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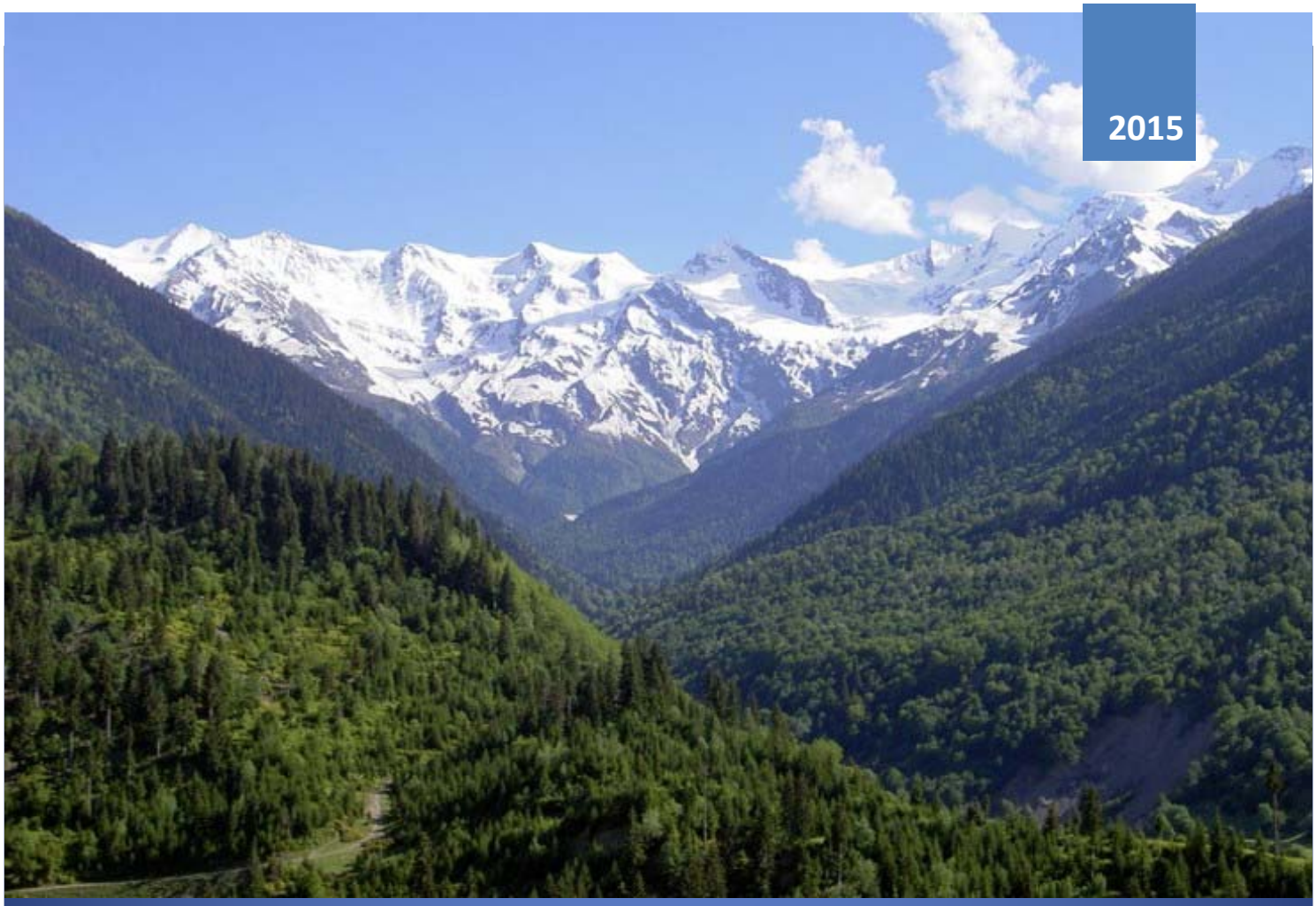

# INFORMATIVE INVENTORY REPORT OF GEORGIA

2007-2013

**Ministry of Environment and Natural Resources Protection of Georgia**

Ambien air protection service

Submitted under the Convention on Long-Range Transboundary Air Pollution

# LIST OF ABBREVIATIONS

MENRP – Ministry of Environment and Natural Resources Protection

EMEP – The European Monitoring and Evalution Programme

EEA – European Economic Area

GEOSTAT – National Statistics Office of Georgia

IPCC – Intergovernmental Panel on Climate Change

CLRTAP – Convention on Long-Range Transboundary Air Pollution

COPERT 4 – Road transport database

IIR – Informative Inventory Report (UNECE)

LPS – Large point sources, equals to the definition of E-PRTR installations

NFR – Nomenclature for reporting (IPCC code of categories)

QA/QC – Quality assurance/quality control:

UNECE – United Nations Economic Commission for Europe

## Pollutants

As – Arsenic

Cd – Cadmium

Cr – Chromium

Cu – Copper

CO – Carbon monoxide

HCB – Hexachlorobenzene

Hg – Mercury

HM – Heavy metals

NH3 – Ammonia

Ni – Nickel

NMVOC – Non-methane volatile organic compounds

NO2 – Nitrogen dioxide

NOx – Nitrogen oxides, nitric oxide and nitrogen dioxide, expressed as nitrogen dioxide

PAH – Polyaromatic hydrocarbons expressed as the sum of benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3,-cd)pyrene

Pb – Lead

PCDD/PCDF – Dioxins and furans: 1,2,3,7,8-PeCDD; 2,3,4,7,8-PeCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF

PCB – Polychlorinated biphenyls

PCP – Pentachlorophenol

PFCs – Perfluorocarbons

PM2.5 – Particulate matter; particles on the order of ~ 2.5 micrometers or less

PM10 – Particulate matter; particles on the order of ~10 micrometers or less

POP – Persistent organic pollutants

Se – Selenium

$SO_2$ – Sulphur dioxide

SOx – Sulphur oxides, all sulphur compounds expressed as sulphur dioxide

TSP – Total suspended particulates

Zn – Zinc

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## Executive Summary

The present report is the first Informative Inventory Report submitted by Georgia under the Convention on Long-Range Transboundary Air Pollution. The report provides background information on Georgia's emission inventory data.

Georgia reports emissions of NOx, NMVOC, SO2, NH3, PM2.5, PM10, TSP, CO, Pb, Cd, Cr, Cu, Ni, Se, Zn, PCDD/ PCDF, benzo(a) pyrene, benzo(b) fluoranthene, benzo(k) fluoranthene, Indeno (1,2,3-cd) pyrene, in the following sectors: Energy, Industrial Processes and Product Use and Agriculture. Georgia also reports emission data from large point sources.

