STATE OF THE ENVIRONMENT - CAUSES AND CONSEQUENCES

• ECONOMIC SECTORS AND THEIR IMPACT ON ENVIRONMENT

Key questions and key findings

What indicates the existing trend in the area of industrial production in terms of its impact on the environment?

- **Energy demand of the Slovak industry still remains very high. It reaches values that are far beyond the EU 27 and the neighbouring countries' average values. From the long-term perspective (2000-2012) there has been a decline in the impact of industry on the environment. Surface water abstraction by industry in 2012, compared to 2000, declined by 55% and represented 79.4% of all abstractions. When compared for the period of 2000-2012, abstraction of groundwater for the food industry declined by 20.1%, and by 32.2% for other industries. Discharged pollution by industrial wastewater was reduced. Slovakia, compared to the neighbouring countries, showed the greatest share of greenhouse gases emissions from industrial processes on total greenhouse gases emissions in 2011, but also the greatest proportion of industrial production on GDP among the EU countries. In 2011, CO emissions from the industry grew by 11.5% compared to the year 2000. SO_2 emissions declined by 39.5%, NO_X emissions declined by 46.8%, and particulate matter emissions declined by 81.3%. In 2012, volumes of industry-generated waste placed on the market declined, compared to 2000.**

What is the trend in the area of mineral extraction activities?

- **In the course of 2012, there was only a slight decline in brown coal and lignite extraction. From the perspective of a long-term trend (2000-2012), there were shown reduced volumes in the extraction of this commodity by 2007, with a growth in 2008 - 2009, and a new reduction in 2010. Extraction of ores grew in 2012 by 13.7 kt, compared to 2011. There has been a significant decrease in ore extraction activities over a longer time period (2000-2012). In 2012, ore extraction activities dropped by 94%, compared to 2000. Slight reduction in extracted volumes was recorded in magnesite and building stone. Slight growth was recorded in the volumes of ballasts and sands. Assessment of long-term trends (1993 - 2012) suggests that the majority of extracted raw material volumes in 2012 did not reach the level of 1993.**

Does the trend in energy intensity and energy consumption show positive characteristics in terms of its connection to the environment?

- **Energy intensity of the Slovak economy declined significantly as a consequence of the stabilizing the primary energy sources and the GDP growth. Since 1993 until 2011, the intensity has been reduced by more than a half. Period of the years 2000 and 2011 shows its reduction by more than 43%. When compared to 2010, intensity declined by approximately 5.7% between individual years. Despite this trend, the Slovak energy intensity is still way above the OECD member states´ average. Total final energy consumption has been fluctuating since 2001, with two lows recorded in 2004 and 2009. In 2011, final energy consumption declined by 6.8%, compared to the previous year. Greatest share in total energy in 2011 recorded industry (34.7%) followed by three sectors: households (23.8%), transport (23.7%), and trades and services (16.1%). Most growth of the consumption was recorded in area of transport that by 2011 had increased by approximately 34%, compared to 2001. In 1993, final energy consumption**

was approximately 28% higher than the present value (2011) with the sector of industry showing the greatest share of about 48%.

What is the trend of electricity production and what is the share of renewable energy sources?

- In 2012, total electricity production was 28 393 GWh. Compared 2011, it has grown only by 1%. In 2012, nuclear power plants had the highest share in production (54.6%), followed by thermal power plants (18.4%), and hydroelectric power plants (15.3%) The rest goes to other sources. Electricity production from renewable sources (RES) is slowly growing. Compared to 1993 and 2000 when the proportion of electricity produced from RES was at the level of 14.1% and 16.9%, in 2011 the proportion was 17.01%.

What is the trend in traffic indicators relevant to impacts on the environment?

- Modal split in passenger transport in the area of road transport in 2012 slightly declined, compared to 2011. Other types of transport showed a slight increase in passenger transport modal split. From the long-term perspective - comparison of the situation in 2000 and 2012, modal split in passenger transport grew only in air transport. However, it must be stated that in the years of 2005 - 2009, air transport showed a relatively significant increase in passenger transport modal split, while in 2010 there was a significant decline.
- Number of transported passengers by municipal public mass transport declined by 7% between individual years. From the long-term perspective - comparison of years 1993 and 2012 - number of transported passengers by municipal public mass transport declined by 26.2%.
- With growing individual passenger transport types and freight transport there is also a growth in the number of road motor vehicles. Since 1993, total number of motor vehicles has grown by 1 068 128 pieces (72.7%).
- Road network in 2012 comprised 18 017 km of roads and highways, which compared to 1993, represents an increased length by 152 km only. Most intensive growth in road construction was recorded after 2007.

What is the trend in indicators assessing the impact of transport on the environment?

- In terms of transport share in total emissions of assessed pollutants for 2011, significant was transport share in CO emissions – 25%, 49% in case of NO_X, and 10% in case of NM VOC. Transport contributed to particulate matter emissions with 7.6%, and to SO_2 emissions with 0.32%.
- In the sector of road transport, Slovakia is still not able to stabilise the growth of greenhouse gases emissions. Share of emissions within the sector of transport on total produced greenhouse gases emissions in 2011 was approximately 14%. (when expressed in CO_2 equivalents) While the share of emissions from stationary sources declines, share of emissions from transport still continues to grow. Since 1950, emissions from transport have grown by 27% and in 1990 reached only 9%.
- Noise has an annoying effect and may pose health risks when its intensity is increased. Limit values for noise load on the population are exceeded in a number of areas in Slovakia In 2010, 13 749 m of noise wall barriers were built in the road transport, while 8 517 m of them were built in the railway transport.
- Number of traffic accidents since 1993 continues to decline. Most noticeable has been the reduction since 2009 when a change to the methodology of traffic accident monitoring was implemented.

What is the impact of agriculture on the environment?

- Consumption of industrial fertilisers in agricultural production in 2012 represented 85.8 kg of net nutrients per ha of agricultural land, which is 6.2 kg more than in 2011. Between the years 2000 and 2012, consumption of industrial fertilisers was rising, with the exception of small deviations. This trend has continued since 1993 when 41.6 kg of net nutrients per ha of agricultural land was consumed.

- **Consumption of pesticides in 2012 recorded an increase compared to the previous year and reached the value of 3 925 tons. Since 1993, consumption of pesticides has been more-less balanced, with the exception of some years in which the consumption grew slightly.**
- **Between the years 2011-2012, abstraction of surface water for irrigation grew by 78.9%, abstraction of groundwater grew by 13.2%, and greenhouse gases emissions grew by 0.6%, with carbon dioxide representing more than a half of the produced volume of emissions. Production of ammonia emissions declined by 3.5% compared to the previous year. Volumes of waste from agricultural activities declined by 4.1%. From the long-term perspective (1993-2012); however, there has been a decline in the impact of agriculture on the environment. Over the mentioned period, abstraction of surface water for irrigation declined by approximately 78.6%. The only growth was recorded in 2000, reaching the highest level of surface water abstraction - 90.6 mil. m^3. Compared to 2004-2012 following a change in the methodology in 2003, abstraction of groundwater declined by 14.5%. Greenhouse gases emissions since 1993 have also shown a declining trend. In the period of 2000-2011 they remained roughly at the same level, with only slight fluctuations in individual years. Compared to 2000, greenhouse gases emissions declined by 10.8%, methane (CH_4) emissions declined by 23.9%, nitrogen monoxide (N_2O) emissions by 3.3%, and ammonia emissions (NH_3) by 25.2%. In 2012, compared to 2005, the number of waste generated in agriculture declined by 23.5%.**
- **In 2012, the size of agricultural land within the system of ecological agriculture reached 8.75% of total agricultural land size, which was a decline by 0.6% compared to 2011. In 2000-2004 this share was approximately only 2%. In 2005 it began to grow until 2011 when as much as 9.5% of agricultural land was classified into the system of ecological agriculture. From a long-term perspective (1993-2012), size of the land under this type of management has grown by 8.13%.**

Is forest management sustainable and environment-friendly?

- **Forest ownership structure is changing only slightly, since as to date the process of settling the ownership rights and the use of forest pursuant to the legislation on restitution of property (12.8% of non-identified forestland of total forestland size) has not been completed. Currently, the size of forest vegetation in Slovakia remain stable and takes up 41.1% of total national territory. In the long run it is possible to see its continuous growth - compared to the year 1981, by 24.1 thous. ha, and by 12.8 thous. compared to 2000. From year to year, the growth was 1 723 ha. The share of natural forest renewal (continuous growth from 8.6% in 1993 to 14.2% in 2000, and to the present 37.1% of total renewal. Annually, this share declined by 2.4%) has shown a positive trend, which helps promote sustainable management in forests. Gradual reduction in spatial distribution of coniferous trees (39.3%), especially spruce compared to broad-leaf trees (60.7%) has been a positive trend and helps the country to advance toward its target tree composition. Compared to 1993, share of coniferous trees declined by 3.8%. Compared to 2000, the decline was by 2.7%, and annually by 0.2%.**

What is the trend in the area of forest exploitation?

- **Although the health of forests has been stabilised over the recent years, it still cannot be considered positive. Gradual and long-term decline in the size of zones threatened by air pollution has been recorded. (from 25 400 ha in 2000 to the current 3 439 ha, with annual decline being 206 ha) The same trend exists in the volumes of calamity wood mass as the result of air pollution (decline by 124 tous. m^3 compared to 1993, and by 173 thous. m^3 compared to 2000. Annually, however, there has been a slight increase by 15 thous. m^3). In 1993, damage caused by wood-boring insects was 565.2 thous. m^3. Gradual increase of damage has been recorded since 2000 (324.4 thous. m^3) with climax in 2009. Since then, calamity caused by wood-boring insects has been declining. Annually, the scope of damage increased again by 27.5 thous. m^3, reaching the present 2 436.9 thous. m^3 of damaged wood matter. Due to adverse impacts by winds, 1 010.36 thous.m^3 of wood matter was damaged (79.4% of all abiotic agents),**

which is a decline by 726.5 thous. m^3 compared to the previous year, and an increase by 1 129.6 thous. m^3 compared to 2000. In the long run, however, there have been recorded irregular fluctuations in the damage by wind. As to the trees damaged by defoliation, compared to 2011, the share of trees in the defoliation categories of 2 - 4 (defoliation of trees between 26 – 100%) has grown by 3.2% in all the tree types. However, from the long-term perspective, this trend in forest damage can be looked at as fluctuations. The situation is still worse than the European average.

Industry

♦ Industry structure

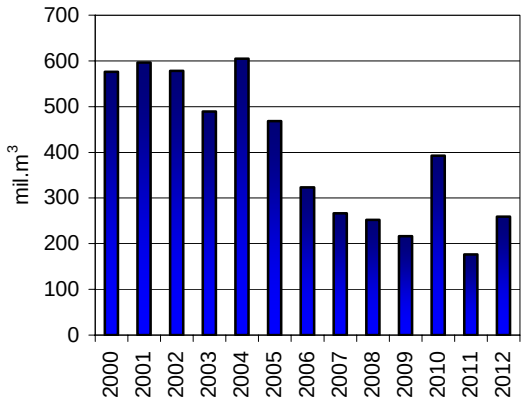
Industrial production includes four basic categories, based on the Revised classification of economic activities (SK NACE Rev. 2): **B** - Mining and quarrying, **C** - Manufacturing, **D** - Electricity, gas, steam and air-condition supply, **E** - Water supply, sewerage, waste management and remediation. Classification of economic activities pursuant to SK NACE Rev. 2 began to be applied since 01.01.2008.

♦ Demand of industrial production on the exploitation of resources

In 2001, industry contributed with 35.8% to the final energy consumption within the national economy. Share of the industry in the final energy consumption declined to 34.7% in 2011. In 2011, compared to 2001, there was a decline in the final energy consumption in industry by 14.7%. (within the whole national economy, decline in the final energy consumption was by 12.1%)

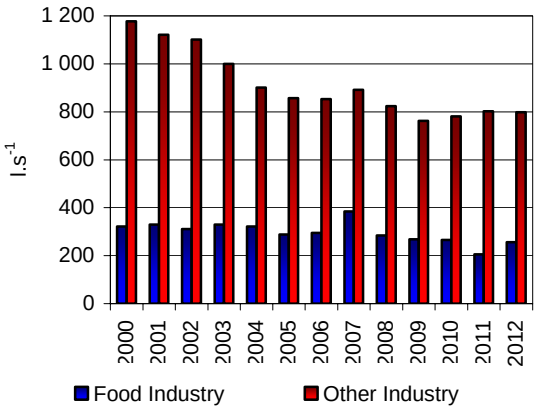
Surface water abstraction by industry in 2012, compared to 2011, declined by 46.8 % and represented 79.4% of all abstractions. Trend in **groundwater abstraction** by industry shows a decreasing tendency. In 2012, compared to 2000, there was a decline in groundwater abstraction in the food industry by 20.1%, and by 32.2% in other industries. Compared to the previous year, there was an increase in groundwater abstraction in the food industry by 24.4 %, and a decline by 0.5 % in other industries.

