.

NFR 3Df Use of pesticides

The possibility to include these emissions in the next submission is studied.

NFR 3F Field burning of agricultural residues
The possibility to include these emissions in the next submission is studied.

NFR 3I Agriculture other
Not occuring in Azerbaijan.

13. NFR 5 Waste (NFR sector 5)

This section concerns the inventory of emissions generated from solid waste landfills and wastewater treatment.

NFR 5A Biological treatment of waste – Solid waste disposal on land

Source category description

The possibility to include these emissions in the next submission is studied.

NFR 5B1 Biological treatment of waste – Composting

Source category description

The possibility to include these emissions in the next submission is studied.

NFR 5B2 Biological treatment of waste – Anaerobic digestion at biogas facitilies

Source category description

The possibility to include these emissions in the next submission is studied.

NFR 5C1a Municipal waste incineration

Source category description

Balakhani Industrial Park was built in Baku in 2012 with an aim to improve solid waste management. Waste collected from the capital city are sorted in Balakhani Waste Management Plant and then recycled. This plant that has been commissioned since 2012 has a capacity to sort 200 thousand tonnes of waste. Waste unfit to be sorted out is dispatched to Balakhani Solid Waste Incineration Facility. This plant has capacity to utilize 500 thousand tonnes of household waste, 10 thousand tonnes of medical waste and generate 231,5 mln KW/hour electric power.

Emission trend

The emissions from municipal waste incineration are presented in Table 68 and in Figures 60-1,60-2,60-3,60-4
The operation of the incineration plant started in 2012.

Table 68. Emissions from Municipal waste incineration (NFR 5C1a)

	2012	2013	2014	2015	2016	2017
NOx	0.0187425	0.3003084	0.3642471	0.4875192	0.444465	0.564472692
NMVOC	0.00010325	0.00165436	0.00200659	0.00268568	0.0024485	0.003109607
SOx	0.0015225	0.0243948	0.0295887	0.0396024	0.036105	0.045853524
NH_3	0.0000525	0.0008412	0.0010203	0.0013656	0.001245	0.001581156

PM 2.5	0.0000525	0.0008412	0.0010203	0.0013656	0.001245	0.001581156
PM 10	0.0000525	0.0008412	0.0010203	0.0013656	0.001245	0.001581156
TSP	0.0000525	0.0008412	0.0010203	0.0013656	0.001245	0.001581156
BC	0.00000184	0.00002944	0.00003571	0.00004780	0.00004358	0.00005534
CO	0.00071750	0.01149640	0.01394410	0.01866320	0.01701500	0.02160913
Pb	0.001015	0.0162632	0.0197258	0.0264016	0.02407	0.030569016
Cd	0.0000805	0.00128984	0.00156446	0.00209392	0.001909	0.002424439
Hg	0.000329	0.00527152	0.00639388	0.00855776	0.007802	0.009908578
As	0.0001085	0.00173848	0.00210862	0.00282224	0.002573	0.003267722
Cr	0.000287	0.00459856	0.00557764	0.00746528	0.006806	0.008643653
Cu	0.00023975	0.00384148	0.00465937	0.00623624	0.0056855	0.007220612
Ni	0.000378	0.00605664	0.00734616	0.00983232	0.008964	0.011384323
Se	0.00020475	0.00328068	0.00397917	0.00532584	0.0048555	0.006166508
Zn	0.00042875	0.0068698	0.00833245	0.0111524	0.0101675	0.012912774
PCDD/F	0.00091875	0.014721	0.01785525	0.023898	0.0217875	0.02767023
benzo(a) pyrene	0.000000147	2.35536E-06	2.85684E-06	3.82368E-06	0.000003486	4.42724E-06
benzo(b) fluoranthene	3.1325E-07	5.01916E-06	6.08779E-06	8.14808E-06	7.4285E-06	9.43423E-06
benzo(k) fluoranthene	1.6625E-07	2.6638E-06	3.23095E-06	4.3244E-06	3.9425E-06	5.00699E-06
Indeno (1,2,3-cd) pyrene	0.000000203	3.25264E-06	3.94516E-06	5.28032E-06	0.000004814	6.1138E-06
HCB	0.000791	0.01267408	0.01537252	0.02057504	0.018758	0.02382275
PCB	5.95E-08	9.5336E-07	1.15634E-06	1.54768E-06	0.000001411	1.79198E-06