The main pollutants reported by Georgia show the following trends:

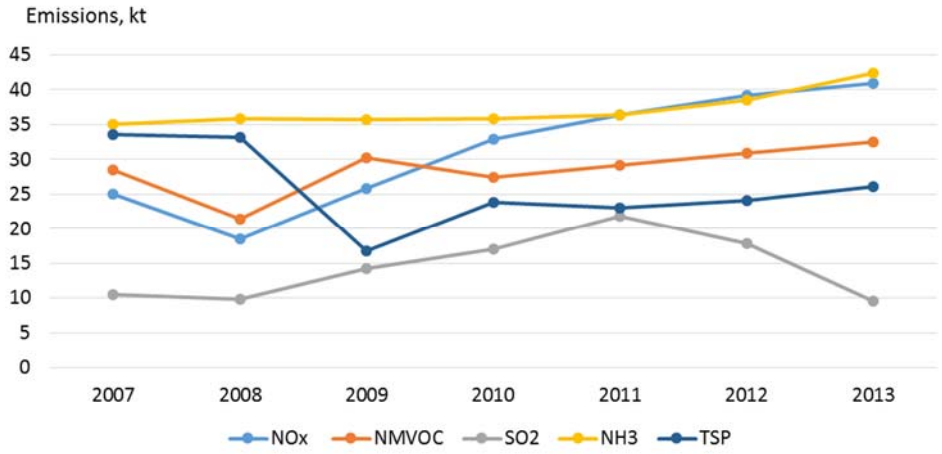


**Figure 1.1** Trends of main pollutants, 2007-2013

# 1. Introduction

## 1.1. National Inventory Background

Georgia joined the Convention on Long-Range Transboundary Pollution in 1999. Georgia annually provides a national inventory of air pollutants. The following pollutants are covered:

**Table 1.1** List of pollutants by sector

| **Sector** | **Pollutant 2007-2013** | | | | | |
|---|---|---|---|---|---|---|
| Energy | Main Pollutants | PM[1] | CO | Priority Heavy Metals[2] | Additional Heavy Metals[3] | POPs[4] |
| Industrial Processes and Product Use | Main Pollutants[5] | TSP | CO | | | |
| Agriculture | Main Pollutants[6] | PM[7] | | | | |

[1] Except BC
[2] Except Hg
[3] Except As
[4] Except HCB and PCBs
[5] Except $NH_3$
[6] Except SOx
[7] Except BC

## 1.2. Institutional Arrangements

In Georgia, the Ministry of Environment and Natural Resource Protection (MoENRP) is responsible for preparation of the inventory. This task is located within the Ambient Air Protection Service, which collects data from GEOSTAT (the Statistical Office) and from various companies. The transport sector is covered by the Ministry of Internal Affairs of Georgia.

MoENRP carries out the emission calculation based on the collected data. Quality checking/control is also carried out by MoENRP.

MoENRP is responsible for reporting emission data to the UNECE.

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

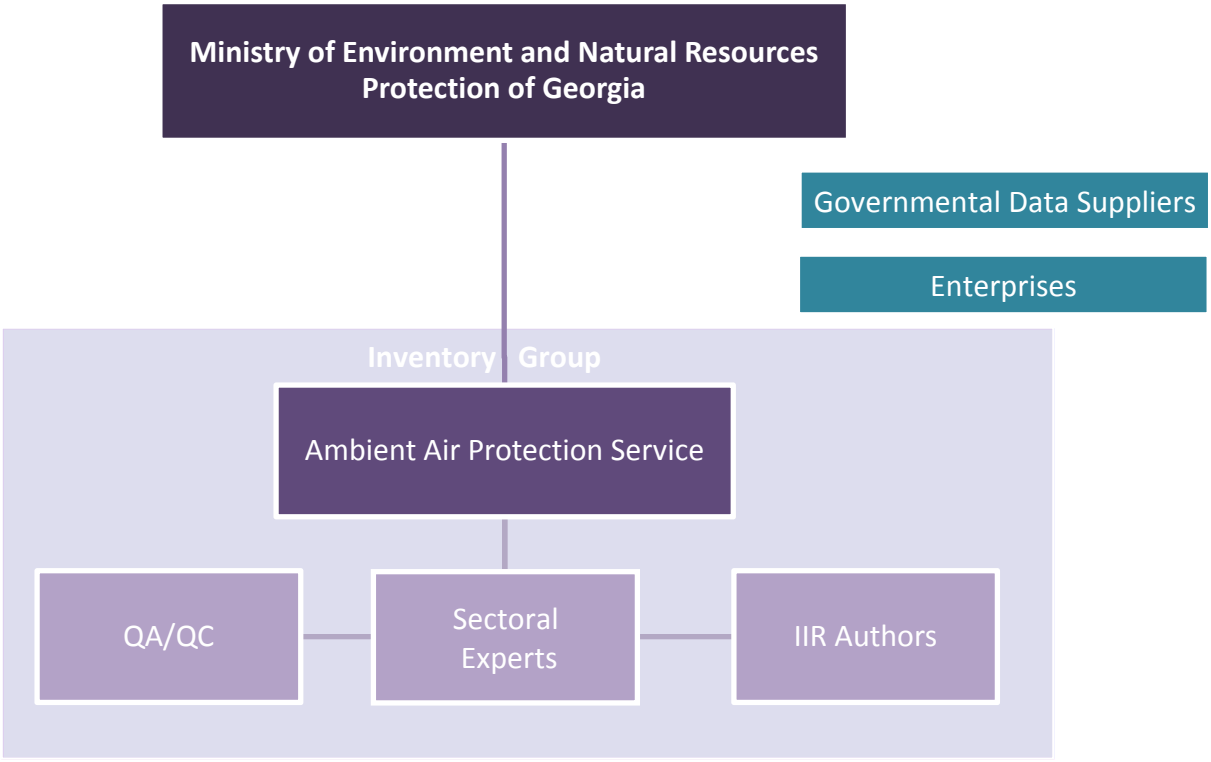


**Figure 1.2** Responsibilities for preparing of emission inventory

## 1.3. Inventory preparation process

In the first step of inventory preparation, MoENRP receives data from the Statistical office and other data suppliers. Information on county's car fleet are received from the Ministry of Internal Affairs of Georgia.

Experts at MoENRP use emission factors from the EMEP/EEA Guidebook to calculate air pollutant emissions in the agriculture sector (Tier 1 method). Emissions from road transport are calculated based on the EMEP/EEA Guidebook as well. For other sectors, a national methodology is applied.

Activity data and emission factors are stored in Excel files. Data is backed-up and archived at MoENRP (Ambient Air Protection Service) in different computers and virtual server.