Development in consumption of surface water in industry (mil.m^3)



Sourcej: SHMI

Advancement in underground water consumption in industry (l.s^{-1})

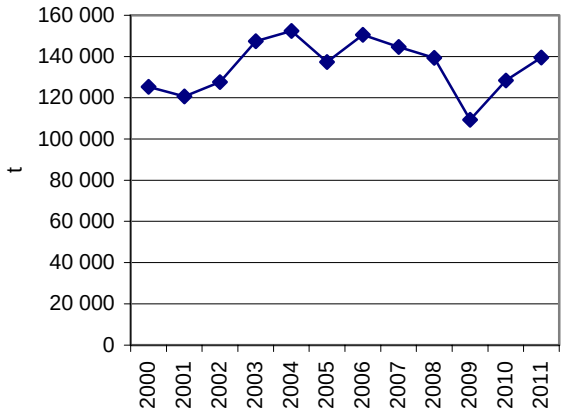


Source: SHMI

♦ Impact of industrial production on environment

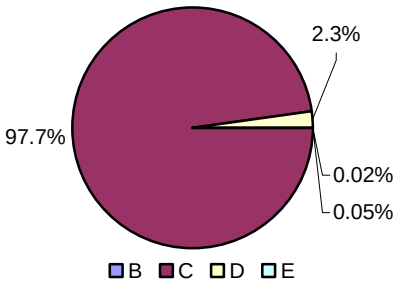
CO emissions from industry in 2011 made up as much as 98.8% of large-size and middle-size stationary sources, and emissions **increased** by 11.5%, compared to 2000. In 2011, the CO emissions from the industry in the previous year increased by 8.8%.

CO emissions trend from stationary industrial sources



Source: SHMI

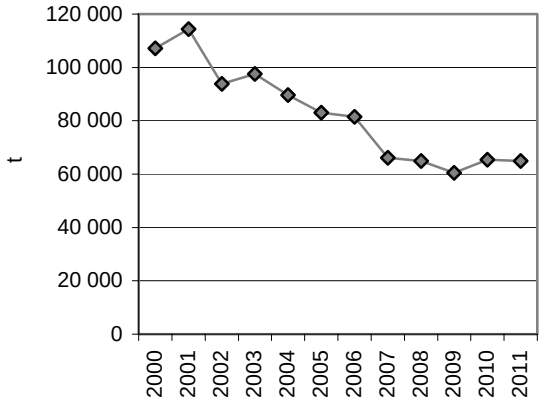
Share of CO emissions from stationary industrial sources on the overall CO emissions in 2011 (%)



Source: SHMI

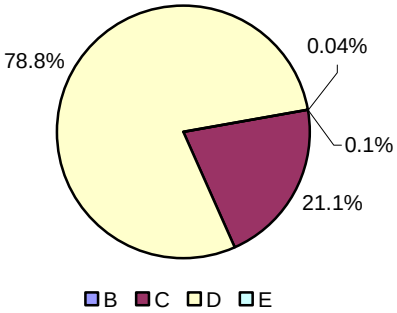
SO_2 emissions from industry in 2011 made up as much as 99.6% of large-size and middle-size stationary sources, and emissions **decreased** by 39.5%, compared to 2000. In 2011, SO_2 emissions from industry in the previous year decreased by 0.8%.

SO_2 emissions trend from stationary industrial sources (t)



Source: SHMI

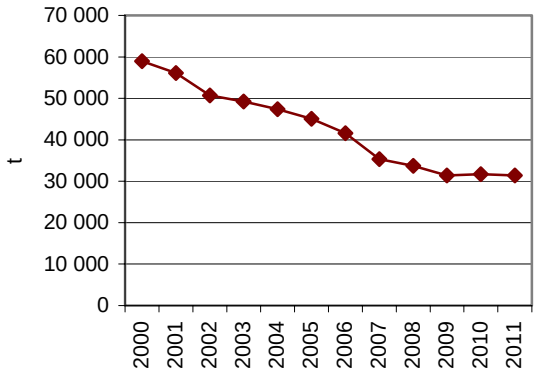
Share of the SO_2 emissions from stationary industrial sources on the overall SO_2 emissions in 2011 (%)



Source: SHMI

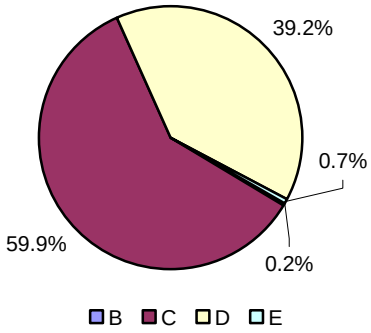
NO_X emissions from industry in 2011 made up as much as 89.9% of large-size and middle-size stationary sources, and emissions **decreased** by 46.8%, compared to 2000. In 2011, NO_X emissions from industry in the previous year decreased by 0.1%.

NO_X emissions trend from stationary industrial sources (t)



Source: SHMI

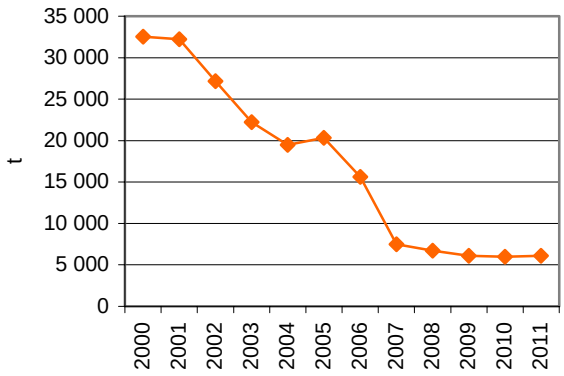
Share of the NO_X emissions from stationary industrial sources on the overall NO_X emissions in 2011 (%)



Source: SHMI

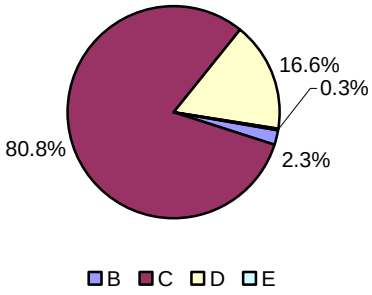
PM emissions from industry in 2011 made up as much as 93% of large-size and middle-size stationary sources, and emissions **decreased** by 81.3%, compared to 2000. In 2011, PM emissions from industry in the previous year increased by 2.1%

PM emission trend from stationary industrial sources (t)



Source: SHMI

Share of the PM emissions from stationary industrial sources on the overall PM emissions in 2011 (%)



Source: SHMI

Heavy metal emissions by industry have had a decreasing tendency since 2000. Nevertheless, in 2011, compared to previous year, there was an increase in the emissions of As, Cu, Pb and Zn from industrial incineration processes.

Aggregated greenhouse gases emissions from industrial processes showed a fluctuating trend. In 2011, when compared with 1990, greenhouse gases emissions from industrial processes dropped by 13.6%, and by 4.3% when compared with the previous year.

In 2011, **industry alone generated 4 671 843 tons of waste,** including **287 847 tons of hazardous waste** and **4 383 996 tons of other waste**.

Most common **losses of agricultural land** to industrial construction were recorded in 2009 (805 ha). In **forestland,** greatest losses to industrial construction were recorded in 2001 (18 ha). In 2012, losses of agricultural land to industrial construction accounted for 78 ha, while forestland lost 2 ha.

Extraction of minerals

♦ Trend in extraction of minerals

In 2012, there were in Slovakia registered 910 industrial mineral deposits of which 3 256.57 kt of industrial minerals were extracted (in 2011 the number was 3 495.02 kt), including 2 093.80 kt of brown coal and lignite (2 159.98 kt in 2011), 15.20 kt of crude oil and gasoline (18.11 kt in 2011), 1 162.77 kt of ores, magnesite, salt, and other minerals (1 335.06 kt in 2011), as well as 97 846 thous.m^3 of natural gas (97 929 thous.m^3 in 2011) . Surface extraction yielded 29 962.84 kt of minerals (34 951.12 kt in 2011), including 22 702.80 kt for construction (building stone, gravel sands and sands, brick clays – 24 701.92 kt in 2011), 7 135.10 kt of limestone (8 436.30 kt in 2011) and 1 799.60 kt of other minerals (1 812.90 kt in 2011).

This suggests that in 2012, compared to 2011, there was a continuing extraction of minerals, especially on the surface, and the increase has been only slight for some minerals. (ballasts and sands, brick raw material) Building stone showed the greatest reduction in extracted volumes (by more than 3 mil. t), followed by limestone and cement raw material. (by appr. 600 kt)

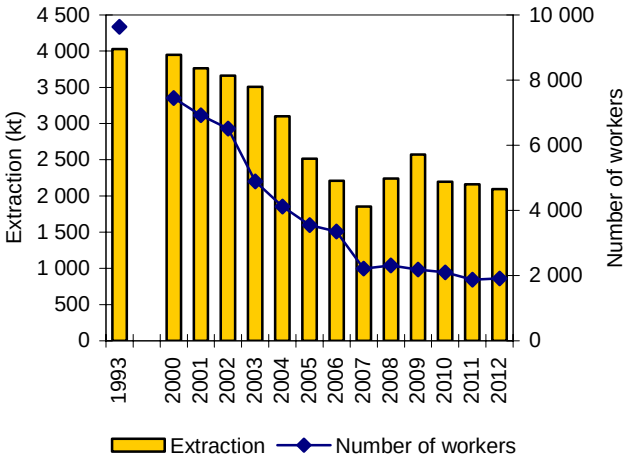
Trend in extraction of minerals

Extracted mineral	Measure unit	2006	2007	2008	2009	2010	2011	2012
Brown coal and lignite	kt	2 208.59	1 851. 56	2 242.82	2 573.71	2 196.45	2 159.98	2 093.80
Crude oil including gasoline	kt	30.5	24. 49	20.80	15.55	15.84	18.11	15.20
Natural gas	thous. m^3	136 881	500 550	111 823	106 668.00	109 493.15	97 929.00	97 846.00
Ores	kt	741.95	666.57	479.14	64.59	60.10	50.14	63.81
Magnesite	kt	1 467.80	1503.60	1 438.50	859.96	1 221.50	1 196.60	1 008.46
Salt	kt	122.50	116.76	99.31	41.40	0.02	0.02	0.00
Building stone	thous. m^3 (since 2009 kt)	6 309.20	6 528.40	7 789.11	17 552.60	17 165.30	15 373.39	12 076.80
Gravel sands and sands	thous. m^3 (since 2009 kt)	5 502.87	5 113.50	6 979.40	10 331.51	8 488.14	8 899.33	10 170.70
Brick clays	thous. m^3 (since 2009 kt)	508.00	1 011.70	512.74	523.50	351.30	429.20	455.30
Limestone and cement raw materials	thous. m^3 (since 2009 kt)	673.50	627.10	757.40	2 529.30	2 982.30	2 893.90	2 293.30
	kt	1 709,10	1 574.84	1 831.50				
Limestone for special purposes	thous. m^3 (since 2009 kt)	67.0	90.30	136.10	1 414.40	1 591.80	1 735.40	1 386.80
	kt	1 243.60	1 175.70	862.50				
High-content limestone	kt	4 393.00	4 362.00	4 035.80	3 714.83	3 700.70	3 807.00	3 455.00
Other minerals	thous. m^3 (surface)	436.60	476.73	490.71	-	-	-	-
	kt (under-ground)	115.30	139.40	140.60	132.46	87.70	88.30	90.50
	kt (surface)	856.40	880.60	931.80	1 655.30	1 752.40	1 812.90	1 799.60