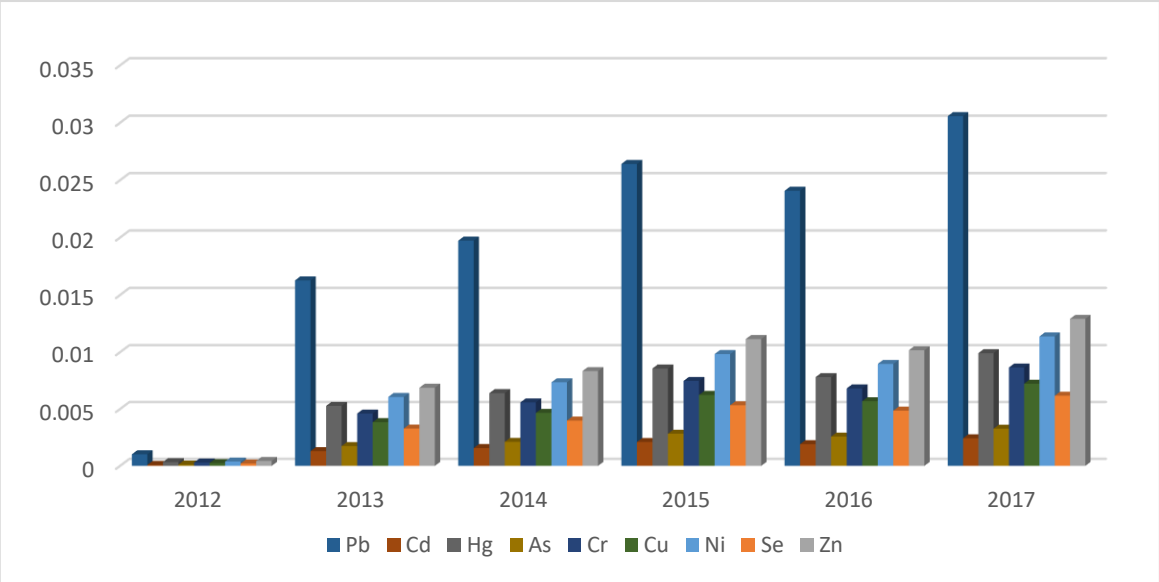


Figure 60-1

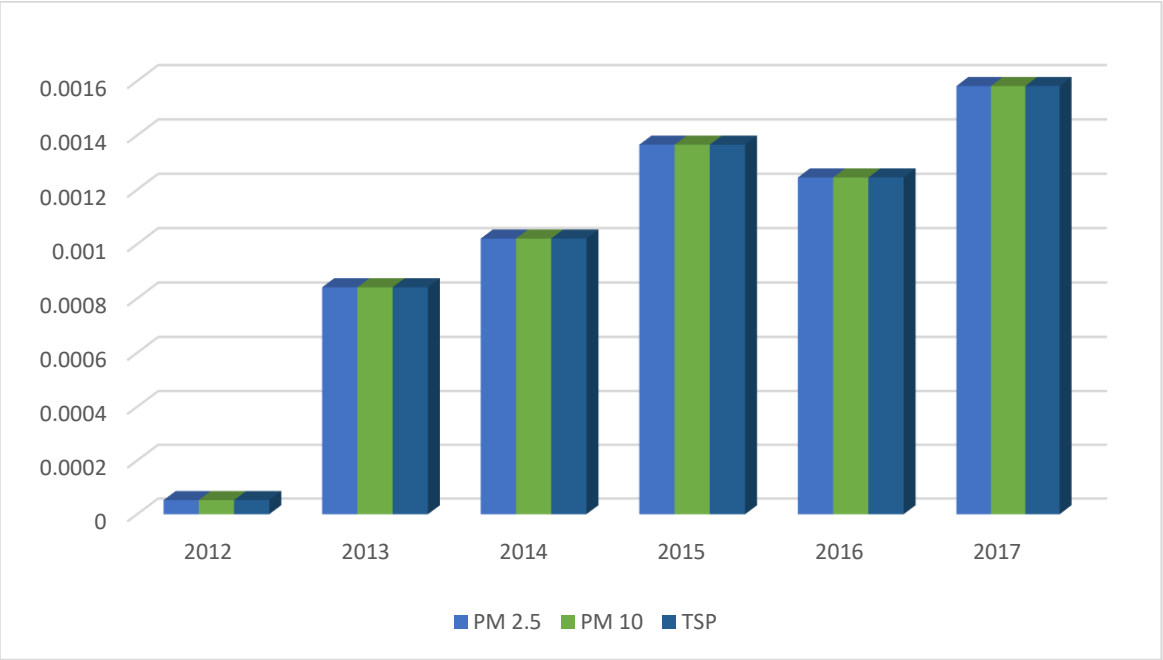


Figure 60-2

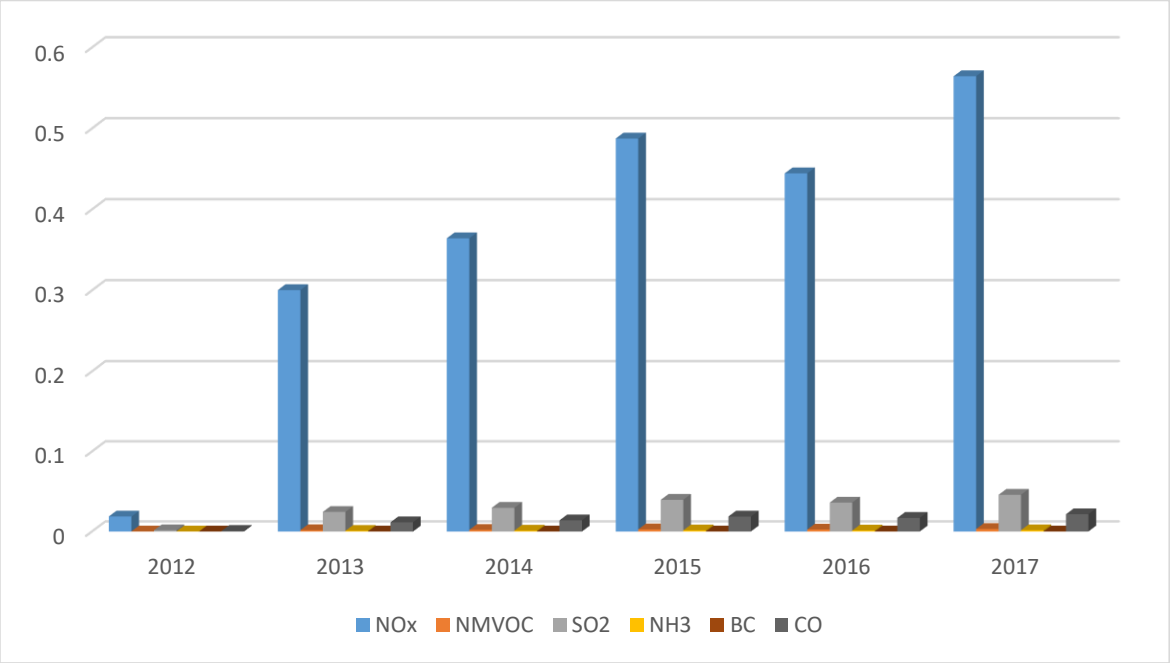


Figure 60-3

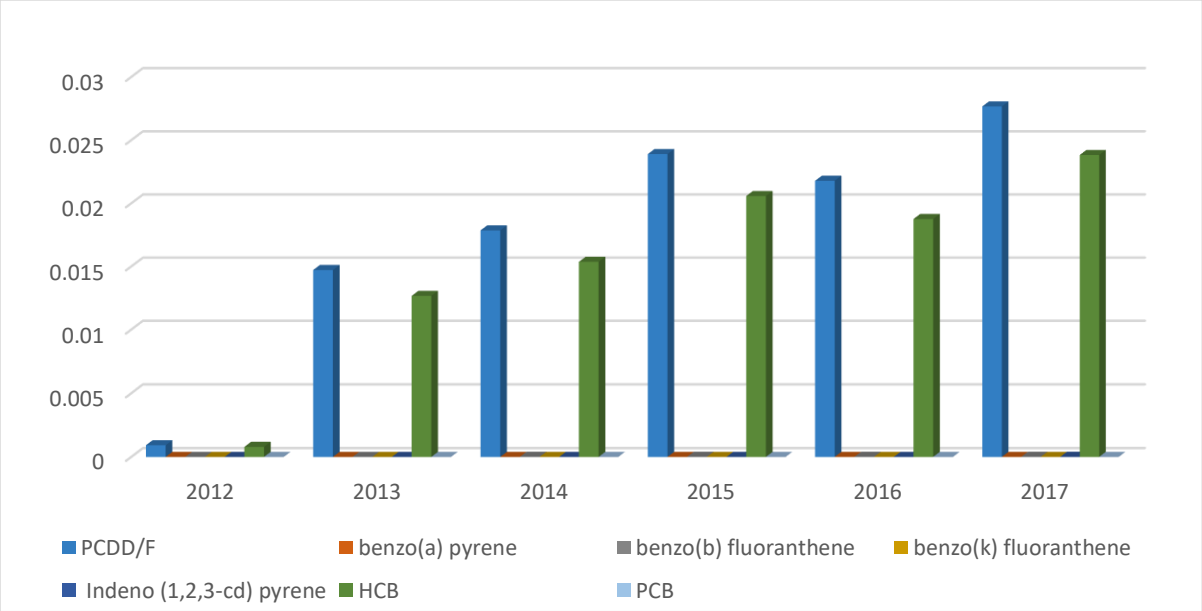


Figure 60-4

Methodological issues

Emission factors

The EFs from the 2016 Guidebook are used in the calculation of emissions and are presented below.

NO_x	1071	g/Mg
CO	41	g/Mg
NMVOC	5.9	g/Mg
SOx	87	g/Mg
NH_3	3	g/Mg
TSP	3	g/Mg
PM_{10}	3	g/Mg
$PM_{2,5}$	3	g/Mg
BC	3.5	% of $PM_{2.5}$
Pb	58	mg/Mg
Cd	4.6	mg/Mg
Hg	18.8	mg/Mg
As	6.2	mg/Mg
Cr	16.4	mg/Mg
Cu	13.7	mg/Mg
Ni	21.6	mg/Mg
Se	11.7	mg/Mg
Zn	24.5	mg/Mg
PCB	3.4	ng/Mg
PCDD/F	52.5	ng/Mg
benzo(a) pyrene	8.4	µg/Mg
benzo(b) fluoranthene	17.9	µg/Mg
benzo(k) fluoranthene	9.5	µg/Mg
Indeno (1,2,3-cd) pyrene	11.6	µg/Mg
HCB	45.2	µg/Mg

Activity data

Information relevant for this category is available since 2012. Data for 2012-2016 has been obtained from the Ministry of Economy of Azerbaijan Republic .

Uncertainty and time series' consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

Data used for calculations is derived from the official letter of the Ministry of Economy and therefore no quality check has been conducted.

Source-specific recalculations including changes made in response to the review Process

2019

Calculation has been carried out for the years 2012 to 2017 and emission factors in the EMEP/EEA Emission Inventory Guidebook 2016 have been used to calculate all emissions.

- The emissions were calculated the first time to the 2019 submission

Source-specific planned improvements

None.

NFR 5C1bi Industrial waste incineration

The possibility to include these emissions in the next submission is studied.

NFR 5C1bii Hazardous waste incineration

The possibility to include these emissions in the next submission is studied.

NFR 5C1bii Clinical Waste Incineration

Source category description

Clinical Waste Incineration has occurred since 1990. Since 2012 the waste has been incinerated in Balakhani waste incineration plant. Information about earlier years will be studied.

NFR 5C1biv Sewage sludge incineration

The possibility to include these emissions in the next submission is studied.

NFR 5C1bv Cremation

Not occuring in Azerbaijan.

NFR 5C1bvi Other waste incineration

Not occuring in Azerbaijan.

NFR 5C2 Open burning of waste

The possibility to include these emissions in the next submission is studied.

NFR 5D1 Domestic wastewater handling

Source category description

A method to estimate the emissions has been developed, however, some checks will be done during 2019 and the emissions will likely be included in the next submission is studied.

NFR 5D2 Industrial wastewater handling

Source category description

Emission trends

Emission trends are presented in Table 69 and in Figure 61.

Table 69. Emission trends 2005-2017

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
NMVOC	0.0036	0.0038	0.0036	0.0034	0.0034	0.0033	0.0029	0.0036	0.0032	0.0034	0.0041	0.0037	0.0043

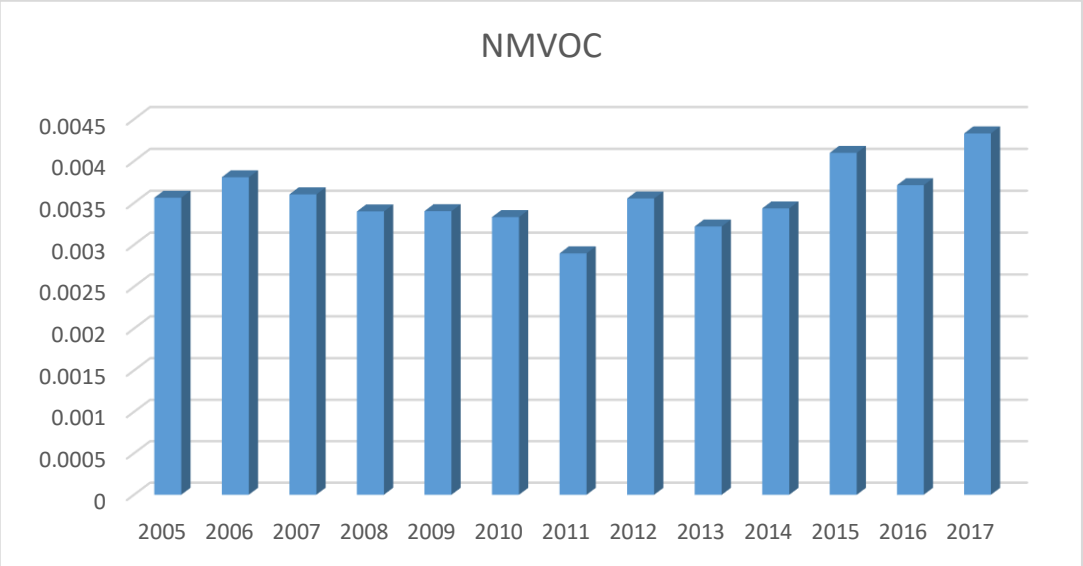


Figure 61. Emission trends from NFR 5D2

Methodological issues

The emissions are calculated using Tier 1 default emission factors from the EMEP/EEA Emission Inventory Guidebook 2016.

NMVOC	15	mg/m3 waste water handled

Activity data are presented in below. Activity data is received from the Statistical Committee

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Amount of treated wastewater mln m3	237.5	253.8	240.2	226.6	226.8	222.1	193.2	236.9	214.6	229	273.2	247.5	288.7

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.
The time series is calculated in consistent methods.

Source category specific QA/QC verification

The data of the Statistical Committee of the Republic of Azerbaijan are checked by the Committee's own quality control system and are officially confirmed information.

Source-specific recalculations including changes made in response to the review process

2019

- Caalculations has been carried out from 2005 to 2017 and emission factors in EMEP 2016 guidelines have been used to calculate all emissions.
- The emissions were calculated the first time to the 2019 submission

Source specific planned improvements

Possibilities to collect information from 1990 to 2005 will be studied for the future submissions.

NFR 5D3 Other wastewater handling

Source category description

The possibility to include these emissions in the next submission is studied.

NFR 5 E Other waste

Source category description

NFR category 5 E Other covers emissions from house and car fires. The emission trends are presented in Tables 70 and Figures 62-1,62-2,62-3

Table 70 Emissions from Other waste (NFR 5E)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PM2.5	0.10624	0.103819	0.143228	0.156404	0.15999	0.163942	0.185714	0.166109	0.185874	0.156385
PM10	0.10624	0.103819	0.143228	0.156404	0.15999	0.163942	0.185714	0.166109	0.185874	0.156385
TSP	0.10624	0.103819	0.143228	0.156404	0.15999	0.163942	0.185714	0.166109	0.185874	0.156385
Pb	0.00031	0.000302	0.000418	0.000456	0.000466	0.000478	0.000541	0.000484	0.000542	0.000456
Cd	0.000624	0.000609	0.000842	0.000919	0.000939	0.000962	0.00109	0.000975	0.001091	0.000918
Hg	0.000624	0.000609	0.000842	0.000919	0.000939	0.000962	0.00109	0.000975	0.001091	0.000918
As	0.000993	0.00097	0.00134	0.001463	0.001495	0.001531	0.001736	0.001551	0.001737	0.001461
Cr	0.000946	0.000924	0.001277	0.001394	0.001425	0.001459	0.001654	0.001478	0.001655	0.001392
Cu	0.002198	0.002146	0.002966	0.003238	0.00331	0.003389	0.003842	0.003434	0.003845	0.003234
PCDD/ PCDF (dioxins/ furans)	1.071009	1.047497	1.442275	1.575892	1.612908	1.653977	1.872455	1.675788	1.873977	1.577297