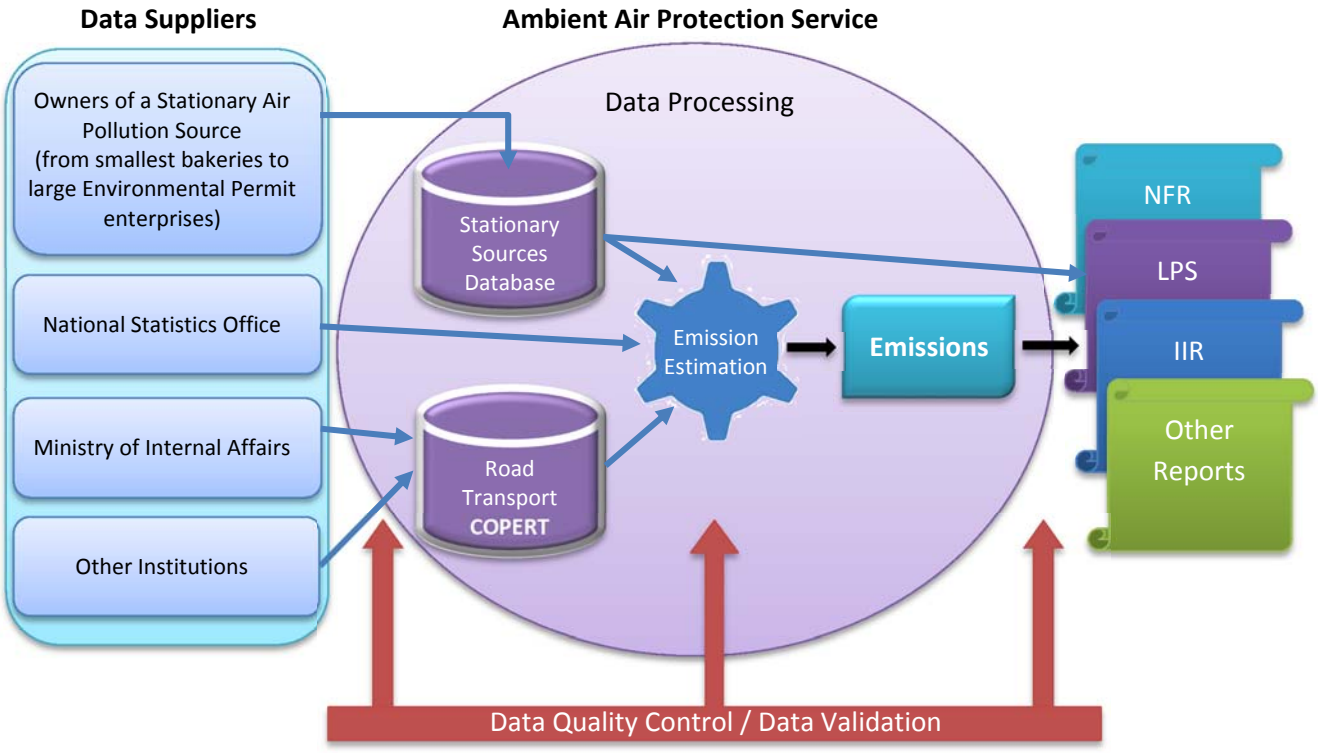


**Figure 1.3** Emission inventory structure

## 1.4. Methods and data sources

Emissions from the Agriculture sector are calculated based on Tier 1 EMEP/EEA methodology, along with the recommended Tier 1 emission factors from GB2013. Road transport emissions are calculated by software tool COPERT 4 (Tier 2/3 method). For other sectors, a national methodology is applied.

Data sources for the inventory comprise the National Statistical Office and the Ministry of Internal Affairs. In addition, information for large point sources is provided in reports by companies, verified by regional offices of Environment Inspectorate and by the MoENRP.

More details on the methods and data sources can be found in Chapters 3 to 6.

## 1.5. Key categories

Table 1.2 presents the results of key sources analyses.

Road transport (1A3biii – 1A3bi) and energy (1A1a) sectors are the main sources of NOx. Road transport sector is also a key source for NMVOC and $SO_2$.

Almost 80% of ammonia emissions comes from livestock management (3B1a – 3B1b).

Industry sector with coal mining, mineral products, ferroalloys, cement, asphalt and lime productions is the largest contributor of PM emissions (44.5%). Public electricity and heat productions (1.A.1.a) with 33.5% is a key polluter as well.

**Table 1.2** Results of key source analysis

| Pollutant | Key sources categories (sorted from high to low from left to right) | | | | | | | | Total (%) |
|---|---|---|---|---|---|---|---|---|---|
| NOx | 1A3biii | 1A3bi | 1A1a | 2B10a | | | | | |
| | 33,3% | 26,3% | 17,6% | 11,4% | | | | | 88,6% |
| NMVOC | 1A3bi | 3B1a | 1A3bv | 2H2 | 3B1b | | | | |
| | 37,7% | 15,9% | 14,0% | 7,9% | 6,5% | | | | 82,0% |
| $SO_2$ | 1A2gviii | 1A3biii | 1A3bi | 1A3bii | 2A1 | | | | |
| | 54,3% | 24,5% | 6,6% | 6,1% | 5,1% | | | | 96,6% |
| $NH_3$ | 3B1a | 3B1b | 3Da1 | | | | | | |
| | 59,5% | 18,6% | 12,4% | | | | | | 90,5% |
| TSP | 1A1a | 1B1a | 2C2 | 2A1 | 2D3b | 2A6 | 3B1a | 2A2 | |
| | 33,5% | 15,1% | 9,3% | 6,5% | 5,3% | 5,0% | 3,4% | 3,2% | 81,4% |

## 1.6. QA/QC and verification methods

The following quality control measures are carried out:

**Check for transcription errors and data comparison**

For point sources, the check is made during transcription into the Excel file. Statistical data is compared to data available from previous years. In case of discrepancies, data from other sources (e.g. from companies) are used. If the data available to the Ministry shows higher levels than the statistical data, the levels available to the Ministry are used.

**Check of calculated emissions**

A staff member who did not make a specific calculation checks the colleague's approach and results. All results are compared to the values of previous years.

In addition, the following measure is carried out:

**Review of methods and emission factors**

Emission factors are updated when new EMEP/EEA-Guidebooks are published. Other guidebooks are monitored. The national methodology is also updated continuously.

## 1.7. General assessment of completeness

### List of notation keys

In the following table, notiation keys are listed (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. Where NE is used in an inventory to report emissions of pollutants, the Party should indicate why such emissions have not been estimated;

(b) "IE" (included elsewhere), for emissions by sources of pollutants estimated but included elsewhere in the inventory instead of under the expected source category. Where IE is used in an inventory, the

Party should indicate where in the inventory the emissions for the displaced source category have been included, and the Party should explain such a deviation from the inclusion under the expected 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;

(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.

### Sources not estimated

The following categories have not been estimated:
List of important sectors with "NE" and short justification why these sectors have not been estimated.

**Table 1.3** Sources not estimated (NE)

| NFR14 code | Substance(s) | Reason for not estimated |
|---|---|---|
| **1A1a** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | Emission occur, but have not been estimated due to lack of emission factors in national methodology |
| **1A2a** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2b** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2c** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2d** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2e** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2f** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2gvii** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A2gviii** | $PM_{2.5}$, $PM_{10}$, BC, HMs, POPs except **benzo(a) pyrene** | |
| **1A3ai(i)** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **1A3aii(i)** | All | |
| **1A3bi** | BC, Hg, As, HCB, PCBs | Emissions occur, but have not been estimated due to lack of emission factors in methodology (Copert 4 version 9.0 generates and fills NFR table (including notation keys NE)). |
| **1A3bii** | BC, Hg, As, HCB, PCBs | |
| **1A3biii** | BC, Hg, As, HCB, PCBs | |
| **1A3biv** | BC, Hg, As, HCB, PCBs | |
| **1A3bv** | PAHs, HCB, PCBs | |
| **1A3bvi** | TSP, BC, PAHs, HCB, PCBs | |
| **1A3bvii** | PM, HMs, POPs | |

| | | |
|---|---|---|
| **1A3c** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **2B10a** | $NH_3$, $PM_{2.5}$, $PM_{10}$ | Emission occur, but have not been estimated due to lack of emission factors in national methodology |
| **2C1** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **2D3c** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **2K** | HMs, POPs | Emission occur, but have not been estimated due to lack of statistic data |
| **3F** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **5C1a** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **5C1bi** | All | |
| **5C1bii** | All | |
| **5C1biii** | All | |
| **5C1biv** | All | |
| **5C2** | All | Emission occur, but have not been estimated due to lack of statistic data |
| **5D1** | All | |
| **5D2** | All | |
| **5D3** | All | |

### Sources included elsewhere

List of important categories with "IE" and short explanation in which category they are included.

**Table 1.4** Sources included elsewhere (IE)

| NFR14 code | Substance(s) | Included in NFR code |
|---|---|---|
| **1A2a** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2b** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2c** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2d** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2e** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2f** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A2gvii** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A2gviii |
| **1A4ai** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **1A4aii** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **1A4bi** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **1A4bii** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **1A4ci** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **1A4cii** | NOx, NMVOC, SOx, TSP, CO, benzo(a) pyrene | 1A1a |
| **3B4a** | NOx, NMVOC, $NH_3$, TSP | 3B1b |
| **3B4gi** | NOx, NMVOC, $NH_3$, TSP | 3B4gii |

## 2. Explanation of key trends

In Georgia ambient air pollution is mainly caused by emissions from motor vehicles, the energy, industrial and agriculture sectors. Trends of emissions of main pollutants from this sector are presented in figure 2.1.