Source: MMO SR

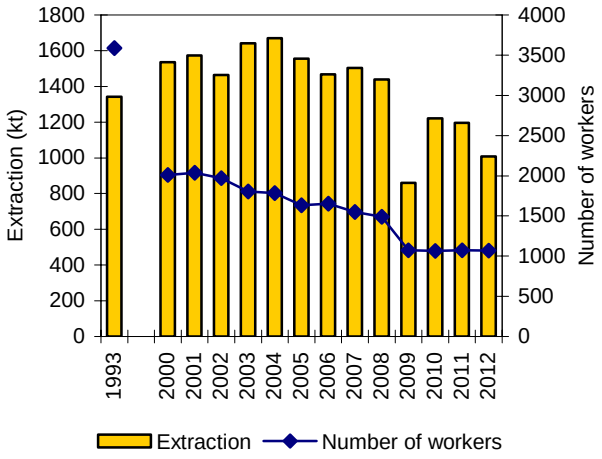
Basic indicators of mineral extraction trend in SR

Trend in brown coal and lignite extraction



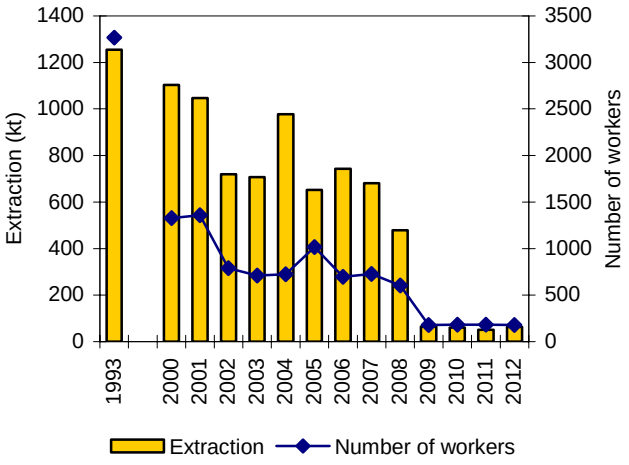
Source: MMO SR

Trend in magnesite extraction



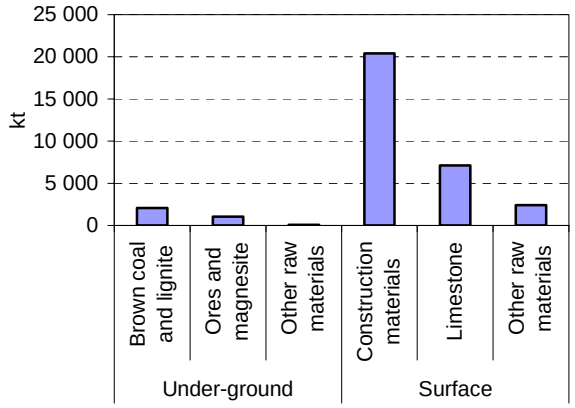
Source: MMO SR

Trend in ores extraction



Source: MMO SR

Total extraction of minerals in 2012



Source: MMO SR

♦ Environmental impact of mineral exploitation

As of December 31, 2012, local mining authorities monitored the total number of 127 dumps, 89 in extraction site (77 active and 12 inactive) and 38 inactive outside extraction site (36 active and 2 inactive). The territory with located dumps is 247.48 ha. There were monitored also 41 tailing dumps, 20 in extraction site (12 active and 8 inactive) and 21 outside in extraction sites (13 active and 8 inactive) **tailings dumps**. The territory with located tailing dumps is 181.95 ha.

Since 2009, provisions of **Act 514/2008 Coll. on handling of waste from extractive industry and amendments to selected laws** have been fully implemented. This Act regulates the rights and obligations of legal and natural persons - small businesses responsible for handling waste from extraction activities, including its temporary storage during the operation phase of the repository, roles of the national administration authorities in extractive industry waste handling, as well as liability for non-compliance with the legislation.

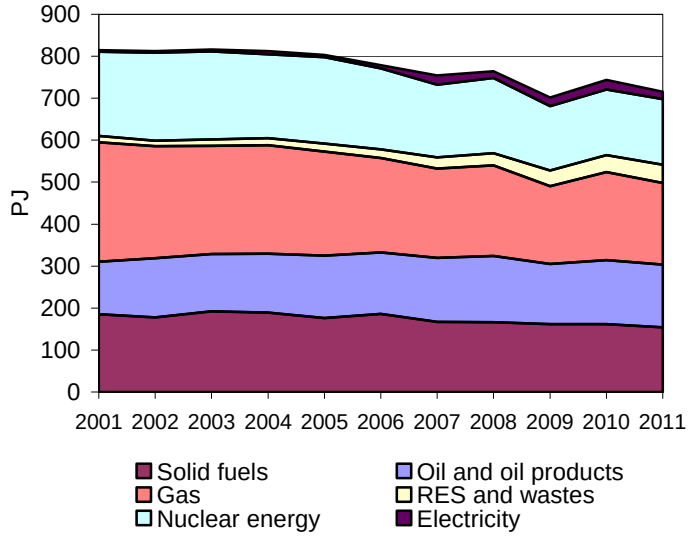
Power engineering, Heat production and Gas management

- **Energy sources balance**

Considering the natural conditions and the country´s current technological possibilities, Slovakia is poor on **primary energy sources** (PES). Almost 90% of PES is imported from the territories outside the internal EU market (Russia, Ukraine). Most significant domestic energy source is brown coal and lignite. Of all renewable energy sources (RES), biomass and water energy contribute the most to the primary production. Dependence of Slovakia on import in 2011 was 64.2%.

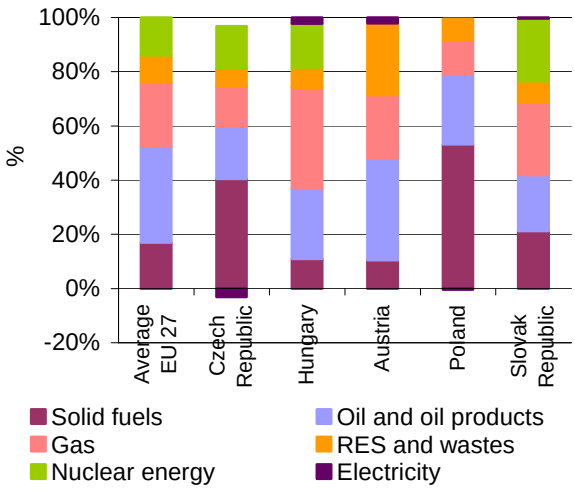
Structure of used PES in Slovakia in the years 2001-2011 was characteristic for a reduced consumption of solid and gas fuels, and heat. Also, electricity consumption was reduced. On the contrary, consumption of liquid fuels and renewable energy sources increased. Utilisation of nuclear fuels in recent years plays an exceptionally significant role in the PES structure of the Slovak Republic. **Gross inland energy consumption** in 2011 reach the level of 715.6 PJ, which is approximately 3.7% decline compared to 2010. This decline is a positive signal for meeting the energy strategy target - reducing the energy demand of the Slovak economy. Over the years 2001-2011, gross inland energy consumption declined by approx. 6.8%.

Trend in used primary energy sources in the SR



Source: SO SR

Structure of primary energy sources in 2011 – international comparison



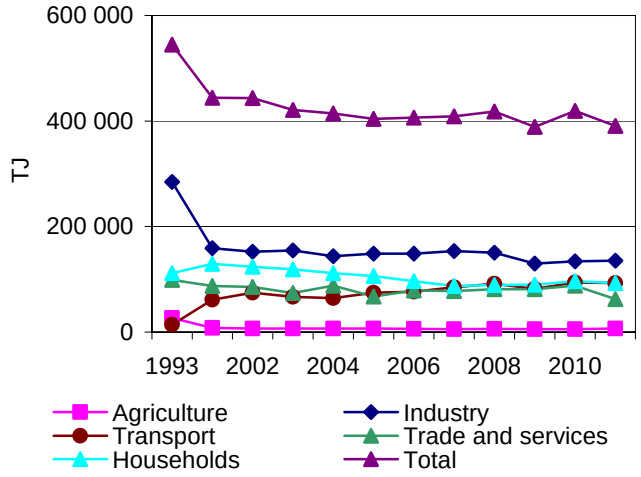
Source: Eurostat

Gross inland energy consumption per capita in Slovakia is still lower than the average consumption in the EU 27 and still remains below 95% of the EU average.

Final energy consumption by sectors was fluctuating and mostly declining in the period of 2001-2011**.** In 2011, final energy consumption declined compared to 2001 by approx. 12.1%. Compared to 2010, its annual decline was by 6.8%. Greatest share in total energy consumption in 2011 was recorded by industry (34.7%) followed by three sectors: households (23.8%), transport (23.7%), and trades and services (16.1%). The lowest share, only 1.7%, was recorded in agriculture. Rising trend

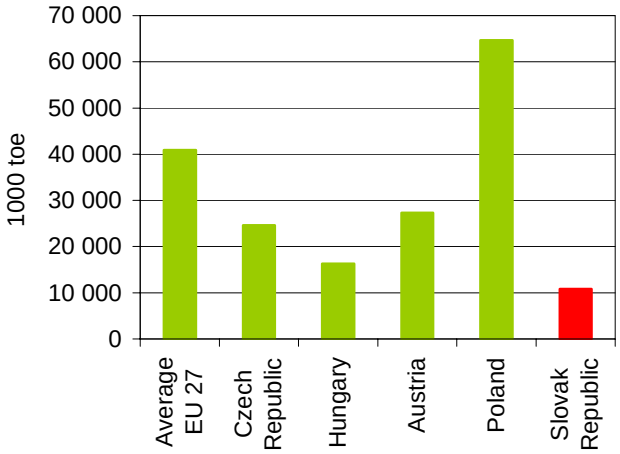
over the monitored period of 2001-2011 was shown in the sector of transport (increase by 50.9%). Consumption in other sectors since 2001 has been declining, despite slight fluctuations. Compared to other EU countries, there is a relatively low consumption by inhabitants.

Trend in final consumption of energy, fuels, electricity and heat in the sectors of economy



Source: SO SR

Final energy consumption in 2011 – international comparison

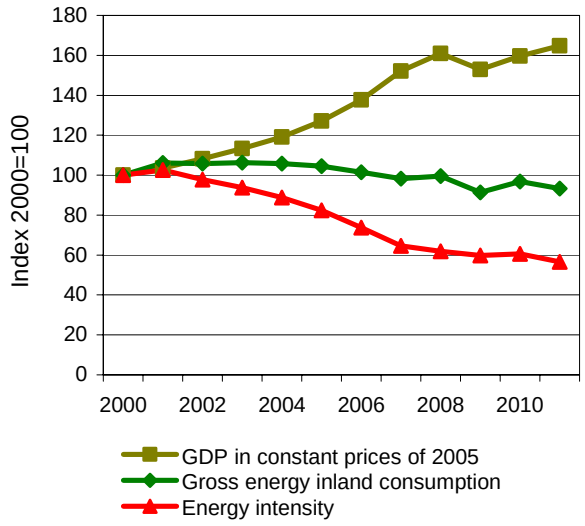


Source: Eurostat

- **Energy intensity**

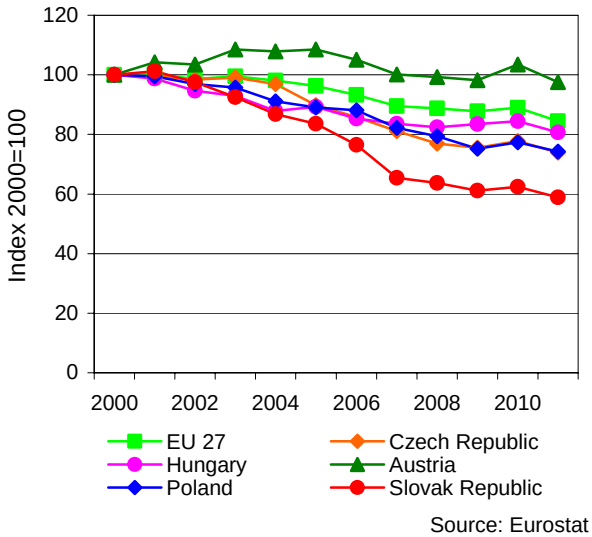
Energy intensity (EI) is an important economic indicator also used to make international comparisons. It is defined as the share of the gross inland energy consumption (GIEC) on the generated GDP (GEIC/GDP=EI). Since 2000, **energy intensity** has been declining every year. By 2011, it dropped by more than 43%. Despite this decline, Slovakia showed the highest energy demand among the EU 27 in the years 2005-2010. In 2011, energy demand in Slovakia was approximately 1.5 times higher than the EU 27 average.