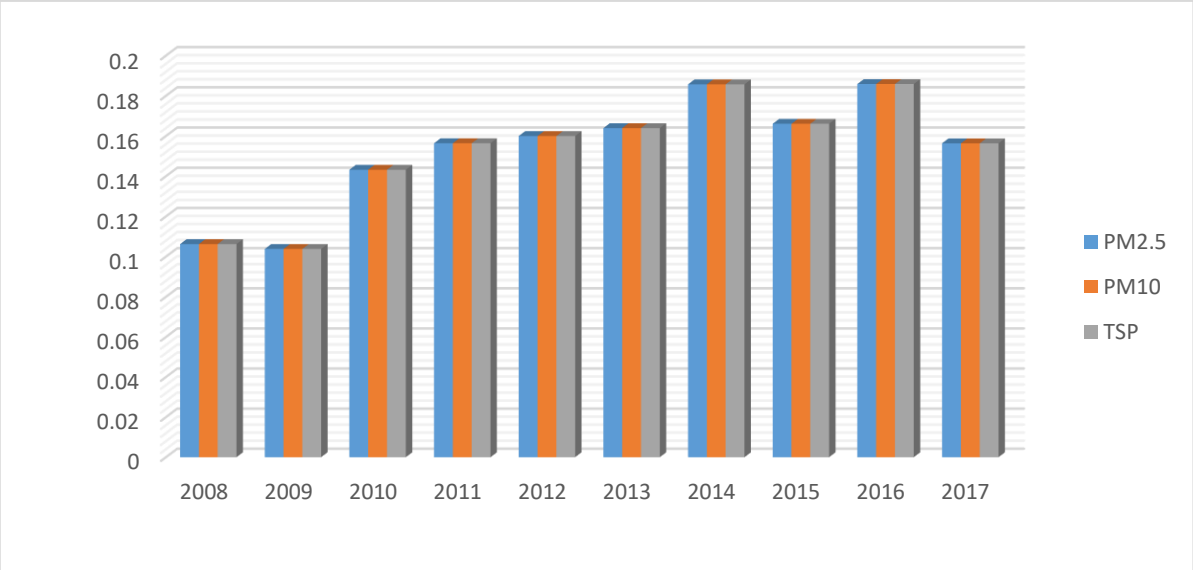


Figure 62-1

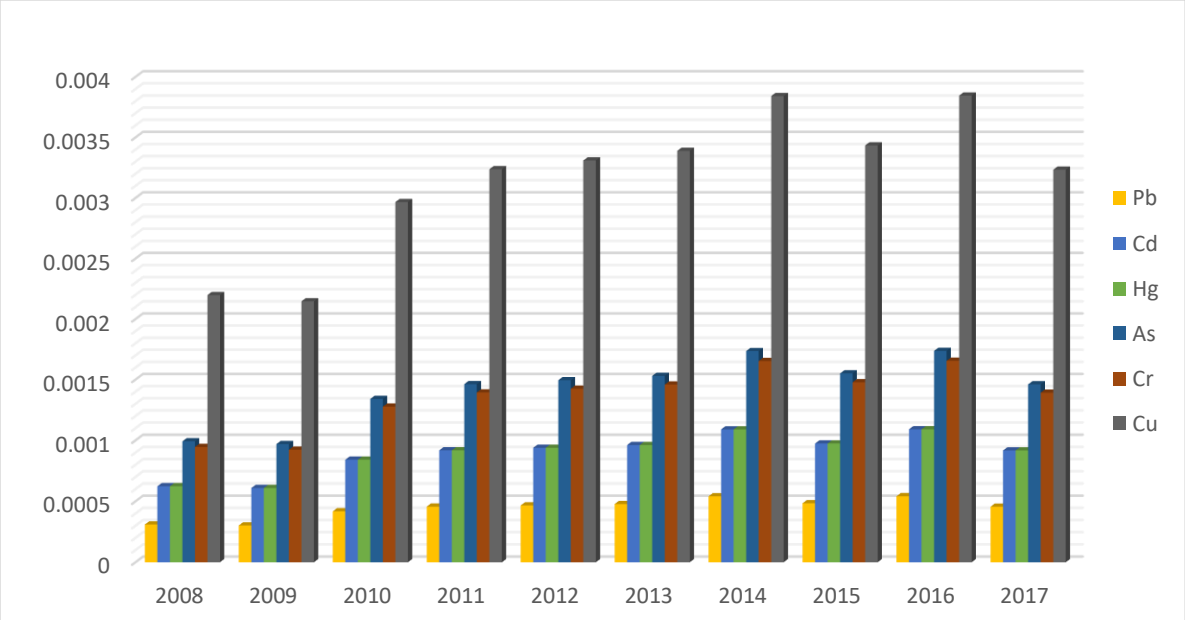


Figure 62-2

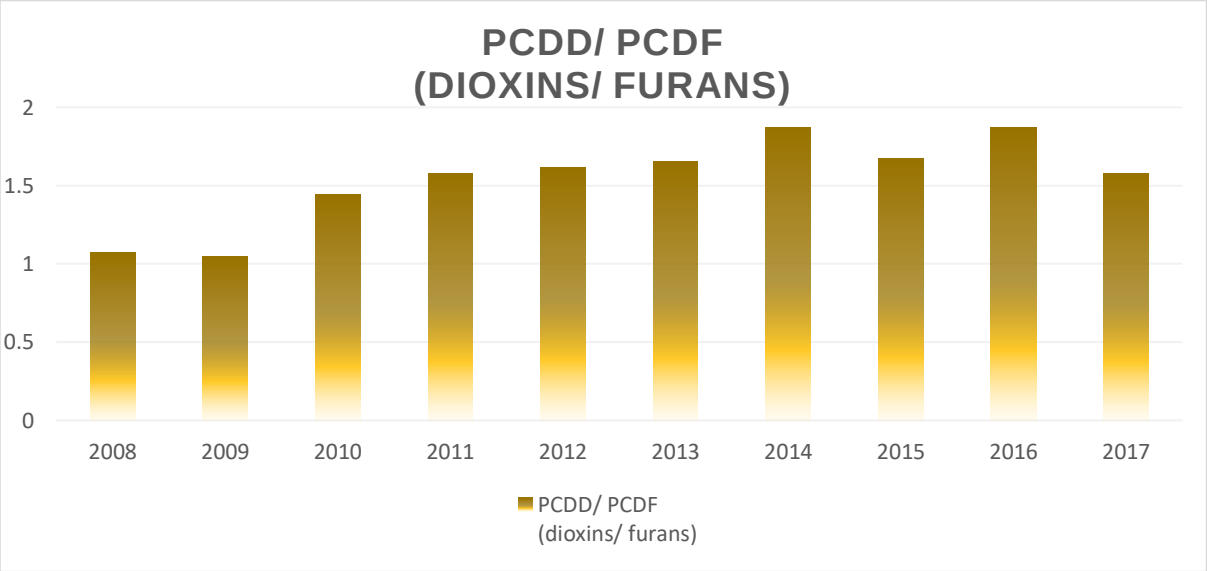


Figure 62-3

Methodological issues

Emission factors

Emissions from house and car fires are calculated using an average emission factor that has been derived from the house specific emission factors presented in the Guidebook 2016 because the statistics in Azerbaijan currently only covers the total number of house fires but does not separate between house types. The emission factors used in the inventory are presented below.

Pollutant	Detached fire EF	Undetached fire EF	Apartment building EF	Average EF	Unit

TSP	143.82	61.62	43.78	83.1	kg/fire
PM10	143.82	61.62	43.78	83.1	kg/fire
PM2.5	143.82	61.62	43.78	83.1	kg/fire
PCDD\F	1.44	0.62	0.44	0.83	mg/fire
Pb	0.42	0.18	0.13	0.24	g/fire
Cd	0.85	0.36	0.26	0.49	g/fire
Hg	0.85	0.36	0.26	0.49	g/fire
As	1.35	0.58	0.41	0.78	g/fire
Cr	1.29	0.55	0.39	0.74	g/fire
Cu	2.99	1.28	0.91	1.73	g/fire

Activity data

Since 2008 The number of house fires is available from the web-page of the Ministry of Emergency Situations of the Republic of Azerbaijan (http://www.fhn.gov.az/).

Uncertainty and time series consistency

An uncertainty analysis will be developed in the next years.

Source-specific QA/QC and verification

No quality check has been conducted.

Source-specific recalculations including changes made in response to the review process

None

Source-specific planned improvements

Possibilities to collect information from 1990 to 2008 also on the types of cars and houses will be studied for the future submissions .

14. Recalculations and Improvements

14.1 Recalculations

Sources of recalculation in the 2019 submission are presented in the following table:

Source category	Method
NFR 1A1a Public electricity	Corrections from CLRTAP Stage 3 review since 2007
NFR 1A2c, 1A2d, 1A2e,1A2f Combustion in Public Energy Production and Manufacturing industries	Recalculation since 2013 using GB16
NFR 1A2a Stationary combustion in manufacturing industries and construction: Iron and steel	Recalculation since 2010 using GB16
NFR 1A2b Stationary combustion in manufacturing industries and construction: Non-ferrous metals	Recalculation since 2007 using GB16
NFR 1A3bv Gasoline evaporation	Recalculation since 2013 using revised GB16 method
NFR1A4ai Commercial/Institutional stationary	Recalculation since 2013 using GB16