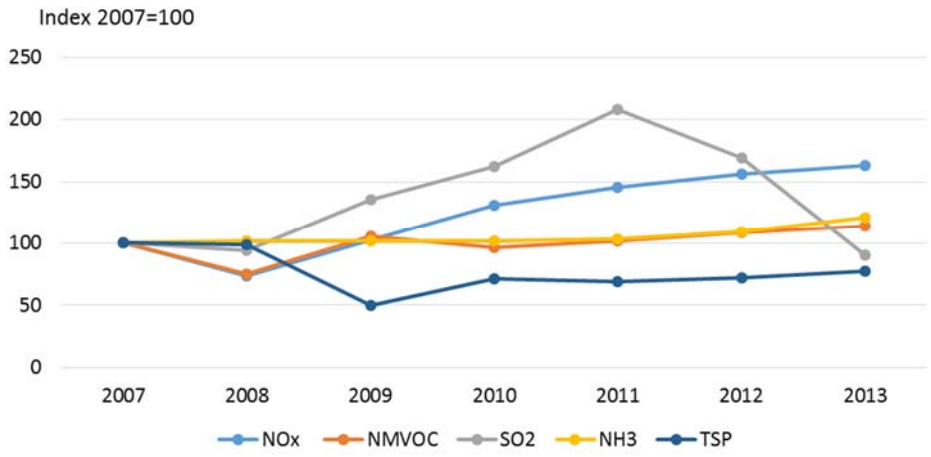


**Figure 2.1** Main pollutants, trends over time, 2007 is 100 %.

- The general economic activity increased over the past decade. In consequence, emissions of most pollutants increase.
- Significant decrease of particulate matter's emissions from 2009, mainly, is a result of introduction of new emission abatement systems in country's largest cement plants. Another important reason is a global economic crises.
- Dramatic drop of SOx emissions since 2011 was caused, on one hand, by desulphurisation of automotive fuel and, on the other hand, by decreased consumption of coal.
- Reduction of emissions of some pollutants in 2008 is mostly related to the military intervention of Russian Federation in Georgia.

### Nitrogen Oxides

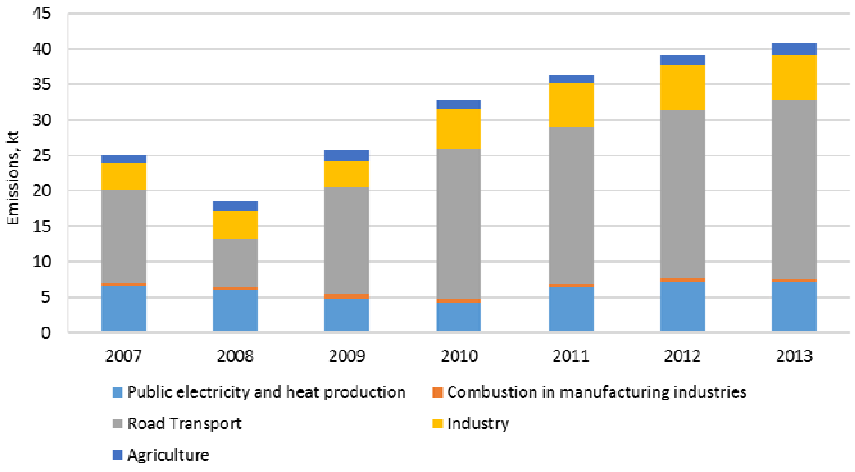


**Figure 2.2** Trend of NOx emissions 2007-2013

Road transport sector has the biggest share in total NOx emissions (about 62%).

In parallel with permanently increasing number of vehicles, in 2013 emissions of nitrogen oxides (NOx) from the road transport almost doubled compared to 2007.

### Non-methane volatile compounds

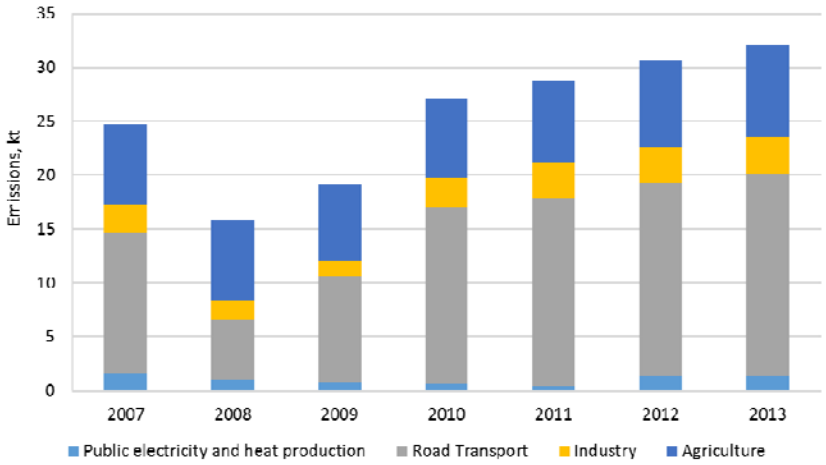


**Figure 2.3** Trend of NMVOC emissions 2007-2013

In 2013 NMVOC emissions increased by 13% compared to 2007 mainly due to road transport emissions. Sharp decreases in 2008 and 2009 related to war between Russia and Georgia and global financial crisis.

Road transport and livestock manure management are the main sources of pollution regarding NMVOC (about 85%).

### Sulphur Dioxide

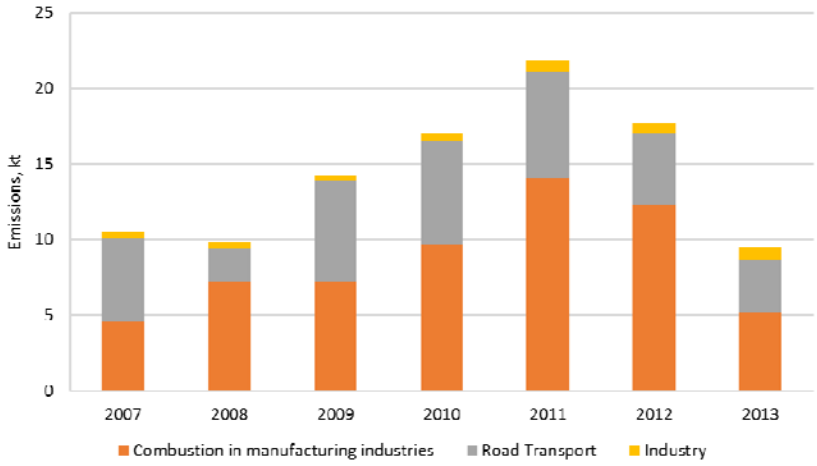


**Figure 2.4** Trend of $SO_2$ emissions 2007-2013

Increasing trend of $SO_2$ emissions during the period of 2009-2011, mainly caused by introduction of coal fuel in industry sector (mostly in cement plants). Dramatic reduction in 2013 compared to 2011 (by 56.1%) resulted by switching back from coal to natural gas in industry sector, as well as by restriction of national fuel quality standards for petrol and diesel since 2012.

Lion share of $SO_2$ emissions comes from combustion in manufacturing industries and road transport (about 95%).