Trend in energy intensity, GIEC and GDP in SR



Source: SO SR

Energy intensity in 2011 – international comparison



Source: Eurostat

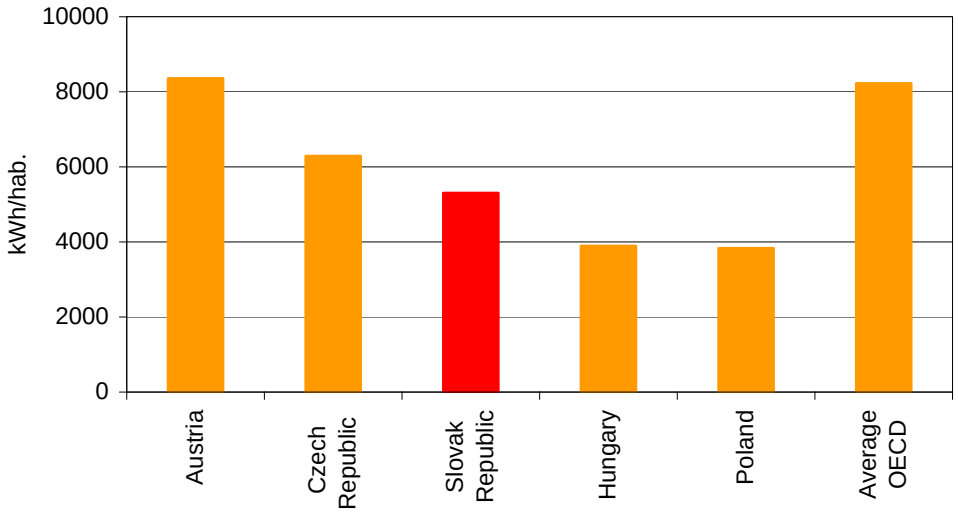
- **Electricity power management**

In 2012, **total electricity consumption** in Slovakia reached the volume of 28 786 GWh. Compared to 2011, it declined by 76 GWh. Decline of electricity was thus by 0,26 %. Historical trend in electricity consumption in the years 2010 to 2012 can be seen as stagnating. Annual maximum load reached the value of 4 395 MW (annual growth by 116 MW).

The highest growth in consumption has been recorded in the area of **trades and services**, with the second highest share in the final electricity consumption among all sectors (approx. 33%). Industry shows the highest electricity consumption, with more than a 45% share.

Compared to the developed OECD countries, Slovakia shows **electricity consumption** per capita lower by approximately one third.

Electricity consumption per capita in 2011 - international comparison



Source: IEA

Volume of **produced electricity** in 2012 was 28 393 GWh. Compared to 2011, electricity production grew by 258 GWh, which represents a 1.0% growth in production. In the long run, nuclear power plants have the most dominant share in electricity production in Slovakia, with 54.6% in 2012. In 2011, they were followed by fossil thermal power plants (18.4%), hydroelectric power plants (15.3%), and so-called other power plants showed the share of 11.7%.

- **Gas management**

Natural gas consumption in Slovakia reached the level of 5.2 bil.m^3 in 2012. Import takes up about 98% of domestic consumption.

In 2009, the market with gas practically opened, and a number of companies launched their activities in the area natural gas supplies to industrial consumers. Since 2011, companies began to supply natural gas also to households.

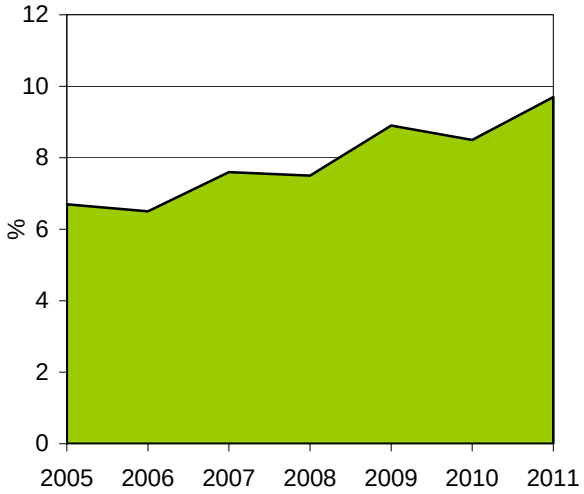
- **Renewable energy sources (RES)**

Slovakia adopted a national target to increase the share of renewable energy sources in gross final energy consumption by 2020 to 14% compared to 2005 when the share was 6.7%.

Over the years 2006 to 2011, share of energy produced from renewable energy sources grew by more than 49%. In 2011, share of the energy produced this way reached the value of **9.7%.** Despite the growing trend, Slovakia is still below the EU 27 average where the share of energy from RES in 2011 was 13%. Of all this mix, biomass use for energy showed the greatest share (almost 70%).

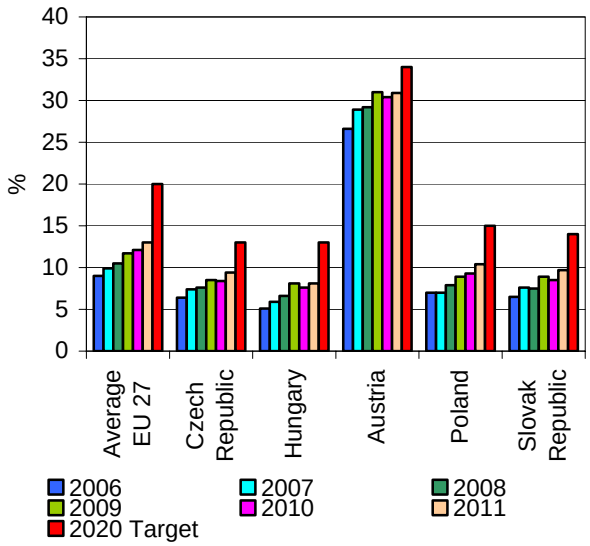
In 2011, 17.01% of the produced energy came from renewable energy sources. Compared to 2000 when the share of electricity produced this way was 16.9%, this is only a negligible increase. Hydroelectric power plants have the greatest share (more than 90%) in electricity production from among all the RES. For this reason, the volumes of electricity produced from RES in Slovakia is fully dependent on favorable hydrological conditions.

Trend in share of renewable energy in gross final energy consumption



Source: Eurostat

Share of renewable energy in 2011 – international comparison



Source: Eurostat

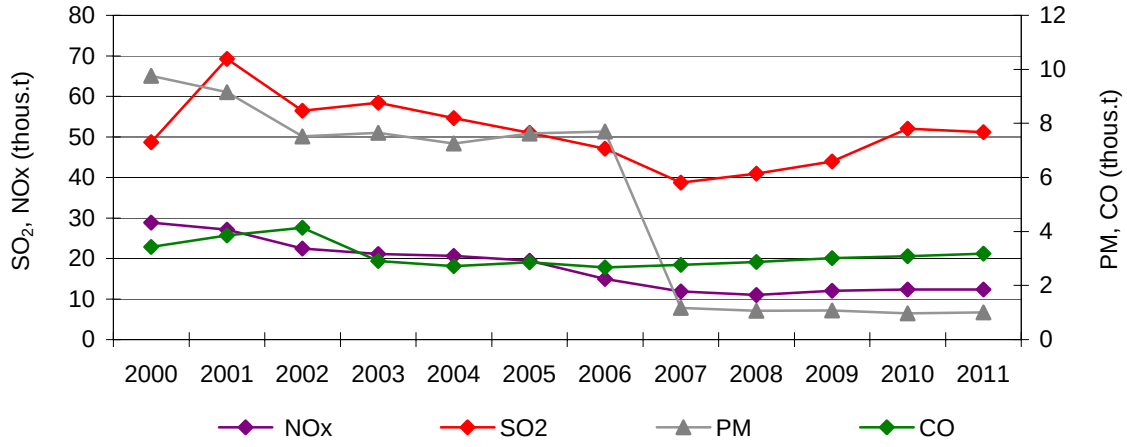
- **Impact of power engineering, heat and gas management on the environment**

Power industry shows the greatest share by **greenhouse gases emissions** that in 2011 (including transport with the share of 20.2%) represented 70% (31 533.37 Gg of CO_2) of total greenhouse gases emissions in Slovakia. By 2011, greenhouse gases emissions from power industry declined by 41.47%, compared to 1990. This was caused by an increased share of services in GDP creation, as well as by a higher share of natural gas within the fuel base, and by structural changes and declining energy consumption by energy intensive sectors.

Energy production and consumption is accompanied by the **production of basic pollutants**. Until 2007, sulfur oxides (SO_2), nitrogen (NO_X), and particulate matter (PM) emissions were reduced significantly. This situation was caused by decreased production and consumption of energy and a shift in the fuel base toward more purified fuels, as well as by using fuels with better quality characteristics.

SO_2 emissions grew in the period of 2007 to 2010. In 2011, these emissions declined slightly but still remained 5% higher than in 2000. Similarly, CO emissions began to rise (compared to 2007 they grew by 15%) along with nitrogen oxides emissions that grew slightly. PM emissions grew by approx. 4% compared to 2010 and their trend since 2007 has remained balanced.

Trend of basic polluting substances emissions from energy stationary sources in the SR

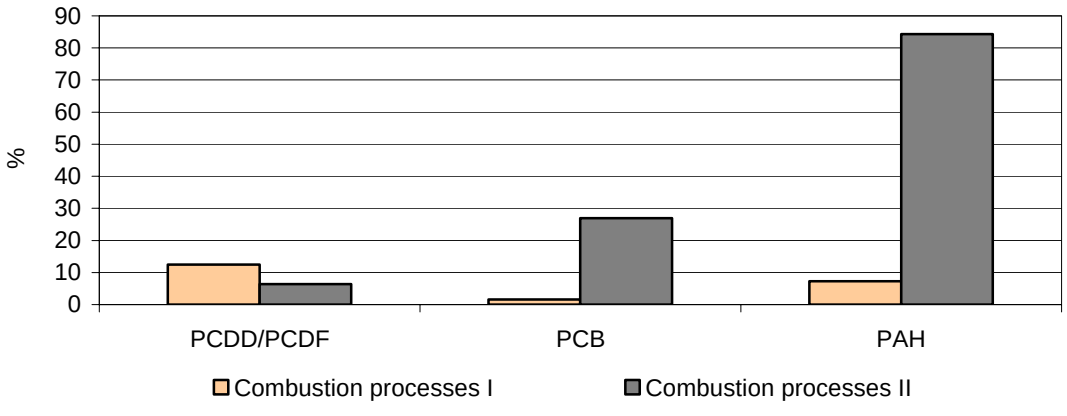


Source: SHMI

Persistent organic pollutants (POPs) and **heavy metal emissions** within the power industry sector also include combustion processes I (systematic power industry, municipal power industry) and combustion processes II (heating of commerce and services, heating of households).

Declining trend in POP emissions was most clearly seen in the 90-ties as a result of changes to aluminum production technologies. In 2011, emissions from combustion processes I declined by approx. 23.4%, compared to 2010. On the contrary, emissions from combustion processes II annually grew by approx. 9%.

Share of POPs emission from sector of energy to overall POPs emission in the SR in 2011



Source: SHMI

In **heavy metal emissions** from combution processes I, the year 2011 with declining emissions of the elements Ni and Se still showed a negative trend in the other heavy metals with the highest increase in As (increase by approximately 15.9%), Pb (increase by 11.7%), Cd (increase by 11.7%), and Hg (increase by 11.3%). As for combustion processes II, emissions declined in As, Cr, Ni, Sn and Mn. Negative trend was recorded in Pb, Cd, Hg, Zn, Se and Cu. In 2011, from among all power industry heavy metals, Mn with 18.6% showed the greatest share in total heavy metals emissions.