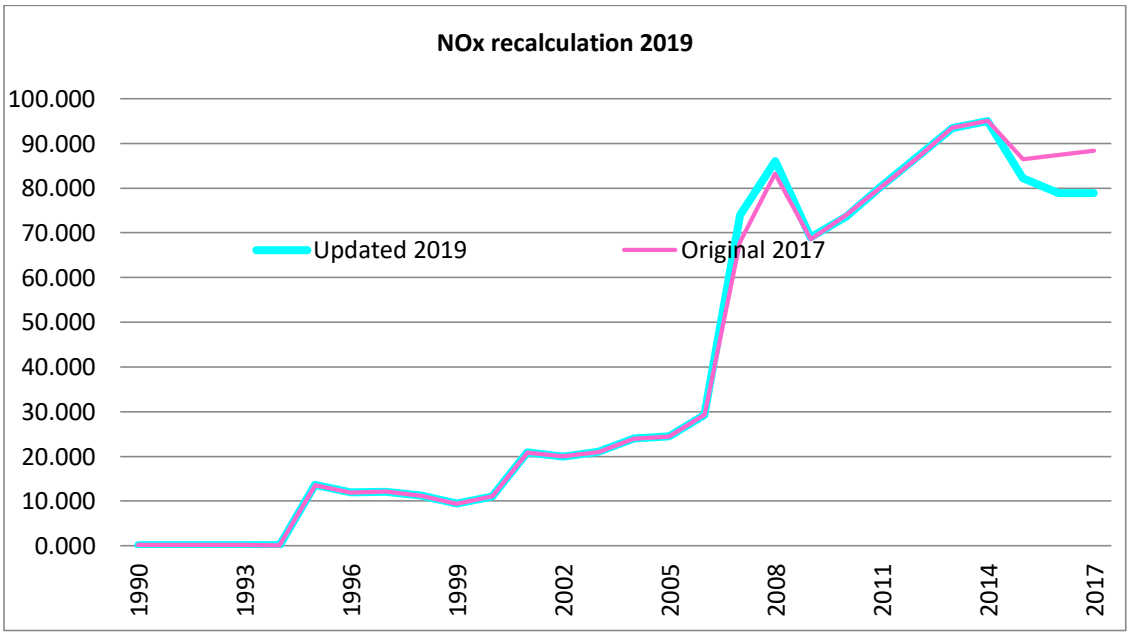
NFR 1A4bi Residential stationary NFR 1A4ci Agriculture/Forestry/Fishing stationary	
NFR1A4aii Commercial/Institutional mobile NFR 1A4bii Residential mobile NFR 1A4cii Agriculture/Forestry/Fishing mobile	Recalculation since 2013 using GB16
NFR 1B2ai Fugitive: Oil Exploration, production NFR 1B2aiv Fugitive: Oil refining/storage NFR 1B2av Fugitive: Distribution of oil products NFR 1B2b Fugitive: Natural gas	Recalculation since 2013 using GB16
NFRs 1A3c Railways and 1A3dii Navigation	Recalculation from 2013 GB 16
NFR 2A1 Cement	Recalculation due to corrected and recalculated activity data and GB 2016 form 2011
NFR 2A2 Lime	Recalculation using GB 2016 from 2005
NFR 2A3 Glass	Recalculation using corrected AD and GB 16
NFR 2A5a Quarrying and mining	Recalculation from 2005 using GB16
NFR 2B10a Chemical industry, other	Recalculation from 2005 using GB16
NFR 2A5a Quarrying and mining	Recalculation from 2005 using GB16
NFRs 2D3a Domestic solvent use	Recalculation since 2007 using GB16
NFR 2D3b Road paving with asphalt	Recalculation since 2013 using GB16
NFR 2D3g Chemical products	Recalculation since 2013 using GB16
NFR 2G Other product use	Recalculation since 2013 using GB16
NFR 2H2 Food and beverages	Recalculation due to corrected and recalculated activity data and GB 2016 form 2012
NFR 2I Wood processing	
NFR 3B1a Dairy cows NFR 3B2 Sheep NFR 3B3 Swine NFR 3B4a Buffalo NFR 3B4d Goats NFR 3B4e Horses NFR 3B4 f Mules and asses NFR 3B4giv Other poultry NFR 3B4hOother animals	Recalculation since 2008 using GB16
NFR 3Da1 Fertilizers	Corrections to the calculation from CLRTAP Stage3 review
NFR 5D2 Industrial wastewater handling	Emissions corrected and recalculated using GB16

The new calculated sources are presented in the following table:

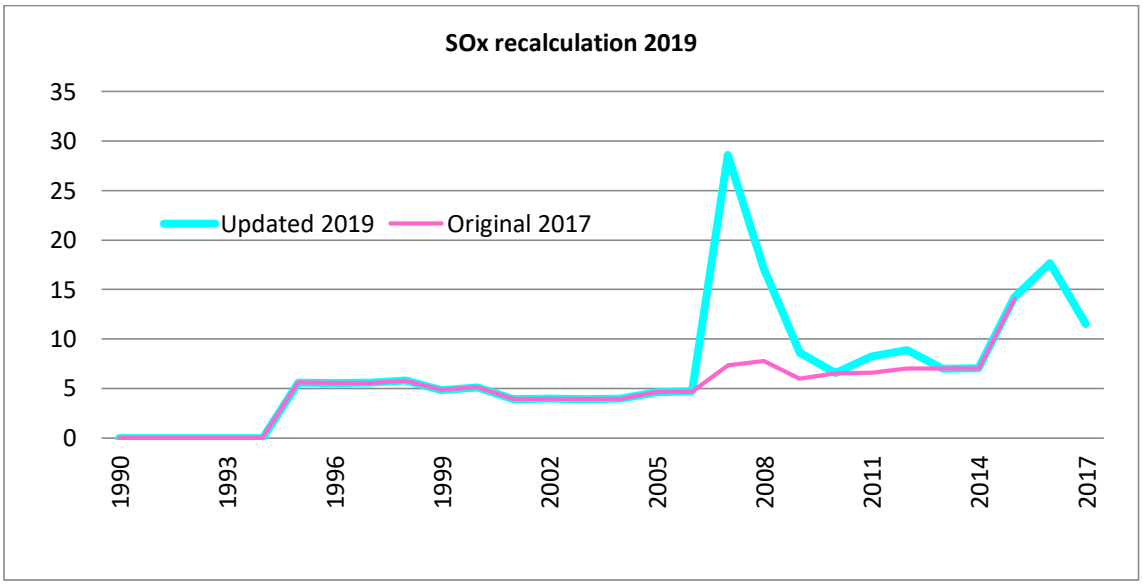
Source category	**Method**
NFR 1A3bi-iv Road transport	Simplified method developed, emissions calculated using GB16 since 2013
NFR 1A3bvi-vii Tyre and Brake wear, Road abrasion	Emissions calculated using GB16 and new AD since 2013
NFR 2A5b Construction and demolition	Emissions calculated using GB16 since 2005
NFR 2A5c Storage, handling and transport of mineral products	Emissions calculated using GB16 since 2013
NFR 2C3 Aluminium	Emissions calculated using GB16 since 2011
NFR 2C7a Copper	Emissions calculated using GB16 since 2013
NFR 3B1b Non-dairy cows	Emissions calculated using GB16 since 2008
NFR 3B4gi Laying hens NFR 3B4gii Broilers NFR 3B4giii Turkeys	Emissions calculated using GB16 since 2008
NFR 3Da2a Manure to soils	Emissions calculated using GB16 since 2013
3Da3 Dung to soils	Emissions calculated using GB16 since 2013
3Dc Farm operations	Emissions calculated using GB16 since 2013
3De Cultivated crops	Emissions calculated using GB16 since 2013
5C1a Municipal waste incineration	Simplified method developed, emissions calculated using GB16 since 2013
NFR 5E Other waste (house and car fires)	Emissions calculated using GB16 since 2013

The impacts of the recalculations in the 2019 submission compared to the submission in 2017 are presented below in the graphs.

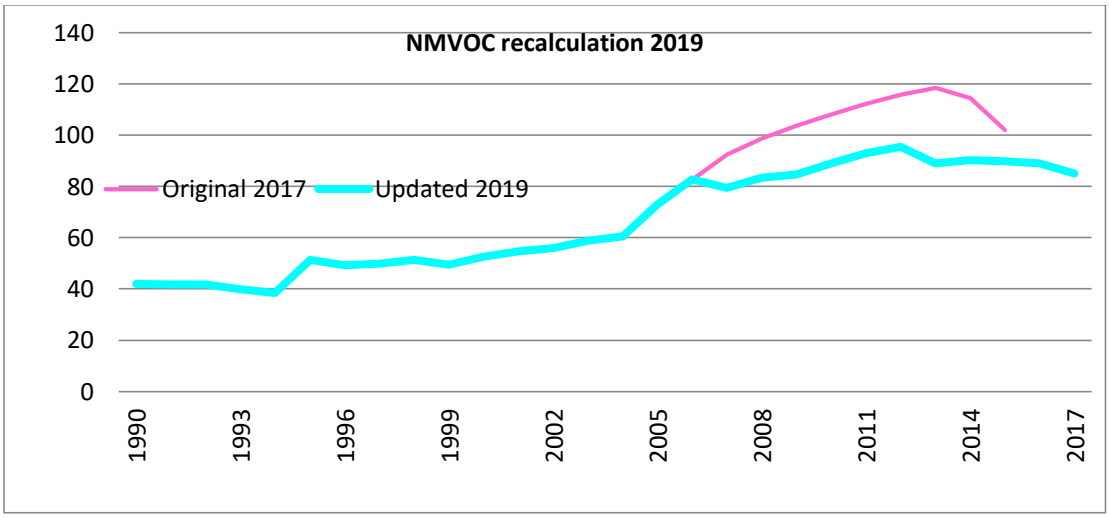
NOx - The emissions recalculated for the years 2007-2017 are consistent with the earlier reported years. The timeseries is onsistent in 2007-2017.



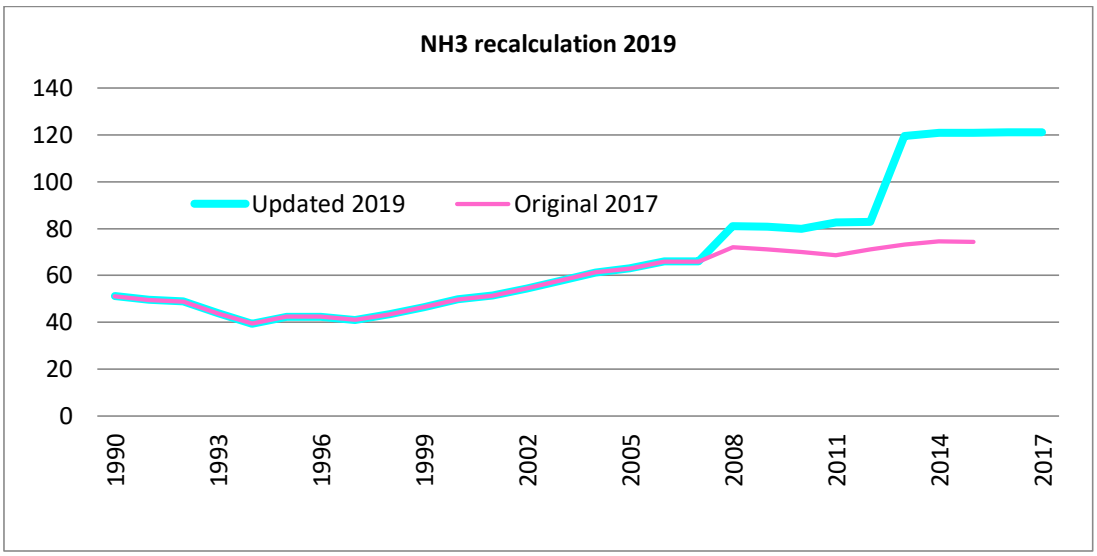
SOx -The time series is consistent in 2007-2017. There is need for completing the time series for the earlier years.