### Ammonia

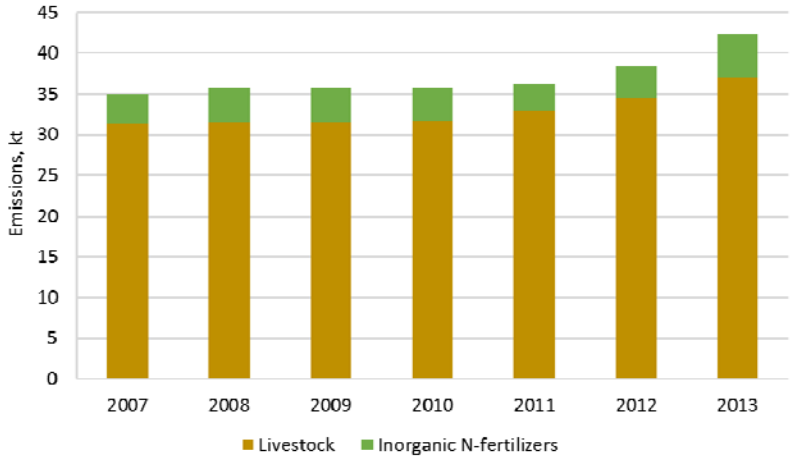


**Figure 2.5** Trend of $NH_3$ emissions 2007-2013

Ammonia emissions during past 10 years remain stable. Slight increase during last two years is related with new Government's policy to strengthen agriculture sector in Georgia. $NH_3$ emission generally comes from livestock manure management (about 89%) and mineral fertiliser use (about 11%). Only negligible emissions occurs in road transport sector.

### Particulates

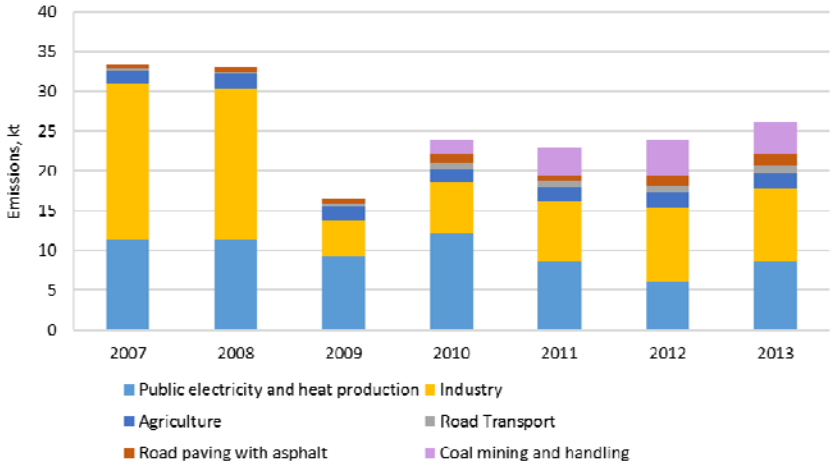


**Figure 2.6** Trend of TSP emissions 2007-2013

Total emissions of particulates decreased by 19.6% from 2007 to 2013. The sharp reduction of particulate matter's emissions since 2009 achieved by installation of new particulate filters in the biggest cement plants in Rustavi and Kaspi. As a result PM emissions from industry sector have been reduced by approximately 60%. From 2010 coal mining has been restored in Georgia. After that this activity, together with industry and public electricity and heat production sectors became main PM polluters.

# 3. Energy (NFR sector 1)

Emissions in energy sector commonly come from fuel combustion. Minor fugitive emissions from fuel exploration generated as well. This sector covers three key activities: public electricity and heat production, combustion in manufacturing industries and road transport. Therefore, the energy sector is the main source of $SO_2$, NOx and NMVOC in Georgia. In 2013 this sector contributed 90.3% of total $SO_2$ emissions, 80.2% of total NOx emissions and 62.4% of total NMVOC emissions.

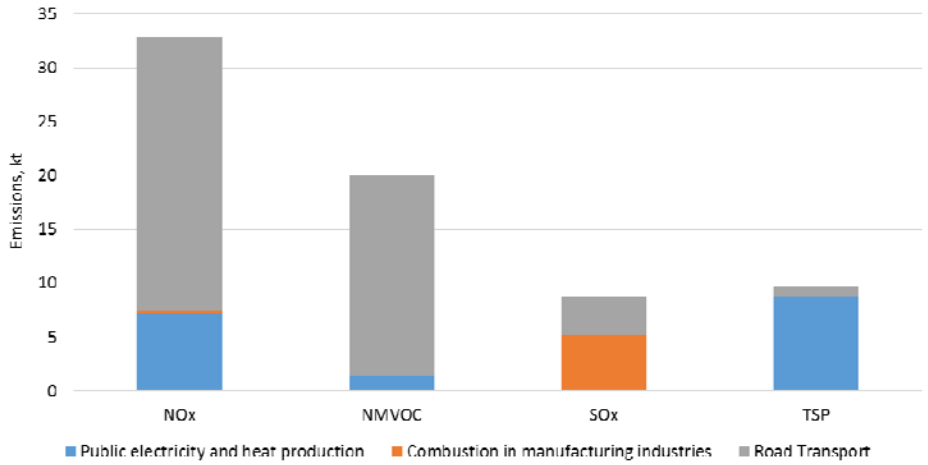


**Figure 3.1** Emissions from energy sector in 2013

Road transport is the major contributor of NMVOC (58.2%) and NOx (62%) emissions in the energy sector. Share of industrial combustion in total $SO_2$ emissions in energy sector is almost 60%. Public electricity and heat production is responsible for the most PM emissions (89.9%) in this sector.

## Public electricity and heat production

Emissions in this category mostly come from wood and gaseous fuel consumption.

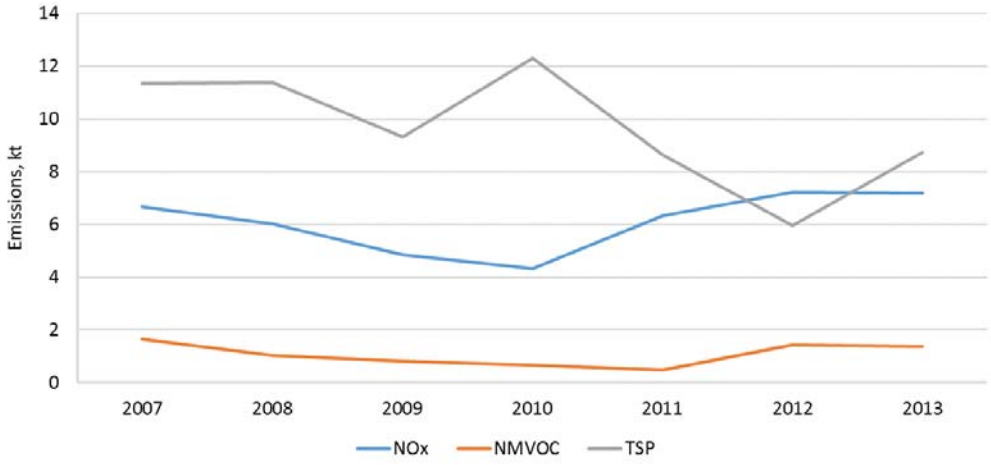


**Figure 3.2** Emissions from public electricity and heat production 2007-2013

Use of natural gas is the main factor for NOx emissions trends. For NMVOC emissions most important role plays liquid fuel combustion. Emissions of particulate matters directly related to wood consumption.

**Methodology**

Emissions are calculated using country-specific emission factors provided in national methodology[8].

## Combustion in manufacturing industries

This category covers emissions occurred by combustion processes (mainly using) in industrial sector, where mainly used coal, gasoil, heavy oil and kerosene[9].