Of all areas within the energy sector, electricity power management contributed the most to total volumes of **discharged waste water**. Waste water produced by electric power plants mainly includes water from technological and cooling processes, and also some run-off water. Waste water from technologies is chemically contaminated. In case of nuclear power plants, water from the primary cycle also shows a degree of radio-chemical contamination. Water used as a coolant shows mostly thermal contamination. Compared to 2011, volume of discharged water from the production and distribution of electricity grew from 19 430 thous.m^3 to 93 804 thous.m^3 in 2012. Compared to 2011, volumes of discharged water from the heating industry grew by approx. 19.4%.

Waste water discharged by energy production in 2012 (electricity production and distribution)

Waste water from electricity production	Volume (thousand $m^3.y^{-1}$)	IS ($t.y^{-1}$)	BOD_5 ($t.y^{-1}$)	COD_{Cr} ($t.y^{-1}$)	ENP_{uv} ($t.y^{-1}$)
Treated	11 316.524	114.602	31.426	186.285	0.705
Untreated	80 091.728	30.243	6.475	31.919	0.001
Subtotal	**91 408.252**	**144.845**	**37.901**	**218.04**	**0.706**
Waste water from heat production					
Treated	999.803	10.047	1.350	34.113	0.139
Untreated	1 395.997	7.729	0.000*	5.961	0.003
Subtotal	**2 395.800**	**17.776**	**1.350**	**40.074**	**0.142**

Source: SHMI

In 2012, the sector of energy and gas industries generated 1 045 757.25 tons of **waste introduced to the market,** which represents an increase in production by 10.6%, compared to 2011. Hazardous waste represented only 0.44% (4 603.30 t), while other waste represented 99.56% (1 041 153.96 t). Classification of economic activities shows that this section of economic activities contributed with a 15.1% share to total waste production in 2012.

Transport

♦ Passenger and freight transport

In 2012, **passenger transport** by the public road and railway transportation showed long-term reduction trend in the number of carried passengers. In terms of modal split in road transport, aquatic and railway transports, the numbers have remained at the level of last year. Number of carried passengers along with passenger modal split in air transport recorded a slight increase compared to the previous year. In terms of assessing individual transport types by passenger transport modal split in 2012, individual motor vehicles represented 75%, public road transport showed 13%, railway transport recorded 7%, municipal mass transport 3%, and air transport 2%.

Freight transport and **transport performances** in all freight transport types with the exception of air transport in 2012 remained roughly at the level of the year before. Although there was a slight decline in road freight transport, transport performances recorded a minimum growth compared to 2011. Air freight transport grew to 4 thous. tons. Road transport contributed the most to freight transport outputs (by 76%), followed by railway transport (21%).

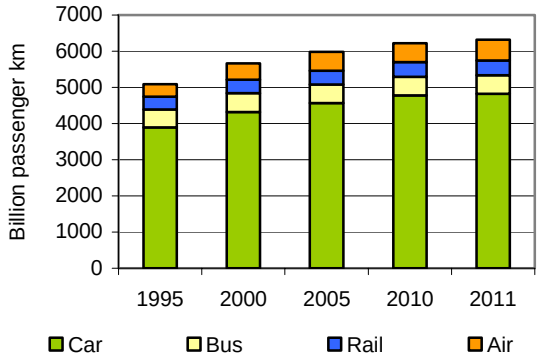
Trends in passenger and freight transport

Indicator	1993	2000	2001	2003	2005	2007	2008	2009	2010	2011	2012
Road transport											
Transport of passenger (thous.)	825 677	604 249	564 078	493 706	449 456	384 637	365 519	323 142	312 717	299 579	289 228
Performances (mill. pass-km)	11 445	8 435	8 051	7 757	7 525	7 596	6 446	4 538	4 436	4 611	4 584
Transport of goods (thous. tons)	37 826	39 680	187 624	174 149	195 405	179 296	199 218	163 148	143 071	132 568	132 074
Performances (mill. tkm)	5 464	7 212	13 799	16 859	22 550	27 050	29 094	27 484	27 411	29 045	29 504
Rail transport											
Transport of passenger (thous.)	86 727	66 806	63 474	51 274	50 458	47 070	48 744	46 667	46 583	47 531	44 698
Performances (mill. pass-km)	4 569	2 870	2 805	2 316	2 182	2 165	2 296	2 264	2 309	2 431	2 459
Transport of goods (thous. tons)	64 825	54 177	53 588	50 521	49 310	51 813	47 910	37 603	44 327	43 711	42 599
Performances (mill. tkm)	14 304	11 234	10 929	10 113	9 463	9 647	9 299	6 964	8 105	7 960	7 591
Water transport											
Transport of passenger (thous.)	134	80	82	321	134	122	122	110	120	111	120
Performances (mill. pass-km)	7	4	4	5	4	4	3	3	3	3	4
Transport of goods (thous. tons)	1 399	1 607	1 551	1 451	1 526	1 806	1 767	2 192	3 109	2 454	2 472
Performances (mill. tkm)	843	1 383	1 015	488	680	843	979	1 230	2 166	1 024	1 078
Air transport											
Transport of passenger (thous.)	34	146	187	428	1 716	3 068	4 176	2 288	554	603	669
Performances (mill. pass-km)	37	246	335	660	2 465	3 699	4 650	3 501	835	878	939
Transport of goods (thous. tons)	5,92	0	0	1	0	0	0	0	0	1	4
Performances (mill. tkm)	0,5	0	0	1	1	1	0	0	0	4	8

Source: SO SR

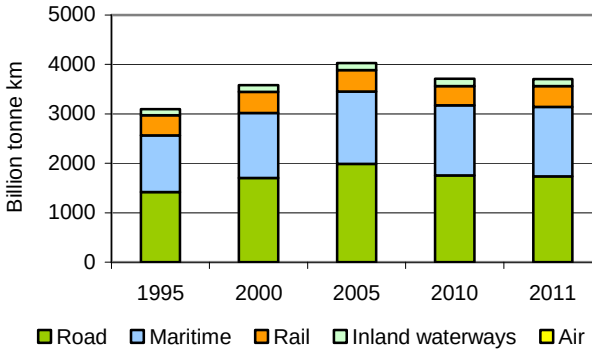
European Commission in 2011 published its third **White Paper: Roadmap to a Single European Transport Area** (hereinafter on Transport 2050) introduced the ambitious plan to increase mobility and reduce emissions. The set goals need to be reached by 2020/2030-2050 and address three modes of transport - transport over middle distances, long distances, and municipal transport. The goal for passenger transport is to reach, by 2050, a situation with the majority of passengers using the rail transport over middle distances. By 2030 it will be necessary to ensure that 30% of road freight transport over 300 km be supplied by other transport modes (e.g. railway transport or water transport), and by 2050 this share should be more than 50%.

Passenger transport volume and modal split within the EU (billion.pkm)



Source: EEA

Freight transport volume and modal split within the EU (billion.tkm)



Source: EEA

City transport enterprises of Bratislava, Košice, Prešov, and Žilina operate the municipal mass passenger transport (MHD). In 2010, lingered decreasing in the number of carried passenger. Buss transportation has over the monitored time period been the major player in passenger transport, followed by tram and trolley buss transportation.

Indicators of city transport

Indicator	1993	2000	2001	2003	2005	2007	2009	2010	2011	2012
Total number of transported passengers (thous.)	525 744	389 263	373 269	394 465	395 064	403 466	389 263	385 594	417 293	388 239
Trams										
Transported passengers (ths.)	188 768	100 871	98 719	104 560	109 101	109 705	100 871	97 739	109 082	98 788
Seat kilometres (mill. km)	2 734	1 793	1 866	1 764	1 822	1 792	1 793	1 782	1 789	1 735
Trolleybuses										
Transported passengers (ths.)	43 346	62 745	53 167	59 034	58 032	60 655	62 745	62 236	65 420	63 281
Seat kilometres (mill. km)	717	1 111	1 008	1 110	1 075	1 104	1 111	1 125	1 228	1 207
Buses										
Transported passengers (ths.)	293 629	225 647	221 383	230 871	227 931	233 106	225 647	225 619	242 791	226 170
Seat kilometres (mill. km)	4 998	3 980	3 996	3 899	3 846	3 839	3 980	4 202	4 028	3 988

Source: SO SR

♦ Number of vehlices

Rising trend in the number of motorised vehicles continued in 2012, by **more than 95 745 pieces** compared to 2011. All categories show an increase in the number of road motor vehicles in 2012. Major modernisation works were carried out in the area of public bus transport, including a continuing modernisation of fleet. This relates to stricter emissions limits (EURO) as well as to the need to make the public transporter more attractive to the passengers, i.e. increase its competitiveness with individual transport.

Number of transport vehicles in railroad and aquatic transport types (most environmental-friendly transport modes for passengers and goods) show declines by individual years.

Number of motor-vehicles by individual types (pcs)

Total number of vehicles	1993	2001	2003	2005	2007	2008	2009	2010	2011	2012
Passenger cars	994 933	1 292 843	1 356 185	1 303 704	1 433 926	1 544 888	1 589 044	1 669 065	1 749 271	1 824 190
Trucks and Pick up vans	101 552	120 399	142 140	160 089	196 141	227 218	246 667	252 866	256 869	259 839
Special vehicles	46 121	36 082	32 033	22 648	18 983	19 675	18 947	20 462	21 953	24 170
Road tractors	-	4 994	8 851	14 141	19 556	21 444	22 655	23 183	24 942	26 139
Buses	12 655	10 649	10 568	9 113	10 480	10 537	9 400	9 350	9 074	8 957
Tractors	65 150	63 422	61 690	46 544	44 098	45 387	45 769	46 092	46 846	47 645
Motorcycles (excl. small)	81 263	46 676	48 709	56 366	63 897	70 318	55 443	59 563	63 859	68 063
Trailers and Semi-trailers (included bus)	167 174	206 627	218 517	188 411	199 329	211 555	218 724	226 333	234 502	241 8223
Others	-	1 507	1 161	101	3 414	7 159	29 959	32 444	34 915	37 150
Total	**1 468 848**	**1 783 199**	**1 879 854**	**1 801 117**	**1 989 824**	**2 158 181**	**2 236 608**	**2 339 358**	**2 442 231**	**2 537 976**

Source: SO SR

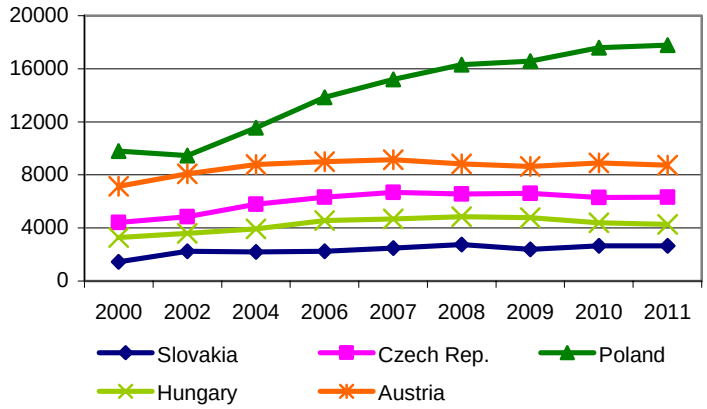
♦ Transport infrastructure

In 2012, the SR transport network included **18 017 km of roads and motorways**. Highways represented 419 km and length of local communication was 25 351 km of the network. The length of **railways** was **3 631 km**, with 1 586 km of electrified tracks. The length of **navigable watercourses** remained unchanged at **172 km**, with channel length of 38.45 km.

♦ Demand of transport on the utilisation of resources

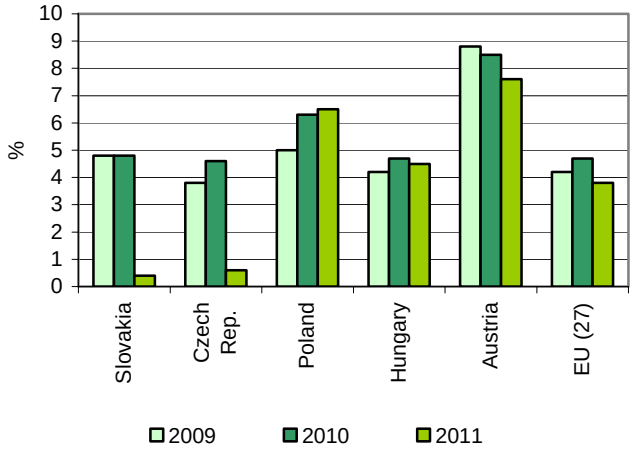
Final energy consumption in the transport sector over the period of 15 years has more than doubled itself. Overall consumption of liquid fuels (97 %) represents the greatest share of energy consumption in the transport sector on the overall energy consumption, while the share of solid fuels, gaseous fuels and electricity overall consumption remains small. Road transport shows the greatest share on the consumption of liquid fuels in the transport sector, on the contrary, proportion of the end electricity consumption in the sector of transport is by the railway transport.