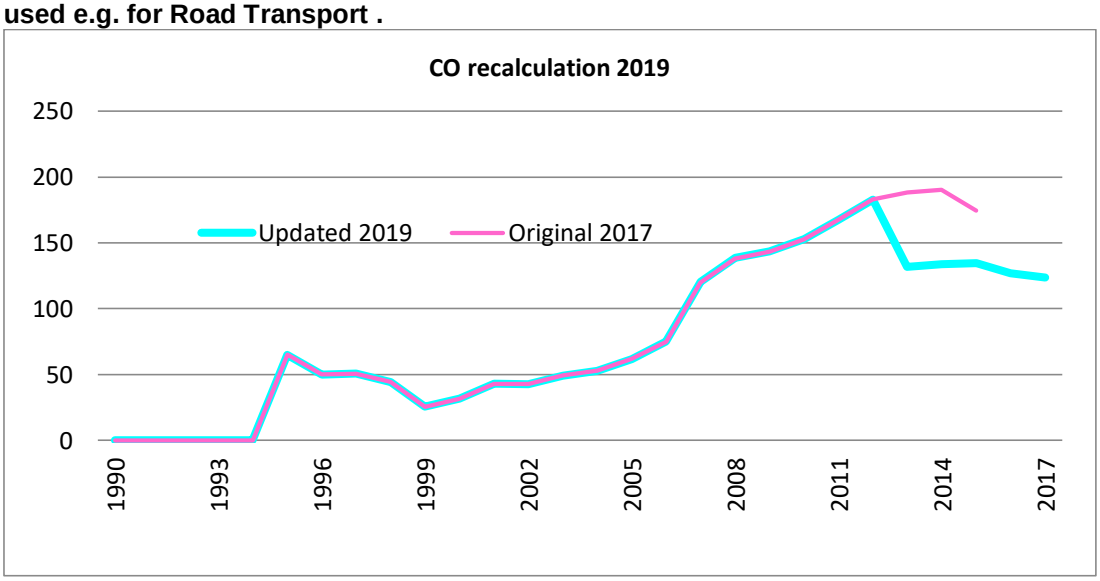
NMVOC – The recalculated emissions differ from the earlier reported emissions as presented in table below. The time series is almost consistent from 2007 when the 1A3bv emissions have been recalculated.



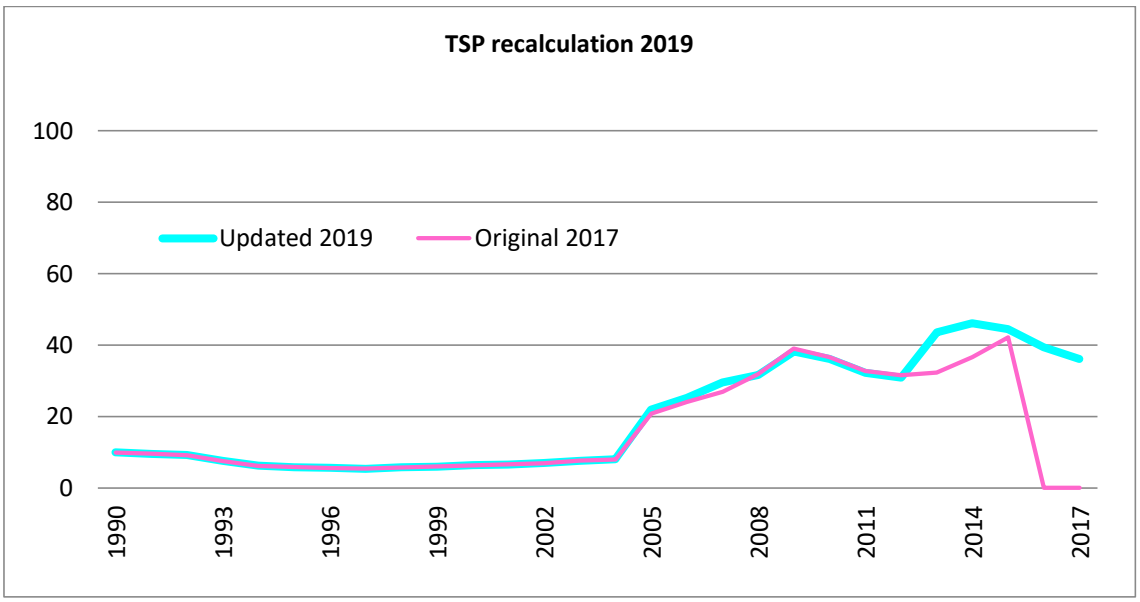
NH3 - The time series is consistent since 2007.



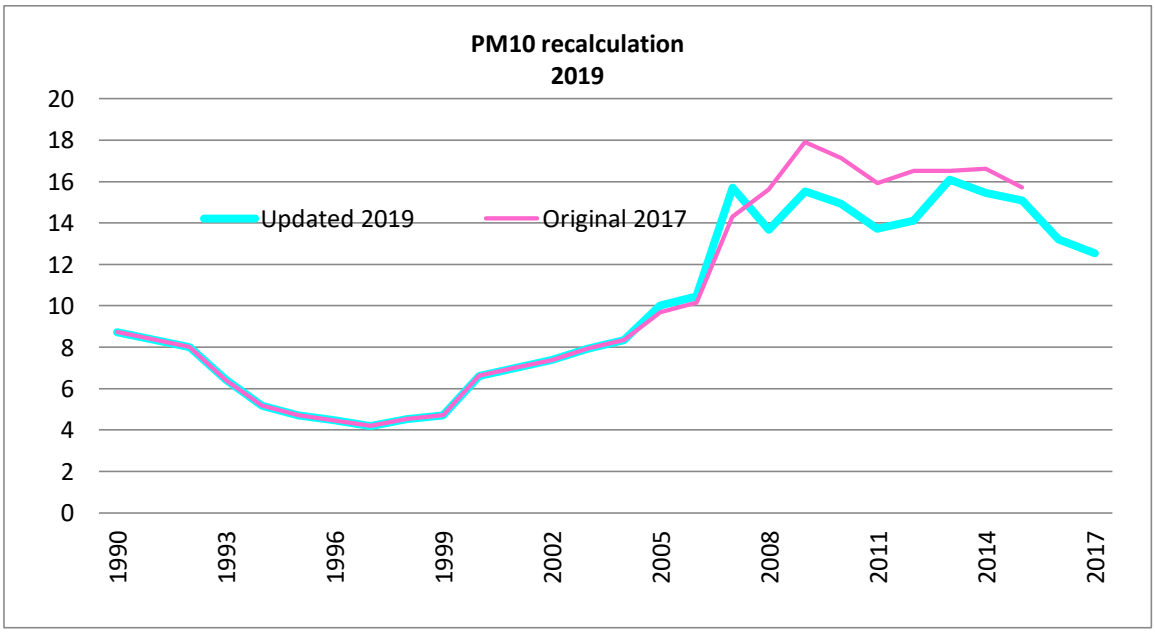
CO - The time series is consistent since 2013, for the previous years there are different methods used e.g. for Road Transport .



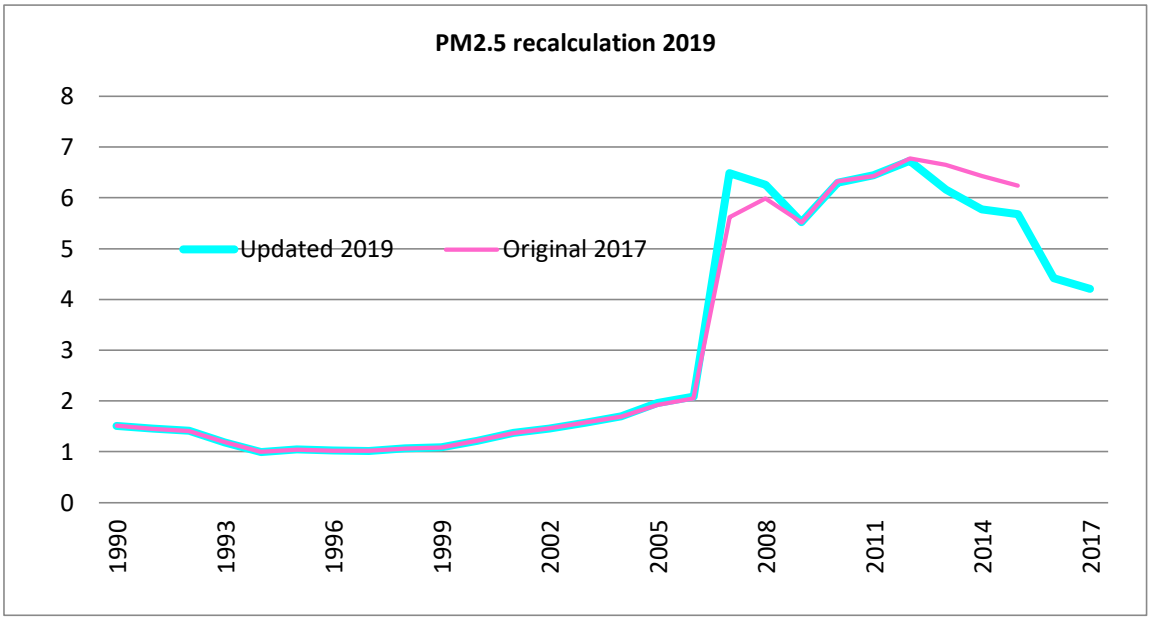
TSP - The time series is almost consistent between 2011-2017.



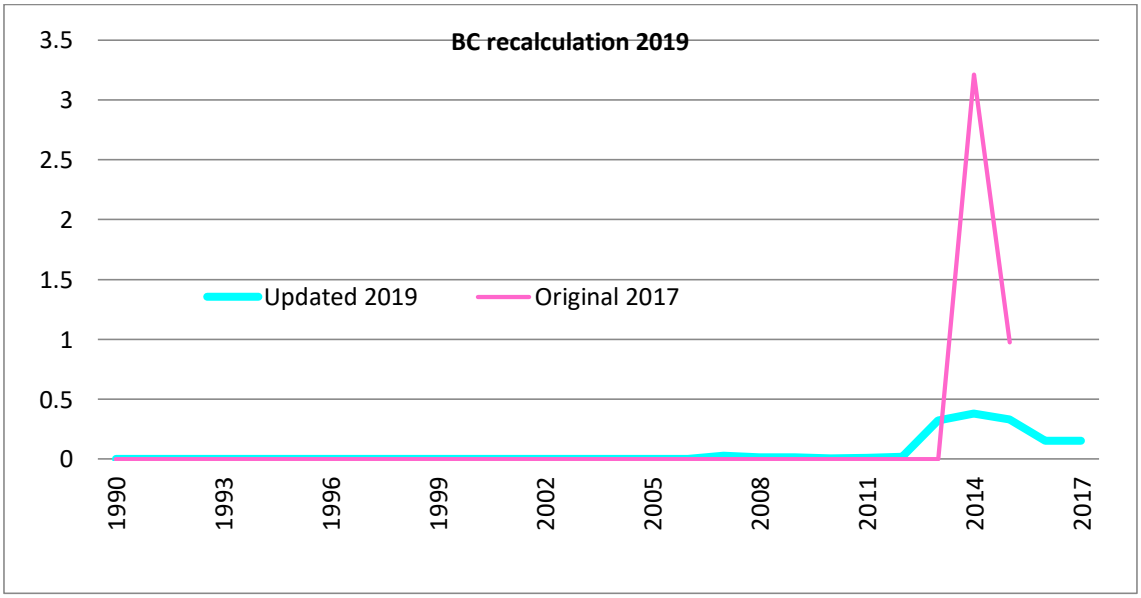
PM_{10} - The time series is almost consistent between 2011-2017.