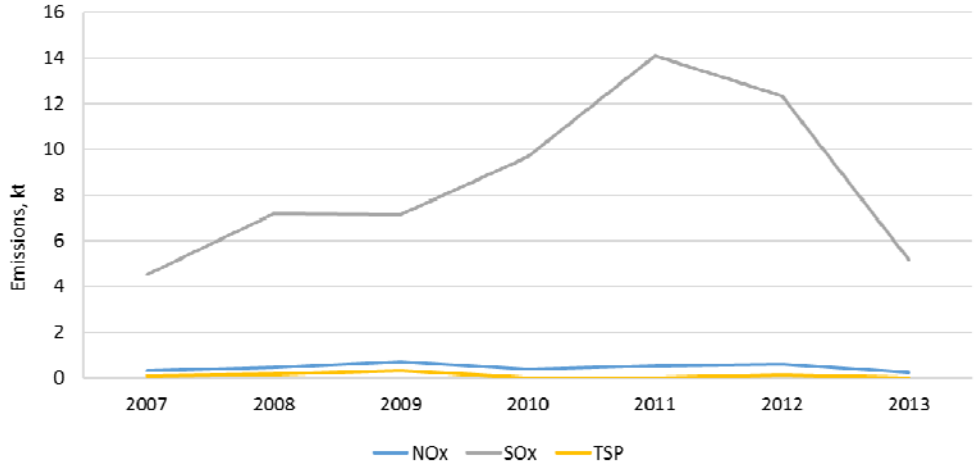


**Figure 3.3** Emissions from combustion in manufacturing industries 2007-2013

Increasing trend of $SO_2$ emissions from 2008 to 2011 is resulted by introduction of coal fuel in industry sector (mostly in cement production). Decreasing emissions of same pollutant in 2012 and 2013 related to reduced consumption of coal and heavy oil within those years, mainly caused by shifting back from coal to natural gas in cement industry.

**Methodology**

Emissions are calculated using country-specific emission factors, which are given in national legislation.

[8] # 435 Order of the Government on instrumental method for determination of actual amounts of emissions into ambient air from stationary pollution source, standard list of emission measuring equipment, and methodology for calculation of actual amounts of emissions into ambient air from stationary pollution source according to technological processes (31/12/13)
[9] From 2002 till 2014, there was not been prepared energy balance report in the country. Therefore, information on natural gas consumption in industrial processes is not available.

## Road transport

Road transport is the main source of air pollution in Georgia. The number of transport vehicles has tripled since 2001. It is expected that this trend is set to continue. This sector includes all types of vehicles (passenger cars, light duty vehicles, heavy duty trucks, buses, motorcycles) except off-road transport (agricultural and industrial machinery, etc.).

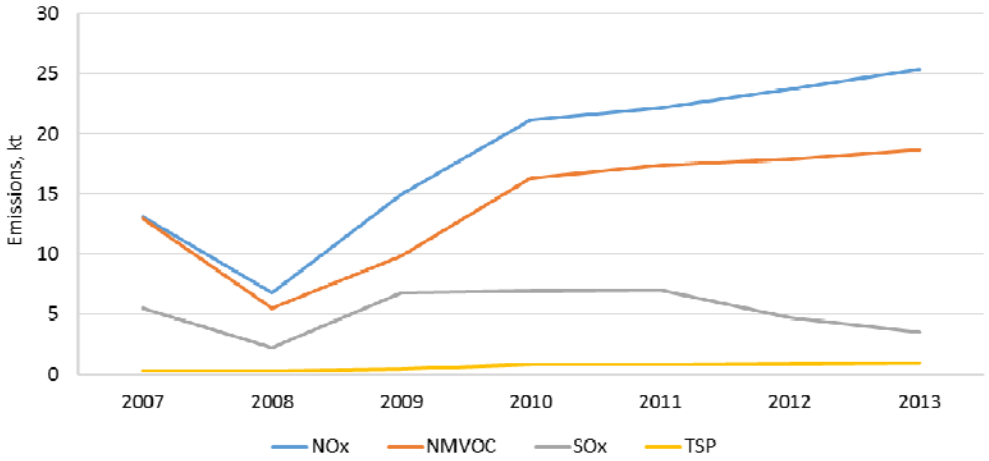


**Figure 3.4** Emissions from road transport 2007-2013

Emission trends of main pollutants from this sector is gradually increasing alongside growing number of vehicle in the country. From 2007 to 2013 emissions of NOx was increased by 93.2%, emissions of NMWOC by 44.4% and emissions PM by 196.6%. Only exception is $SO_2$, whose emissions started decreasing since 2012 due to reduction of sulphur content limit in national standards for petrol and diesel (for petrol: from 500 ppm to 250 ppm and for diesel: from 350 ppm to 300 ppm). Sharp fall of emission of all pollutants in 2008 related to military intervention of Russian Federation in Georgia.

### Methodology

Road transport emissions are calculated by software tool COPERT 4 (Tier 2/3 method of the EMEP/EEA Guidebook).

# 4. Industrial processes and product use (NFR sector 2)

Dissolution of the Soviet Union and accompanied with the collapse of the economy in the 1990s resulted in a significant decrease of industrial activities in Georgia. There has been some growth in these sector in more recent years. The main activities in this sector are manufacturing of mineral products, chemical industry, metal production as well as paper, wood and food industries.

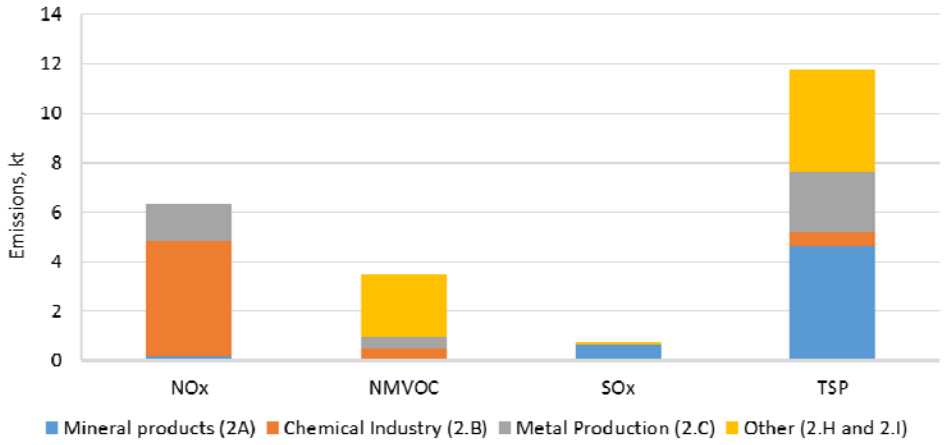


**Figure 4.1** Emissions from industry sector in 2013

## Mineral Products (2.A)

### Source category description

In this category, cement production, lime production, limestone and dolomite use, road paving with asphalt, gypsum plaster, bricks, concrete, gravel and glass production are reported.