Comparison of final energy consumption by transport in selected countries (1 000 toe)



Source: Eurostat

Share renewable energy in fuel consumption of transport (%)

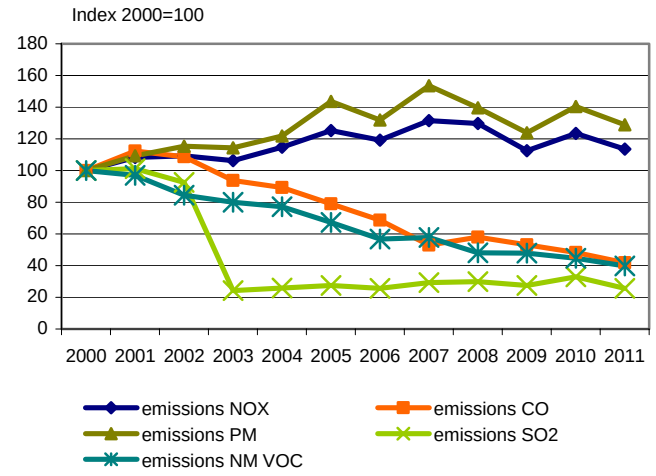


Source: Eurostat

♦ Impact of transport on environment

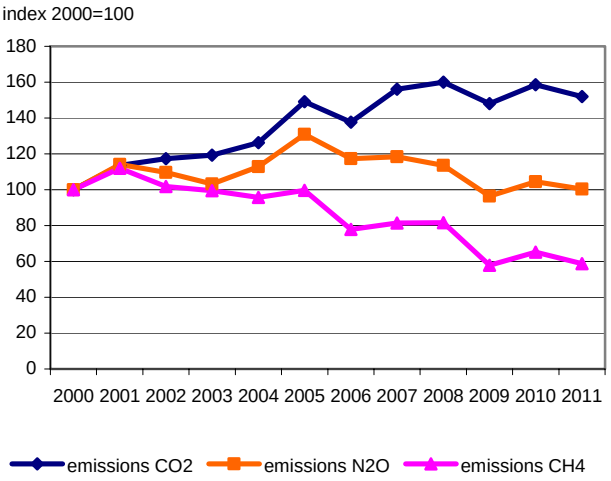
The CORINAIR methodology has been used to determine production volumes of individual monitored harmful substances in the EU countries. Its unique programme product called COPERT is designated to assess and evaluate the annual emission production from road transport. Basic pollutants emissions from transport in 2011 decline and have receved the level of 2009.

Trends in emissions of air pollutants from transport in SR



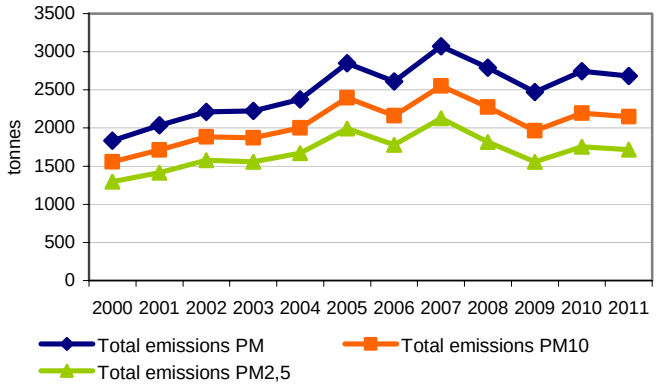
Source: SHMI

Trends in GHG emissions from transport in SR



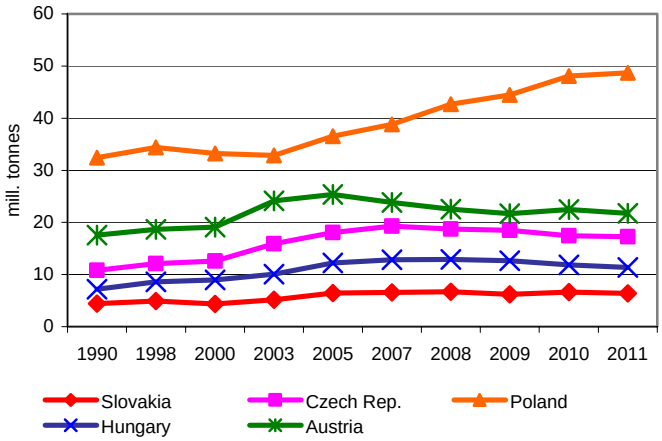
Source: SHMI

Total Particulate Matter emissions ($PM_{2,5}$ and PM_{10}) from road transport in period 2000 - 2011 (tonnes)



Source: SHMI

Total GHG emissions from transport in Europe (mill. tonnes)



Source: Eurostat

In terms of transport's share on total emissions of the assessed pollutants for 2011, significant is transport's share on CO emissions – 25%, 49% in case of NO_x and 10% in case of NM VOC. Solid pollutants represented 7.6% of all emissions in 2011, while the SO_2 emissions showed 0.32%. Transport's share on heavy metal emissions is approximately 7.6%, with copper showing the greatest share on heavy metal emissions by transport (18.1%) followed by zinc (7.9%), and lead (5.0%). Similarly, in case of other heavy metals there was a slight increase in the values of the recorded emissions, compared to the previous year.

In the sector of road transport, Slovakia has not been able to stabilise the rising trend in greenhouse gases emissions. Share of emissions within the sector of transport on total produced greenhouse gases emissions in 2011 was approximately 14% (when expressed in CO_2 equivalents). While the share of emissions from stationary sources declines, share of emissions from transport still continues to grow. Since 1990, emissions from transport have grown by 27 % and in 1990 reached only 9 %.

Within the area of transport and transport routes in 2012, 112 606 tonnes of **waste** were produced, of which 11 994 tonnes were hazardous waste, and 100 612 tonnes were other types of waste. This represents a decrease by 12 587 tonnes, compared to the previous year.

Directive 2002/49/EC of the European Parliament and of the Council relating to the assessment and management of environmental noise, calls for the creation of noise maps. The Directive initiated the approval of **Act no. 2/2005 Coll. on the assessment and control of noise in the external environment.**

The mentioned Directive calls for an on-going periodic monitoring of road transport noise, noise from the railway transport and from industrial activities, and from large-size noise sources within the territory every 5 years.

The findings show that 84 700 of Slovak inhabitants have been exposed to road transport noise where the value of 60 dB is exceeded. 126 400 of Slovak inhabitants have been exposed to the noise above 60 dB that comes from the railway transport, while 500 inhabitants are exposed to an excessive

noise from the air transport. Noise studies are done at the planning stage of new transport infrastructure in order to minimize the noise load on the public, and noise wall barriers are built. In 2010, **13 749 m** of noise wall barriers were built in the **road transport**, while **8 517 m** of them were built in the **railway transport.**

♦ Traffic accident rate

"Strategy for increasing the road traffic safety in the Slovak Republic for the years 2011 to 2020" has been the strategic document approved in 2011. With its activities and measures, the Strategy aims to minimise the losses of human lives and material damages. Its target is to reduce the number of fatal traffic accidents by 2030 by 50%, compared to 2010.

In 2012, there was a slight reduction in the number of traffic accidents. The same trend exists in traffic accidents analysis, with reduced number of traffic casualties, heavily injured, and injured, compared to 2011.

Trend of traffic accidents in SR

Indicators		1993	2000	2002	2004	2006	2007	2008	2009*	2010*	2011*	2012*
Traffic accidents	Number of accidents	50 159	50 930	57 060	61 233	62 040	61 071	59 008	25 989	21 611	15 001	13 945
	Killed	584	626	610	603	579	627	558	347	345	324	296
	Heavily injured	2736	2 205	2 213	2 157	2 032	2 036	1 806	1 408	1 207	1 168	1 122
	Lightly injured	8 682	7 891	8 050	9 033	8 660	9 274	9 234	7 126	6 943	5 889	5 316

*since 2009 methodology changed

Source: ŠO SR

Agriculture

♦ Structure of agricultural land

In 2012, **total area of agricultural land in Slovakia was 2 405 971 ha.** Analysis of the changes to overall values of land types for the year 2012 as compared to 2011 suggests that the **loss** of agricultural land in 2012 (-4 841 ha) when compared with 2011 (-3 479 ha) is higher by 1 362 ha. Trend in the soils of Slovakia in 2012 has been affected by further **loss of** agricultural land types and arable land types**,** giving way to forestland, non-agricultural, and non-forested land types.

Structure of the agricultural land (state to the date 31st December 2012)

Type of land	Area(ha)	Share of agricultural land (%)
Agricultural land total	2 405 971	100.00
Arable land	1 413 739	58.76
Hop-fields	515	0.02
Vineyards	26 964	1.12
Gardens	76 568	3.18
Orchards	16 861	0.70
Permanent grassland	871 324	36.22
Total area of SR	**4 903 557**	**-**

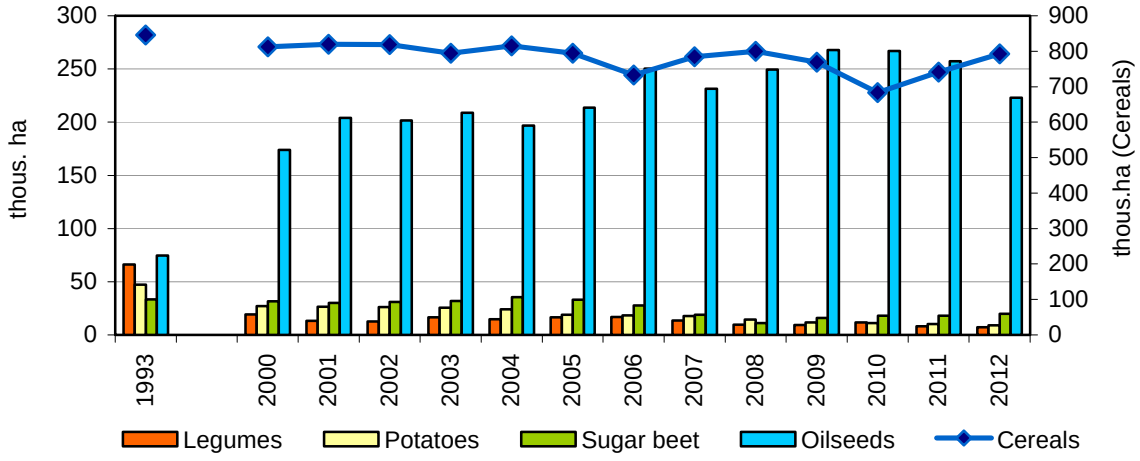
Source: GCCA SR

In 1970, the size of arable land represented 0.37 ha per capita, in 1990 it was 0.28 ha, and 0.2613 ha in 2012.

♦ Plant production

In 2012, **harvest areas of legumes, oilseeds and potatoes** decreased on an annual basis. Harvest areas of grains and sugar cane increased from year to year.

Harvested areas of agricultural crops



Source: SO SR

Growing genetically modified crop in agricultural production in Slovakia follows the provisions of Act 184/2006 Coll. on growing genetically modified crop in agricultural production, and the provisions of

Decree 69/2007 Coll. Central Controlling and Testing Institute in Agriculture in Bratislava (ÚKSÚP) has been the body commissioned to oversee the compliance with this legislation. In 2012, total area of sown authorised **genetically modified corn** resistant to the European corn borer (MON 810) was 188 ha, which represent a decline by 573 ha, compared to 2011.