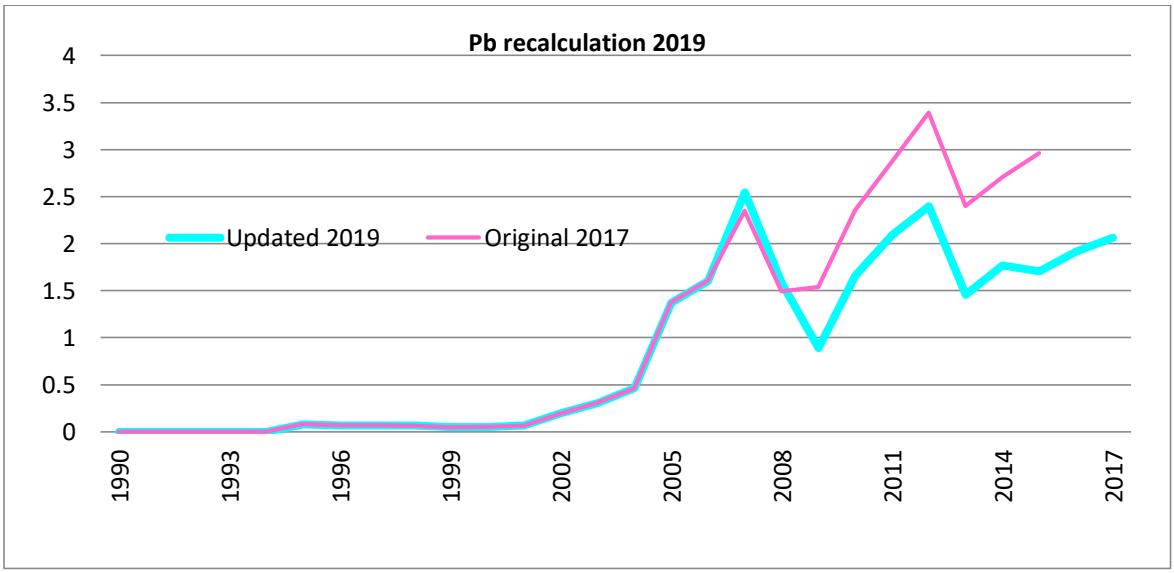
$PM_{2.5}$ - The time series is almost consistent between 2011-2017.



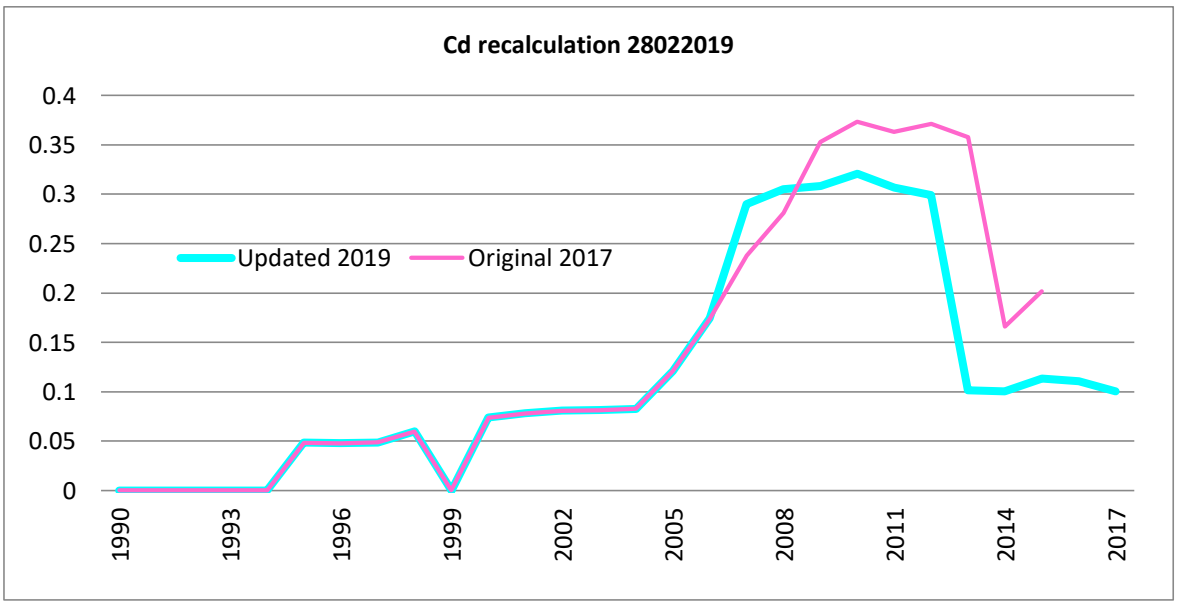
BC The time series is almost consistent between 2011-2017.



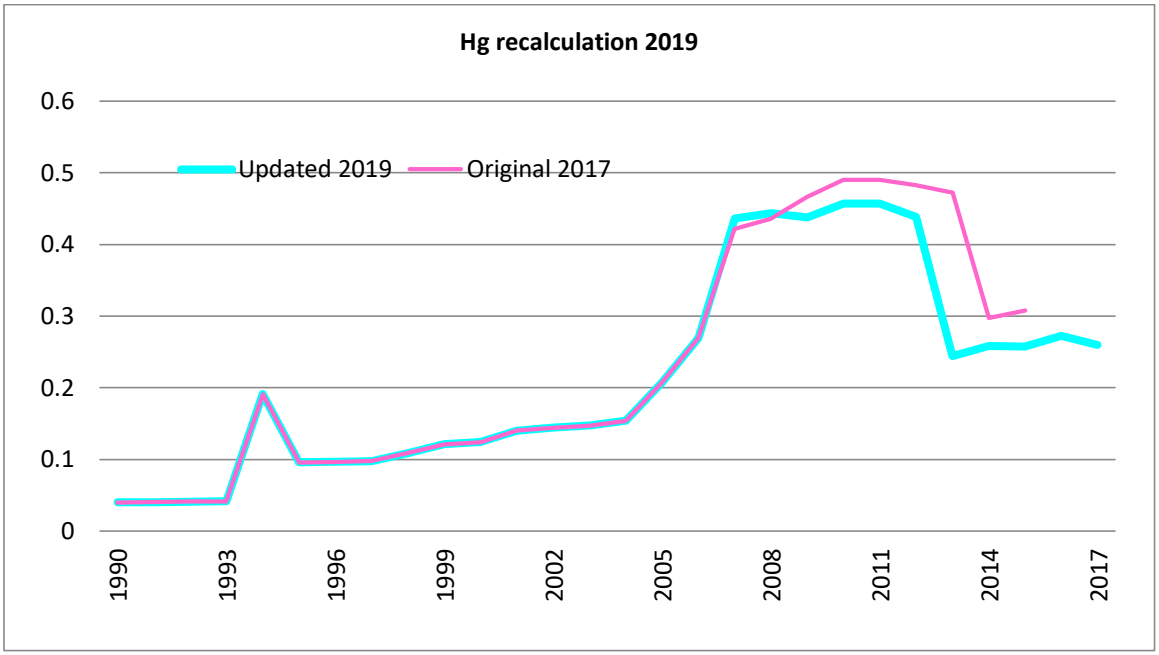
Pb - The time series is consistent between 2011-2014. The dips in 2009 and 2013 are caused by low production volumes in 2C1. The peaks in 2007 and 2016 are caused by high use of Mazout those years. The decrease in emissions in 2016-2017 is due to the reduced use of wood these years.



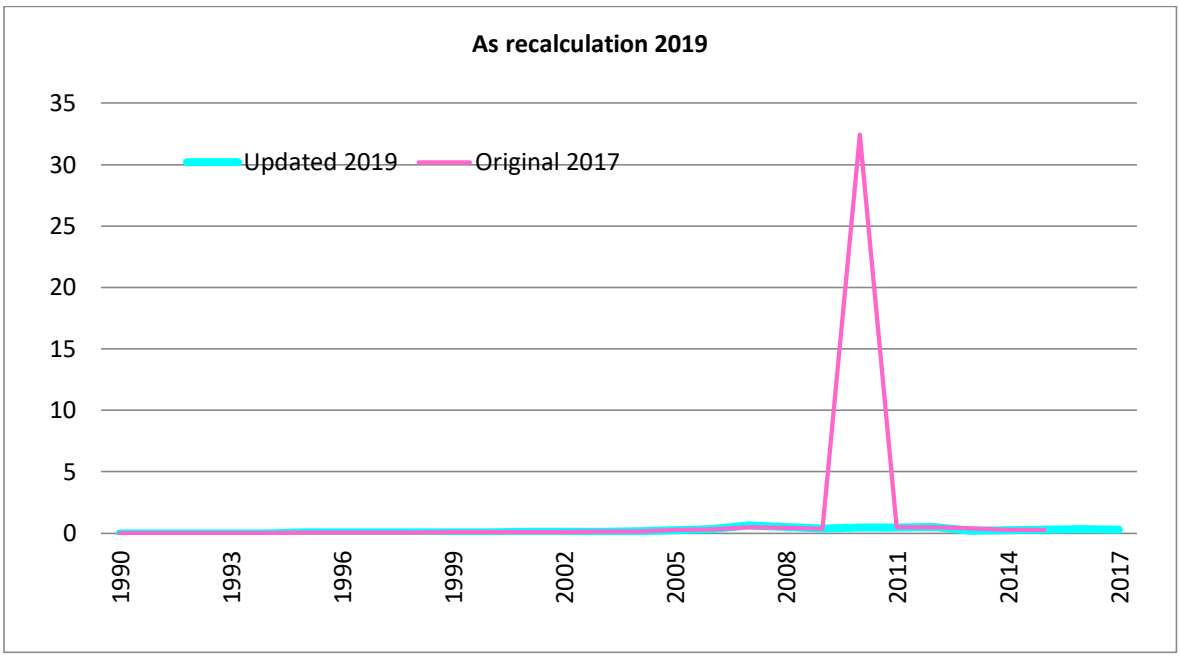
Cd - The time series is consistent from 2013. The peaks in 2007 and 2016 are caused by high use of Mazout those years.