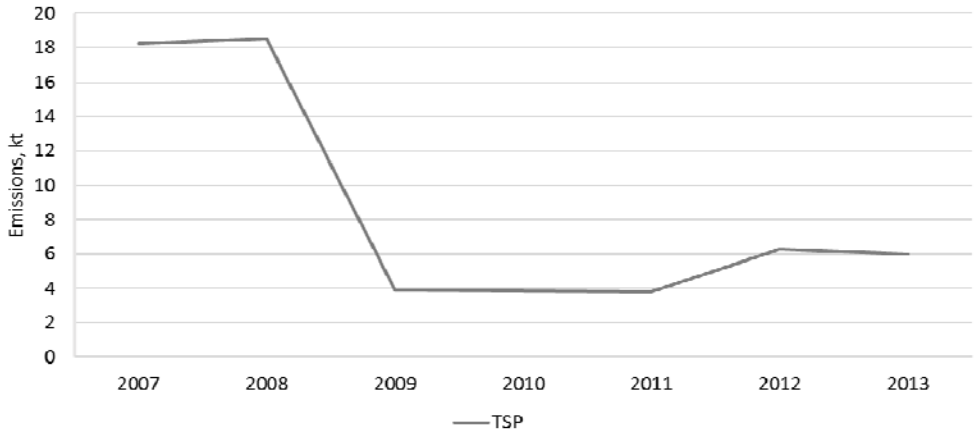


**Figure 4.2** Emissions from mineral products 2007-2013

The most important pollutant emitted from this category is particulate matters. Dramatic drop of this pollutant's emissions since 2009 caused by introduction of new high efficient emission abatement systems in the country's largest cement plants.

### Methodology

Emissions are calculated using country-specific emission factors. These factors are given in national legislation. Some were taken the EMEP/EEA Guidebook and from other international reports.

Activity data in these categories is total production per year in tonnes.

## Chemical Industry (2.B)

### Source category description

This category covers emissions from fertilizer production.

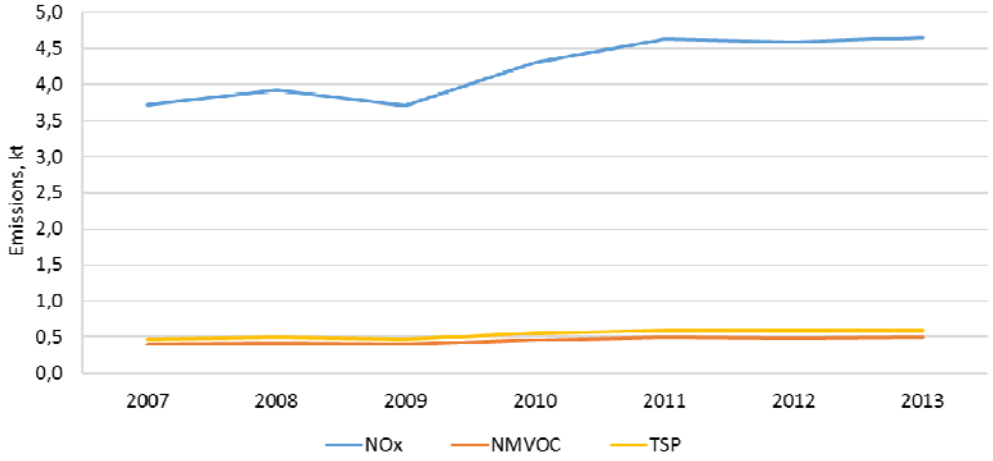


**Figure 4.3** Emissions from chemical industry 2007-2013

Emissions of each pollutant from chemical industry from 2007 to 2013 was increased by approx. 25%.

### Methodology

Emissions are calculated using country-specific emission factors are approved by national legislation.

## Metal Production (2.C)

### Source category description

In Georgia, there is no primary metal production. There is ferroalloys and secondary iron/steel production. Emissions from secondary iron and steel production are included in ferroalloys production.

There is also secondary lead and aluminium production. Emissions for these processes are currently not estimated.

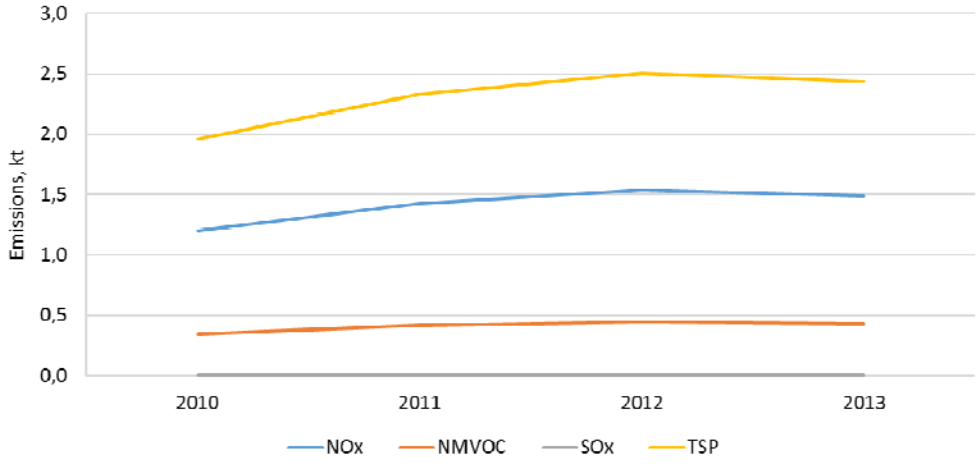


**Figure 4.4** Emissions from metal production 2007-2013

**Methodology**

For ferroalloys, emissions are calculated using country-specific emission factors. These factors are given in national legislation.

Emissions from secondary iron and steel production are included in the ferroalloys category. These two categories are combined because the underlying activity data (statistical data) is combined.

## Other (2.H and 2.I)

**Source category description**

This category covers pulp and paper, food and drink and wood processing.

In Georgia, there is secondary paper processing only. Food comprises bread production, sugar production, flour production, tea production, coffee processing, canned food, fish processing, meat processing. Under drink production, beer, wine, spirits, soft drinks, mineral water and dairy products are included.

In the past large wood processing companies existed in Georgia. Nowadays small plants remain which process logs and produce wooden boards etc.

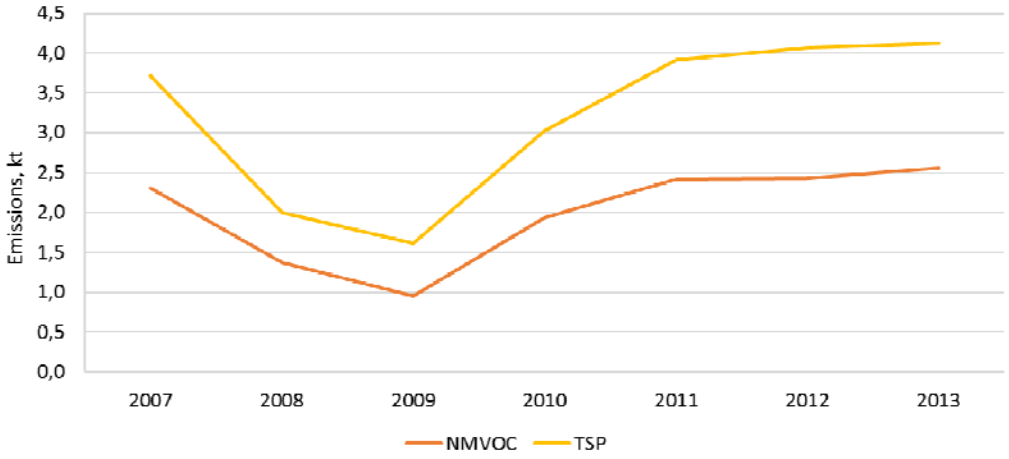


**Figure 4.5** Emissions from other industrial processes 2007-2013

Reductions of emissions from this sector in 2008-2009 related to the global economic crisis.

**Methodology**

Emissions are calculated using country-specific emission factors. These factors are given in national legislation. Where new factors are provided in the EMEP/EEA Guidebook, they are taken from the guidebook directly (e.g. wine production).