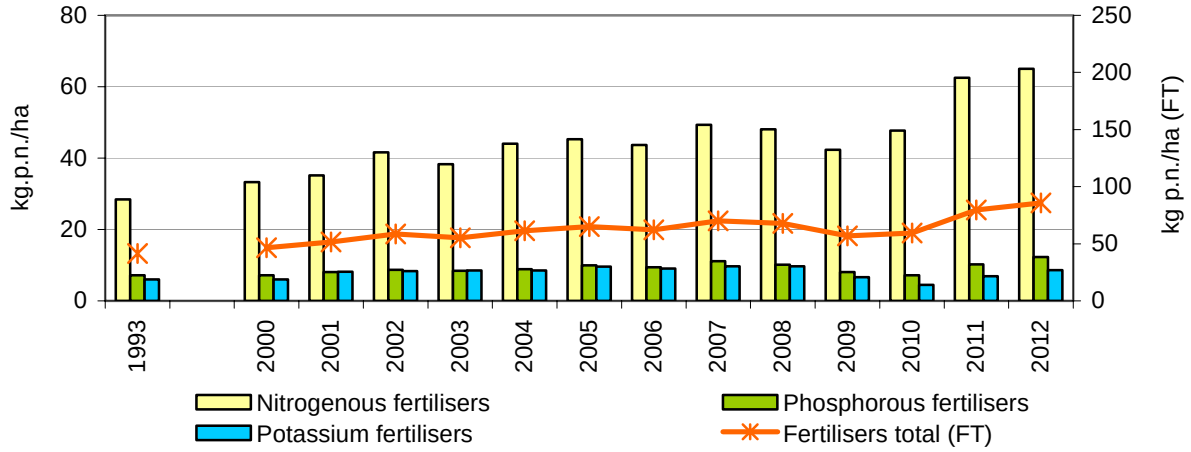
Areas of genetically modified crop in the SR

	2006	2007	2008	2009	2010	2011	2012
Area with sown genetically modified corn (in ha)	33	949	1 942	875	1 249	761	188

Source: CCTIA

In 2012, consumption of industrial fertilisers was **85.8 kg** of pure nutrients per hectare of agricultural land.

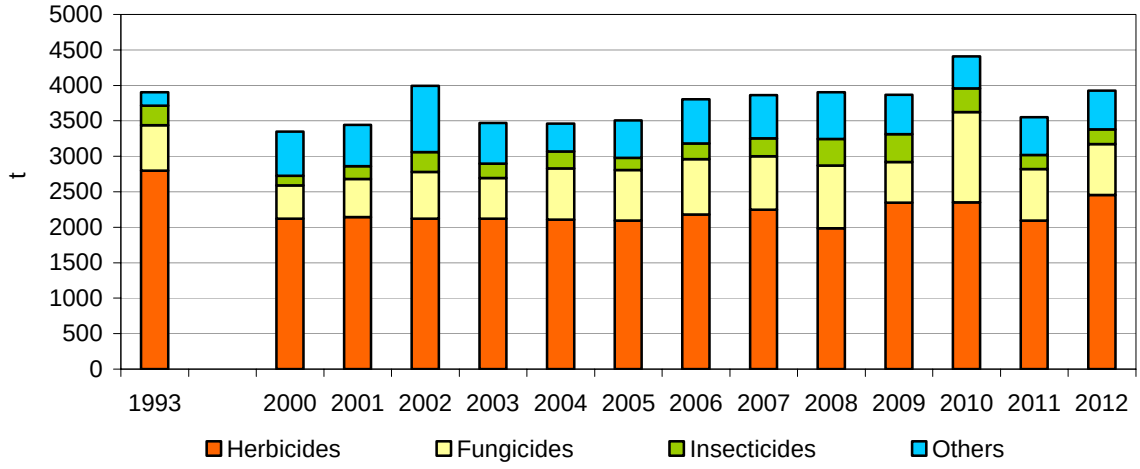
Fertilisers consumption



Source: SO SR

Consumption of pesticides in 2012 annually grew by 372 tons when compared to 2011. Altogether, 3 925 t of agents were applied to protect the crop, including 2 457 t of herbicides, 713 t of fungicides, 212 t of insecticides, and 543 t of other agents.

Pesticides consumption



Source: CCTIA

♦ Animal production

In 2012, **the numbers of all livestock grew annually.** Most significant growth was recorded in raising pork and poultry.

Number of livestock

Source: SO SR

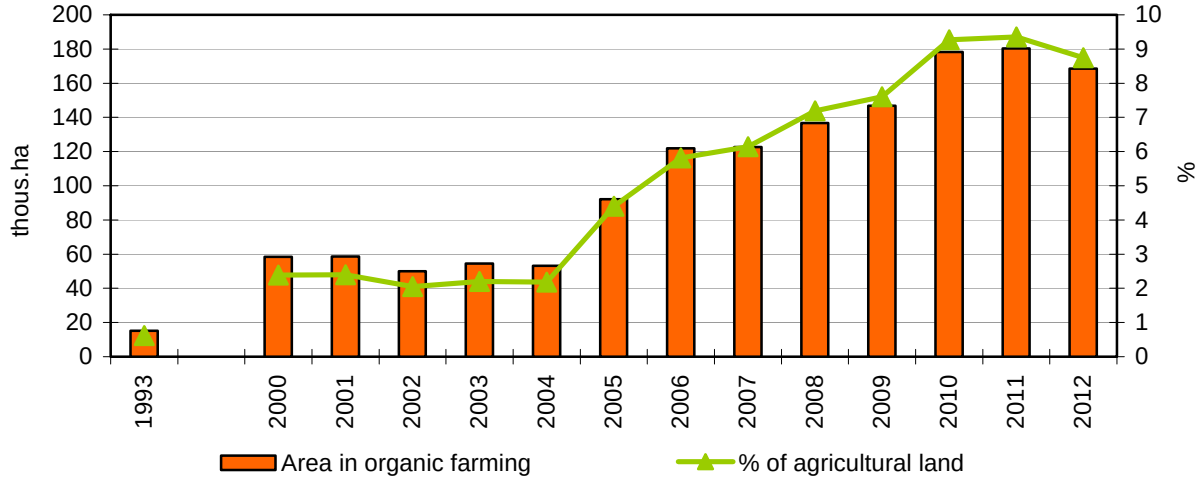
♦ Irrigation

In 2012, **24 847 ha** of agricultural land was **irrigated,** which represents an increase by 11 040 ha, compared to 2011.

♦ Organic farming

In 2012, the system of ecological agriculture in the SR included **362 subjects** operating on **168 602 ha of agricultural land**, which is 8.75% of total agricultural land. Compared to 2011, it is a decline by 11 659 ha.

Trend in the organic farming area



Source: CCTIA

♦ Demand of agriculture on the exploitation of resources

In 2011, there was an annual decline in the consumption of heat, solid, and liquid fuels. On the contrary, increased consumption was recorded on an annual basis in the consumption of electricity and gas fuels.

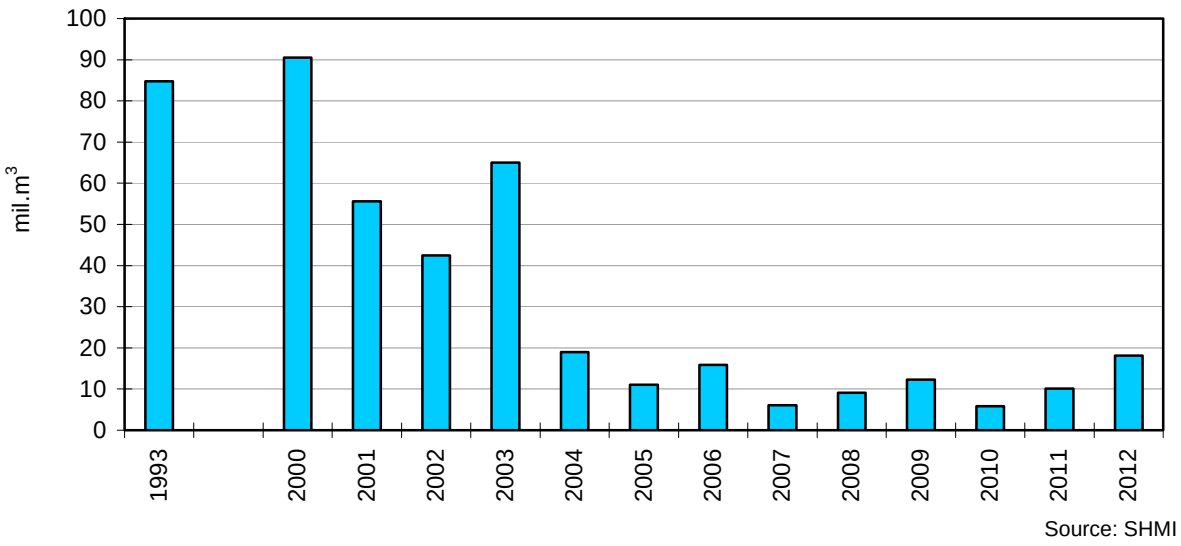
Consumption of selected fuel types, heat, and electricity in agriculture (TJ)

Kind of fuel	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Solid fuel	133	131	82	65	55	58	45	33	33	22
Liquid fuel	2 665	2 987	3 250	3 423	3 000	2 874	3 001	2 703	2 839	2 835
Gas fuel	1 869	1 316	1 781	1 670	1 263	1 137	1 257	1 140	1 340	1 617
Heat	312	323	203	201	189	231	226	187	164	141
Electricity	1 850	1 796	1 530	1 411	1 325	1 278	1 195	1 152	1 030	1 080

Source: SO SR

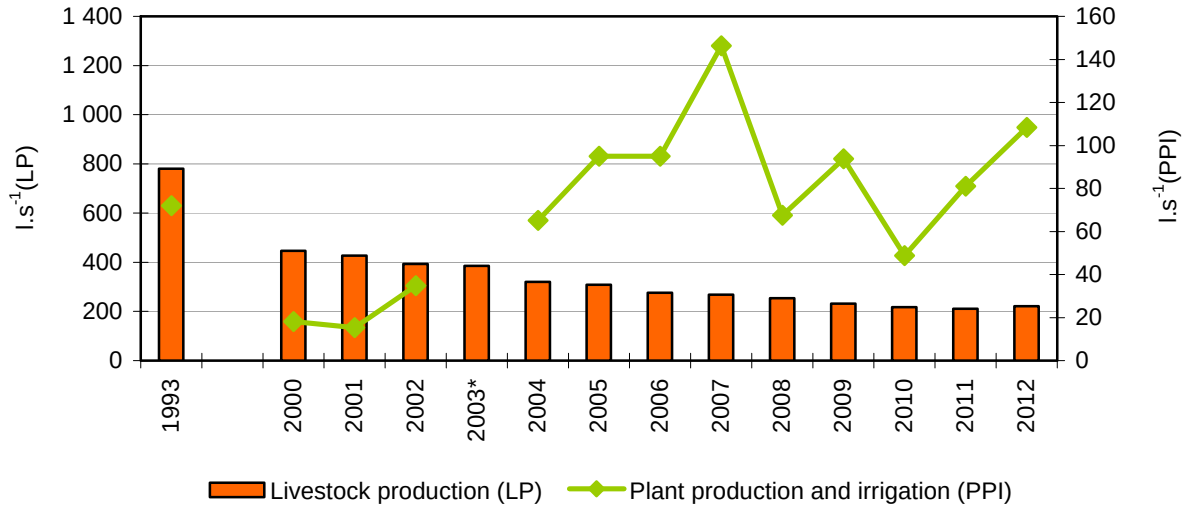
In 2012, surface water abstractions for irrigation reached the value of 18.138 mil.m^3, which is 78.9% more than in the previous year. Volumes of groundwater in agriculture increased by 38.3 l/s in 2012, compared to 2011.

Trend in the use of surface water for irrigation



Source: SHMI

Trend in groundwater use in agriculture



** after 2003 there was a change in the methodology of crop production and irrigation*

Source: SHMI

♦ Production of renewable energy from agriculture

The category of biomass for the production of liquid bio-fuels contains mainly oilseeds and grains that serve for extracting plant oils, along with their derivatives (e.g. plant oils methyl esters, especially rapeseed oil MERO) and alcohols (ethanol, methanol and their derivatives - methyl-tert-butyl-ether (MTBE), ethyl tert-butyl ether ETBE). The category of biomass for the production of gaseous products contains mainly green carbohydrate forage and livestock excrements. In 2012, there were **38 bio-gas production facilities** in operation in Slovakia with total bio-gas production of 98 424 thous.m^3.