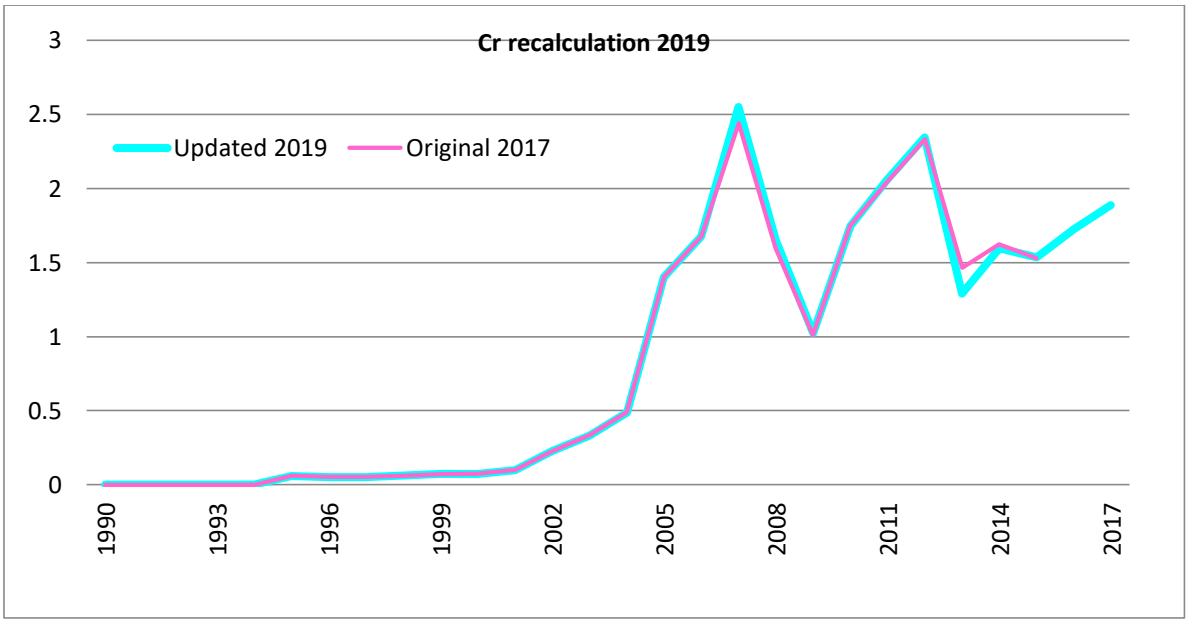
Hg - The time series is almost consistent since 2013 and the increase of emissions between 2007-2012 is due to high oil storage and transport emissions.



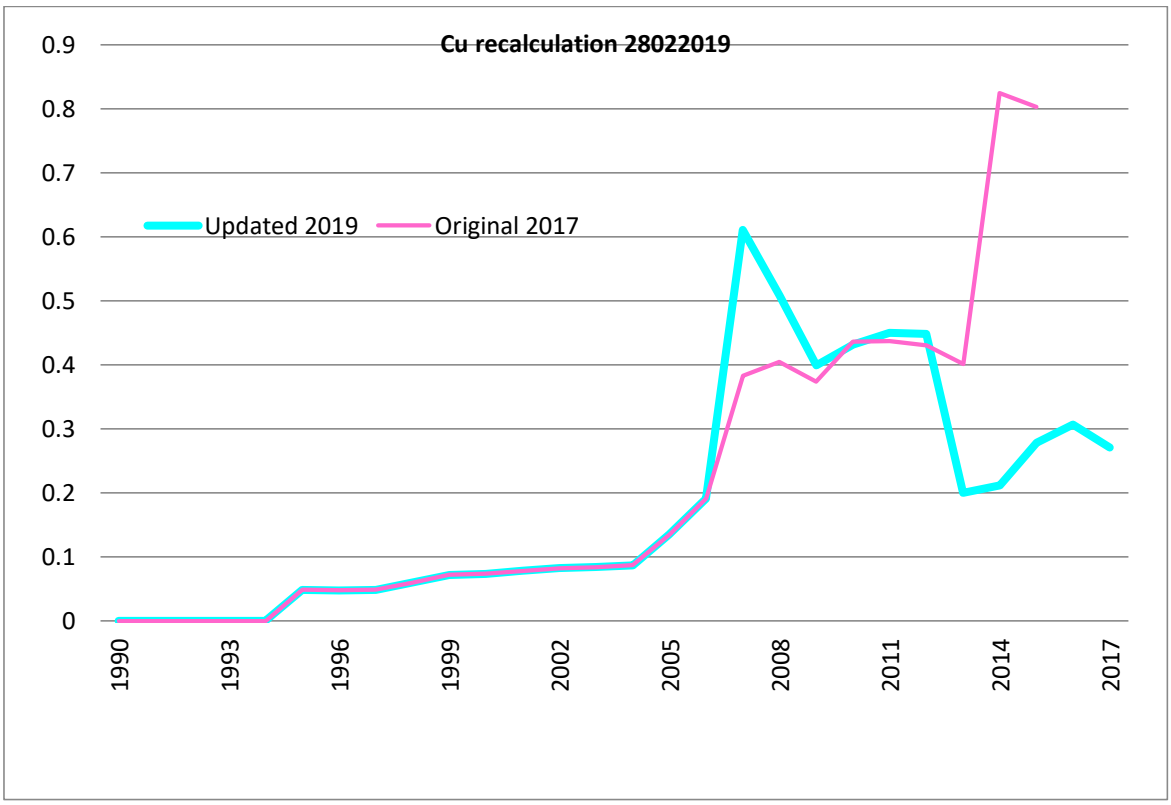
As - The time series is almost consistent since 2013. Errors in the 2010 submission have been corrected.



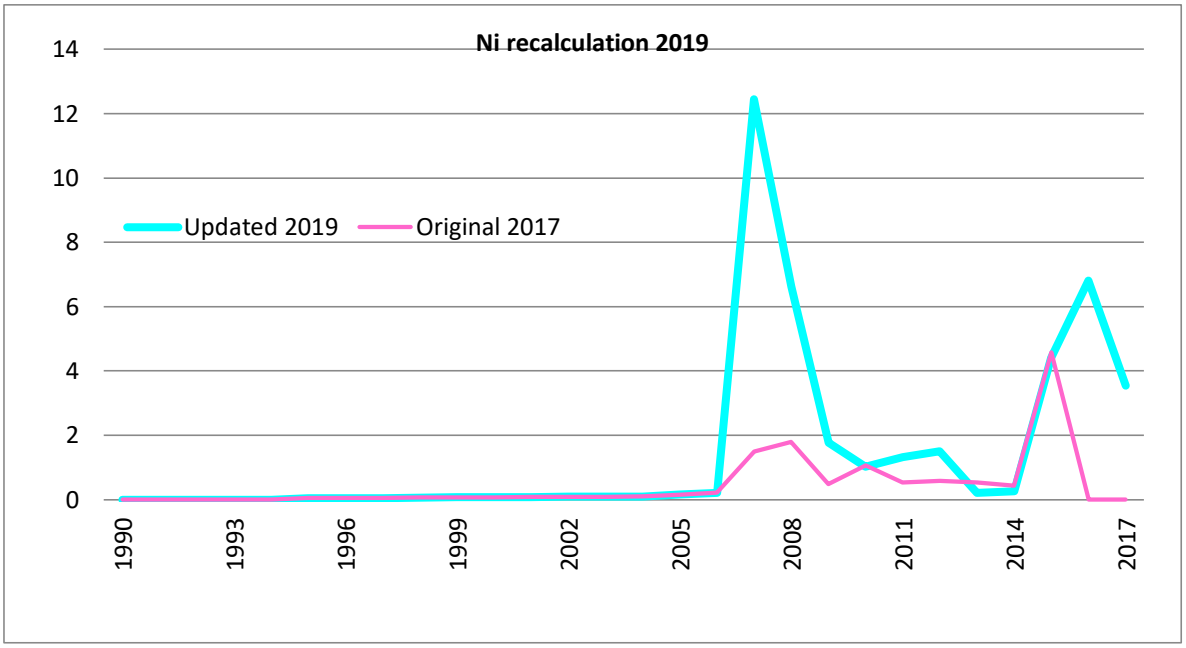
Cr - The time series ins consistent since 2013. Between 2007-2012 the oil storage and transport (1A2aiv) volumes were high and in 2009 the production of iron and steel (2C1) was low compared to the adjacent years.



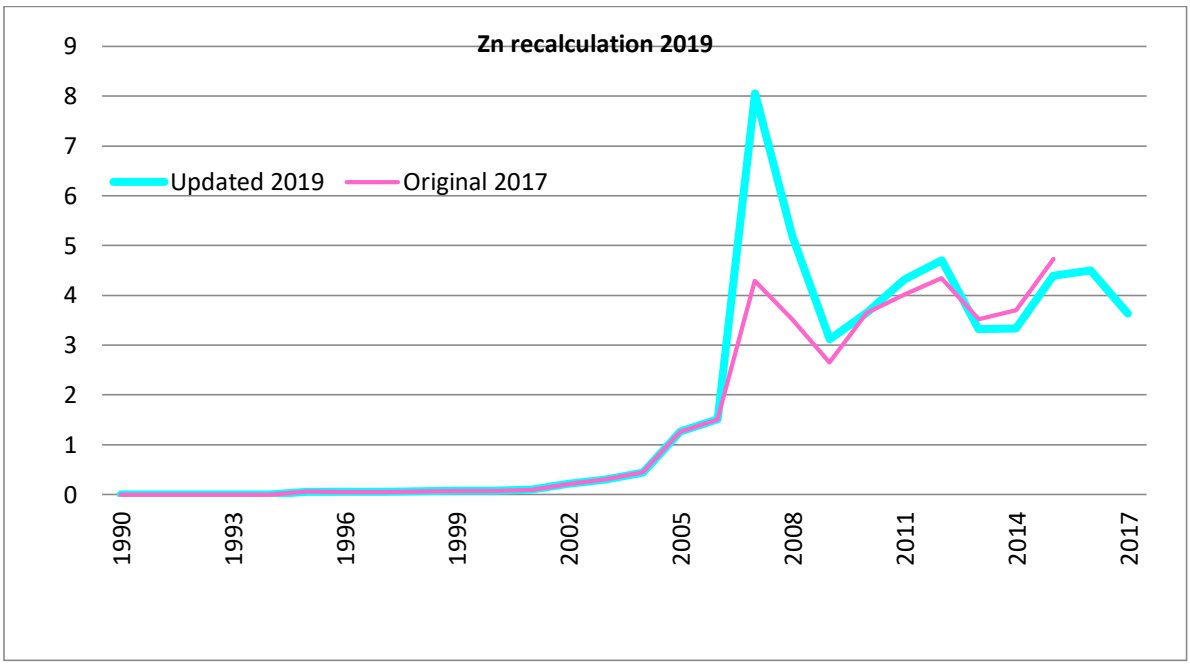
Cu - The timeseries is almost consistent since 2013. Between 2007 and 2012 the emissions are higher due to the higher use of Mazout.