The methodology is regularly updated based on the Guidebook. The methods referenced in the national legislation are also updated based on the Guidebook.

# 5. Agriculture (NFR sector 3)

Emission inventory from agriculture sector includes animal husbandry and the application of inorganic fertilizers.

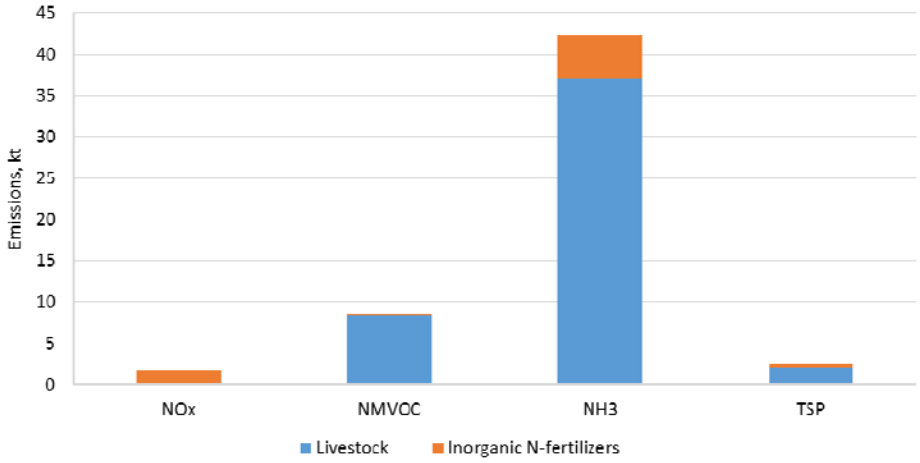


**Figure 5.1** Emissions from agriculture sector in 2013

Agriculture sector is the main emitter of ammonia in the country.

## Manure Management

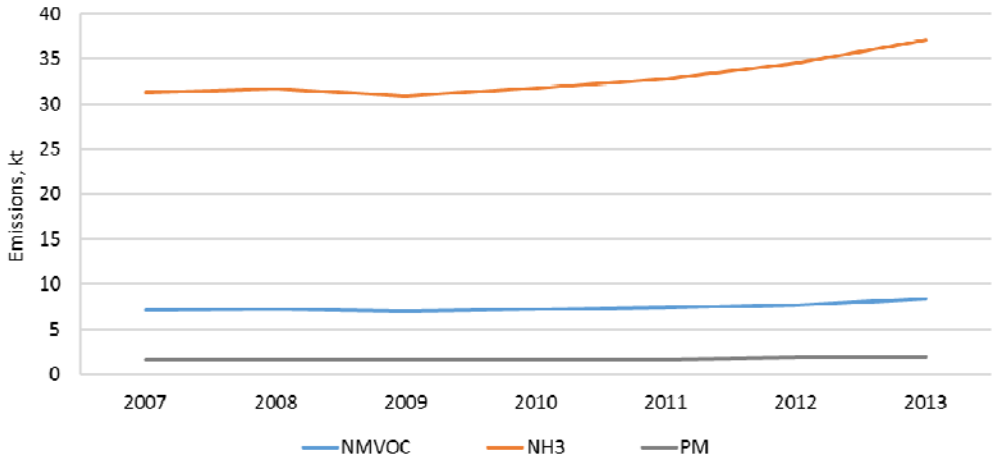


**Figure 5.2** Emissions from livestock manure management 2007-2013

Manure management is the most significant source of ammonia emissions. Emission of this pollutant was increased by 18.5% from 2007 to 2013.

### Methodology

Emissions are calculated using the EMEP/EEA Guidebook tier 1 approach.

### Agricultural Soils

Under this category $NH_3$ emissions from fertilizers and particulate matters emissions from grain fields are provided. Additionally, emissions of NOx, NMVOC and $PM_{2.5}$ have occurred.

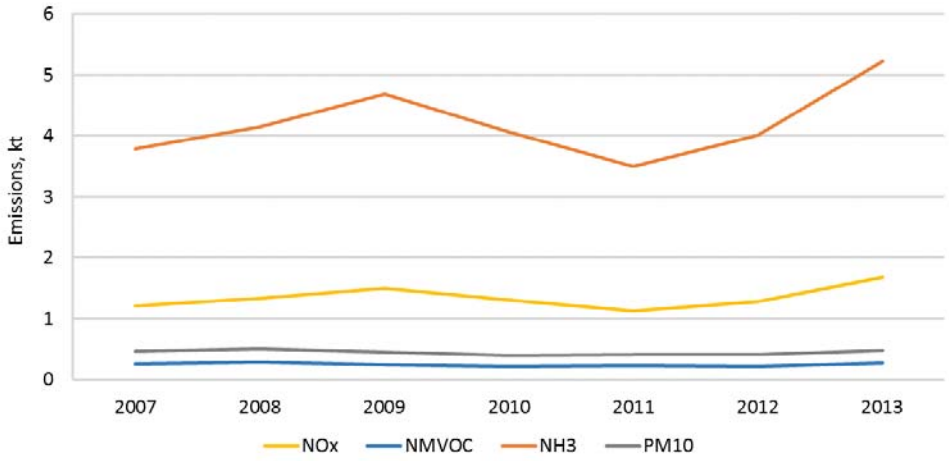


**Figure 5.3** Emissions from agriculture soils 2007-2013

**Methodology**

Emissions are calculated using the EMEP/EEA Guidebook tier 1 approach.

## 6. Recalculations and improvements

### Recalculations

Recalculations mainly are related with using of the new methodology. Period of recalculations covers each reported year.

All emissions in agriculture sector were recalculated based on the EMEP/EEA Guidebook tier 1 approach instead of old soviet methodology as new activity data became available from GEOSTAT.

Category 3Da1: Inorganic N-fertilizers is reported for the first time.

Emissions from road transport sector was recalculated as well. More detailed car fleet data was gained from the ministry of internal affairs. This made available to use COPERT 4 software.

Due to small changes/updates in national methodology, some minor recalculations were made in energy and industry sectors too.

### Planned improvements

It is planned to calculate emissions of heavy metals from energy and industry sectors based on renewed national methodology or EMEP/EEA Guidebook.

It is intended to provide PM10 and PM2.5 emissions in industry sector using EMEP/EEA Guidebook.

## 7. Reporting of LPS data

Operators of various point sources annually report emission data for main pollutants. These data are based on calculations and measurements and are verified by regional branches of environmental inspection.

Among these point sources, the most important point sources in terms of emission level were determined. Emissions from these sources, including stack height and geographical coordinates, are reported in the "Large Point Sources (LPS) emissions template".

LPS covers power plants, sea ports and terminals, gypsum production, cement, lime and asphalt plants, ferroalloys production, coal mining, gold and copper mining, production of fertilisers, metallurgical plants and glass production.

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2. UNECE, 2014. Guidelines for Reporting Emission Data under the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/125);

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4. UNECE, 2013. Decision 2013/4 reporting of emissions and projections data under the Convention and its protocols in force (ECE/EB.AIR/122/Add.1.);

5. # 435 Order of the Government on instrumental method for determination of actual amounts of emissions into ambient air from stationary pollution source, standard list of emission measuring equipment, and methodology for calculation of actual amounts of emissions into ambient air from stationary pollution source according to technological processes (31/12/13);

6. EMEP/EEA air pollutant emission inventory guidebook – 2013: http://www.eea.europa.eu/publications/emep-eea-guidebook-2013;

7. AGRICULTURE OF GEORGIA - Statistical Publications 2007;

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13. AGRICULTURE OF GEORGIA - Statistical Publications 2013.