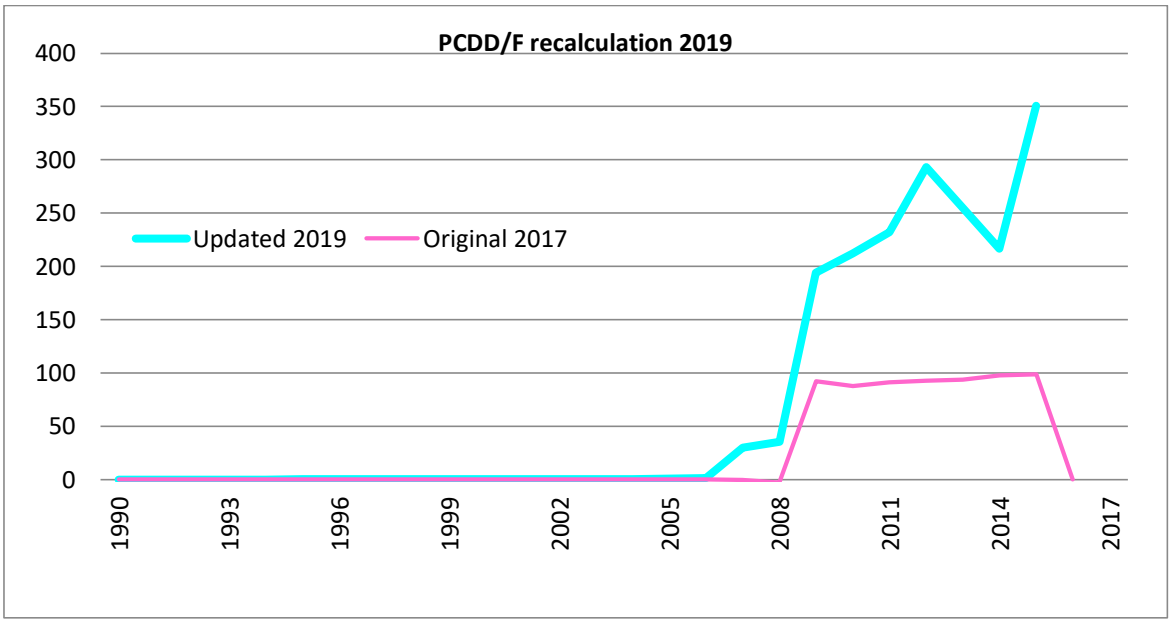
Ni - The time series is consistent since 2013. The higher emissionsin 2007, 2015 and 2016 are due to higher use of Mazout.



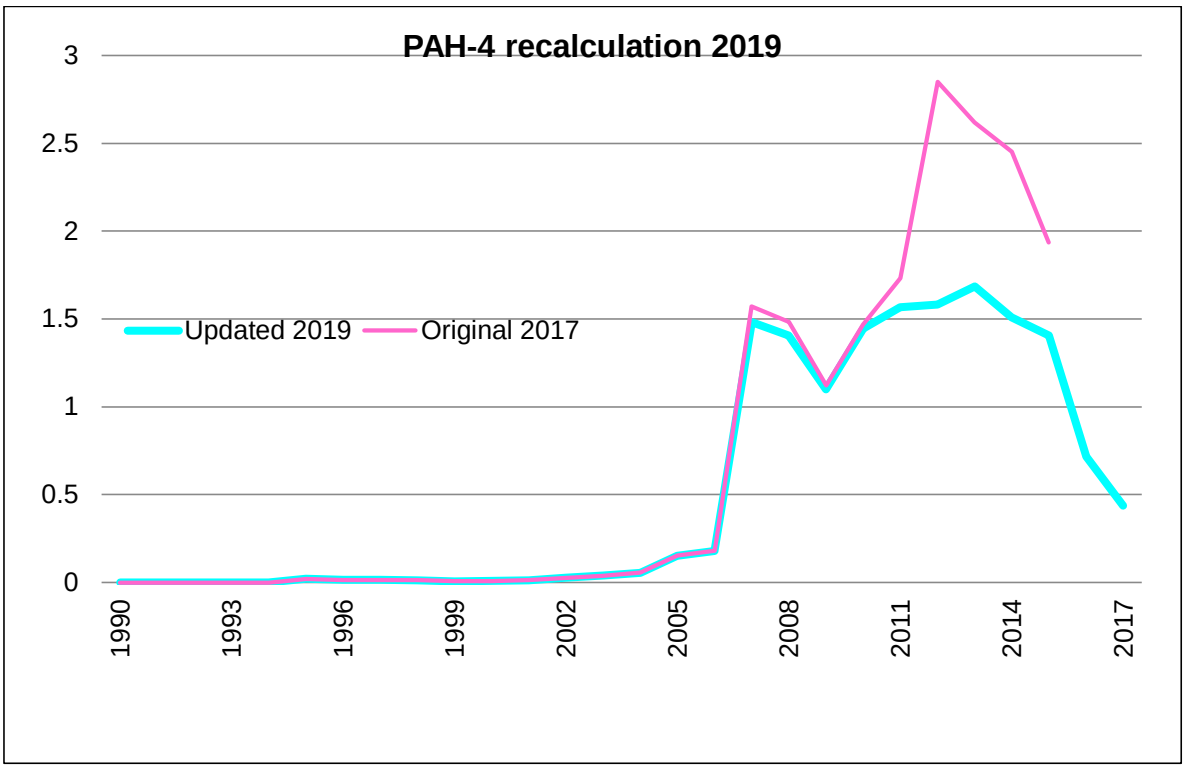
Zn - The time series is consistent since 2013. The higher emission in 2007 due to higher use of Mazout.



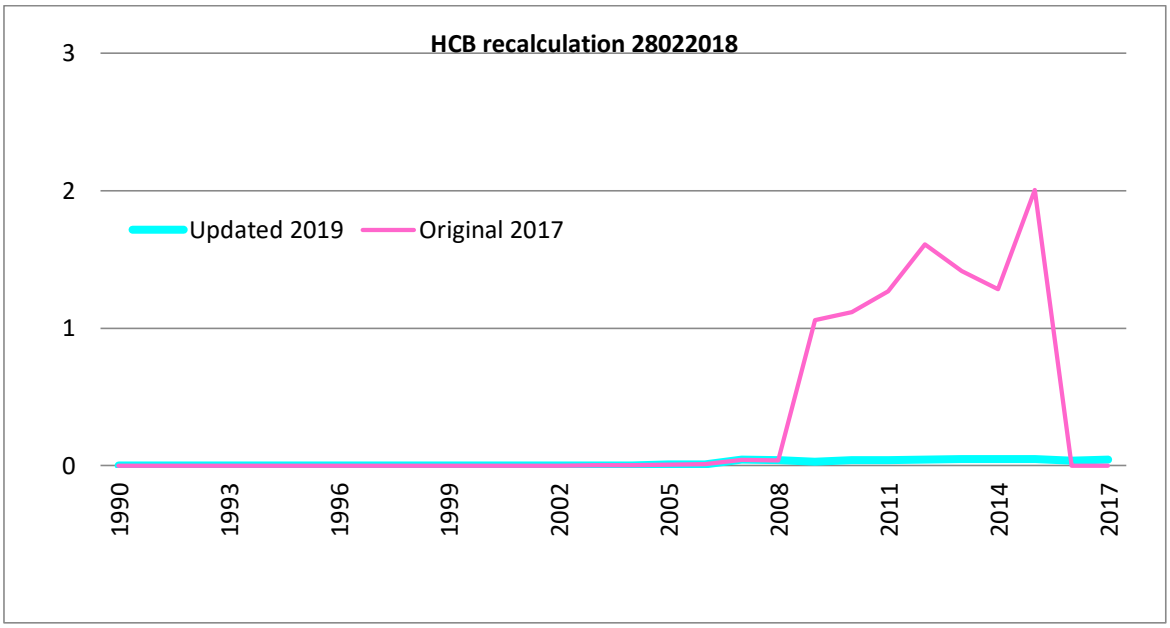
PCDD/F- The time series is almost consistent between 2007-2013 and there is a likely mistake in navigation emissions in 2009.



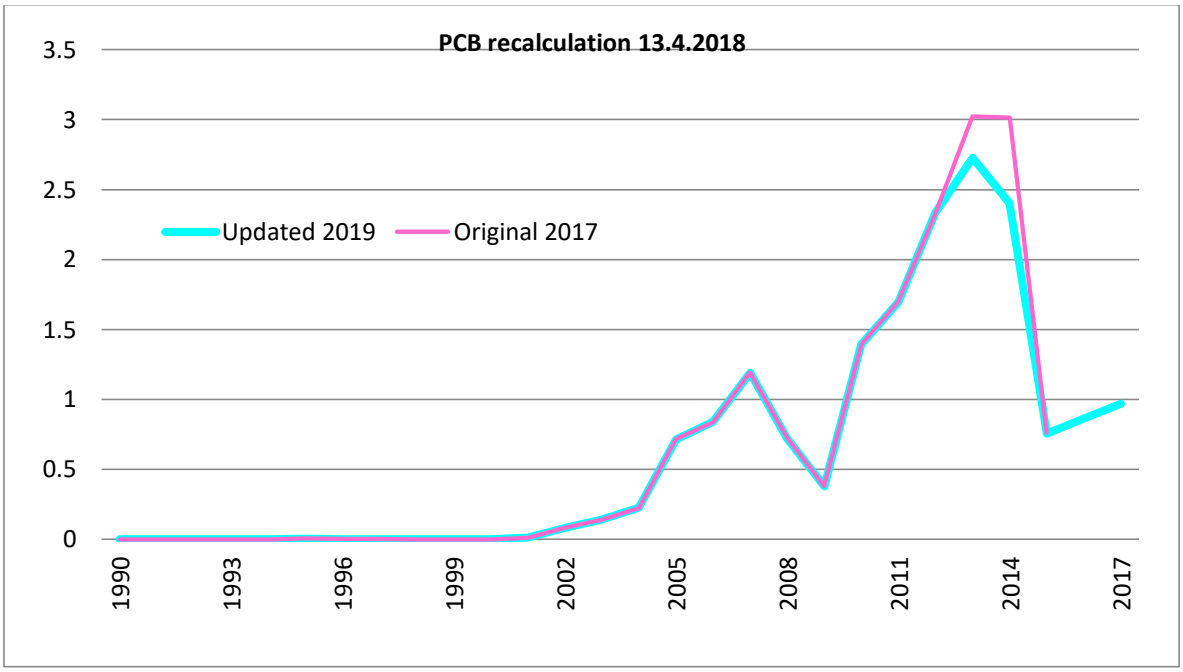
PAH-4 - The time series is almost consistent since 2007. The decrease in emissions in 2016-2017 is due to the reduced use of wood these years.



HCB - The time is almost consistent since 2007. The emissions are impacted since 2012 by the start of the municipal waste incineration plant.



PCB - The time series is mainly consistent since 2007. In 2009 the iron and steel production volumes (2C1) were lower than in the adjacent years. Since 2015 the emissions are lower due to change in methodology in 2C7a to Guidebook 2016 and the fact that activity data is not available at the moment to recalculate the previous years.



14.2 Planned improvements

In the following years, Azerbaijan is planned to enhance emission data and covered

categories. Make data more comparable and sustainable through recalculations. Improve and use tier 2 for key categories. Estimation of uncertainties is planned to realize in line with the EMEP guidelines.

Azerbaijan interested in submitting projections and gridded data but needs assistance for preparing them relevant to the guidelines. It might take a while but Azerbaijan is planning to develop the submitted data every year and become one of the examples of other Parties.

15. IIR References

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Available at: www.eea.europa.eu/publications/emep-eea-guidebook-2016

2. Statistic year book of State Statistical Committee of the Republic of Azerbaijan, "Environment, Forestry, Fishery and Hunting in Azerbaijan", 2018 www.stat.gov.az

3. Second National Communication to the United Nations Framework Convention on Climate Change, report of Azerbaijan