From October 1, 2011, Decree of the Ministry of Labour, Social Affairs and Family no 295/2011 Coll. came into effect. The Decree appoints VÚPOP as the organisation that administers and updates the database of areas where the grown biomass designed for the production of bio-fuel or bio-liquid complied with the criteria of sustainability and where at the same time we may expect that greenhouse gases emissions from growing feedstock do not exceed the limits imposed by special provisions.

Total annual production of agricultural biomass suitable for heat production in Slovakia

Crop type	Area (ha)	Yield of biomass (t/ha)	Production of biomass (t/year)
Thick-sown cereals - total	580 482	2.57	1 491 838.74
Maize	212 336	6.61	1 403 540.96
Sunflower	90 121	6.79	611 921.59
Rapeseed	106 389	6.37	677 697.93
Orchards	8 114	3.58	29 048.12
Vineyards	10 492	2.49	26 125.08
Flight from permanent grasslands	76 285	1.95	148 755.75
Total	**1 086 231**	**4.39**	**4 390 940.17**

Source: ATaTI

♦ Impact of agriculture on environment

The sector of agriculture in 2011 contributed with 6.9% to total greenhouse gases emissions. Agricultural production processes produce mainly methane (CH_4), nitrous oxide (N_2O), and less carbon dioxide (CO_2) and halogenated carbohydrates.

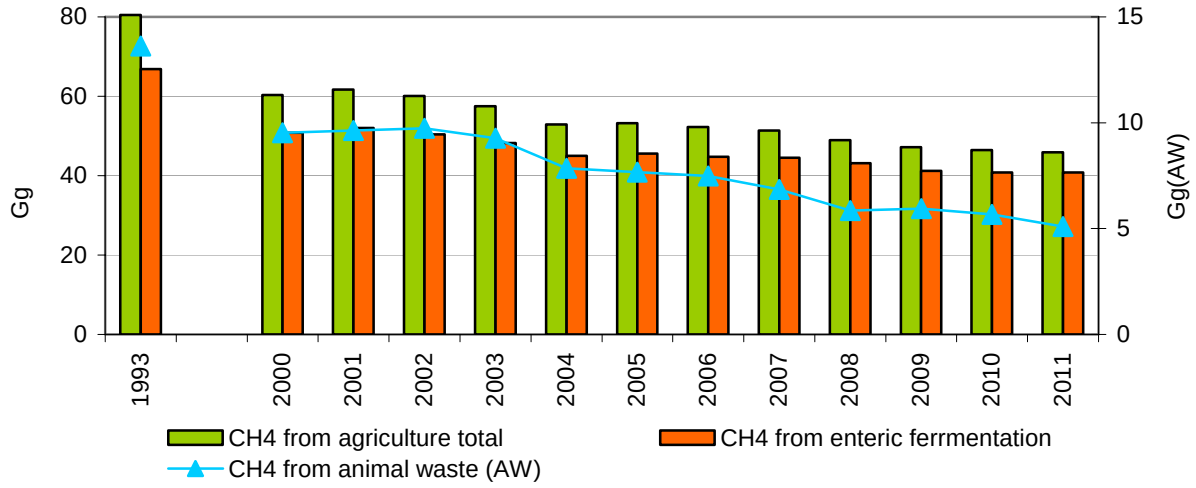
Agriculture belongs to the biggest producers of methane (livestock production) - large-scale cattle and pork farms. Methane originates as a direct product of metabolism in herbivores (enteric fermentation) as well as a product of animal excrements breakdown.

Share of agriculture on total methane production has been mostly falling since 2000 due to decreased number of livestock. In 2011, agriculture produced 45.92 thous. tons of methane.

The main source of nitrous oxide is agriculture (plant production) - excessive amounts of mineral nitrogen in soil (due to intensive fertilisation) and adverse air regime of the soil (soil compaction).

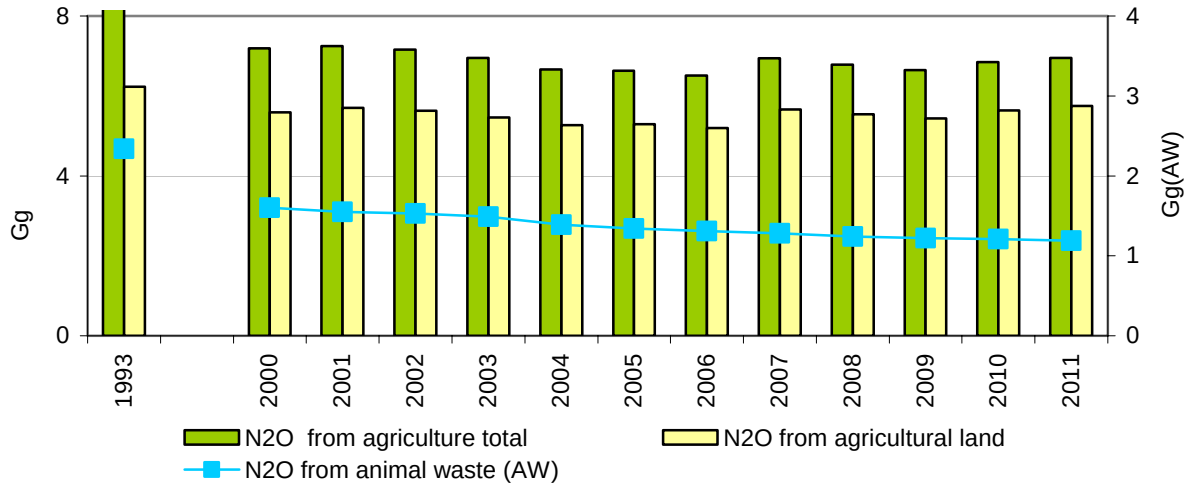
Production of nitrous oxide by agriculture after 2000 has been mostly uniform. In 2011, agriculture produced 6.95 thous. tons of nitrous oxide.

Trend in methane emissions from agriculture according to type of activity



Source SHMI

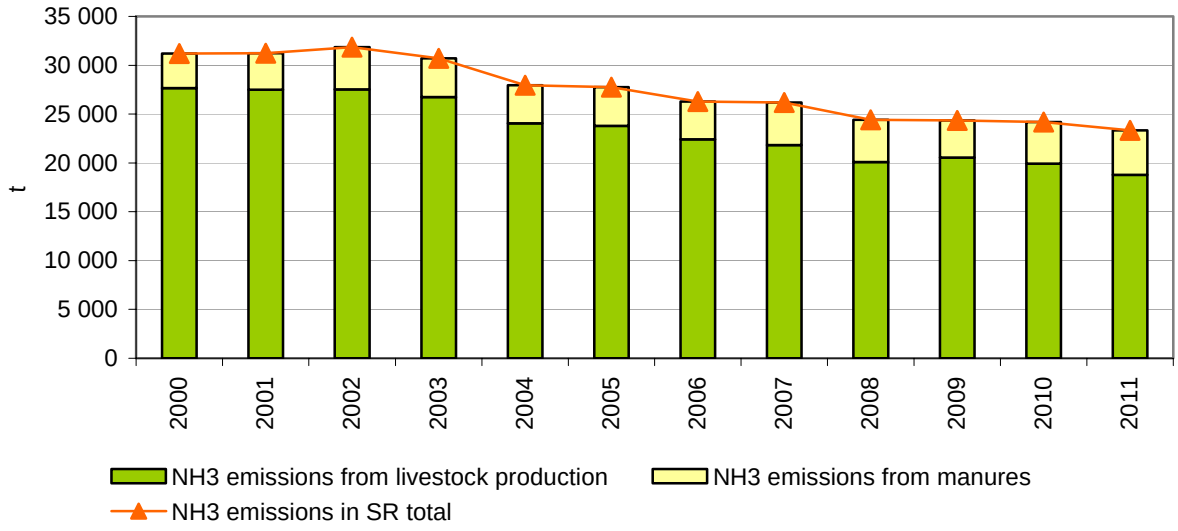
Trend in nitrogen monoxide emissions from agriculture according to type of activity



Source: SHMI

Agriculture is the biggest producer of ammonia (NH_3). Total ammonia emissions in agriculture comprise emissions from livestock production and from agricultural land. **NH_3 emissions show a falling tendency since 2000 in Slovakia.** In 2011, agriculture produced 23 349 tons of emissions.

Trend in ammonia emissions from agriculture



Source: SHMI

In 2012, the total of 370 466 m^3 of waste water related to agricultural production were discharged.

Discharged amount of waste water related to agriculture in 2012

Waste water from agriculture	Volume ($m^3.yr^{-1}$)	Insoluble compounds ($t.year^{-1}$)	BOD_5 ($t.year^{-1}$)	COD_{Cr} ($t.year^{-1}$)
Treated	242.559	1.210	2.842	16.764
Untreated	127.907	0.000	0.000	0.000
Total	**370.466**	**1.210**	**2.842**	**16.764**

Source: SHMI

In 2012, there were **505 924.6 tons of hazardous and other waste introduced to the market,** which is by 21 443 t **less than in 2011.** Of total volume of waste from agricultural activities, other waste represented 98.9%, and hazardous waste represented 1.1%.

Forestry

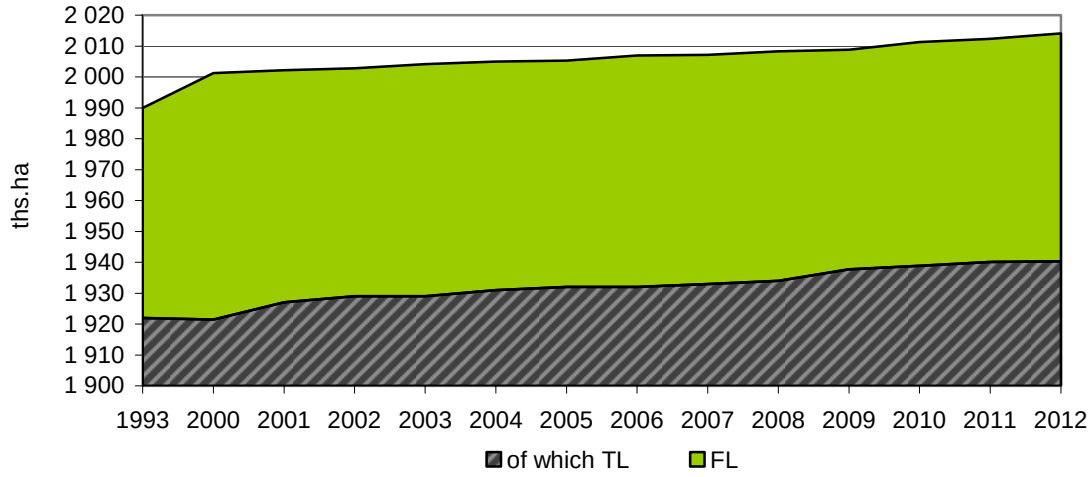
♦ Size and structure of forest land

Size of forest land

Slovakia belongs to the European countries with the largest share of forested land. Forest cover of our territory has long been stable and is slightly increasing. **Forest land size** in 2012 reached **2 014 059 ha** (annual increase by 1 723 ha), which represents the area of **41.07%** of the Slovak territory (data supplied by IGCC SR). **Timber land** in 2012 represented app. 96.3% (1 940 300 ha) of total size of forest land. Calculated to the number of inhabitants, this represents 3.59 km^2 per 1 000 inhabitants.

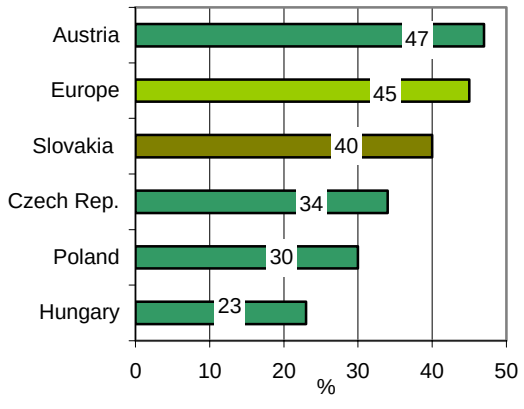
Increase in the size of forest in the recent years has been caused mainly by harmonizing the actual state with the state recorded in the register of immovable property and in the forest care programmes.

Trend in forest land (FL) and timber land (TL)



Source: IGCC SR

Comparison of forestation in selected countries

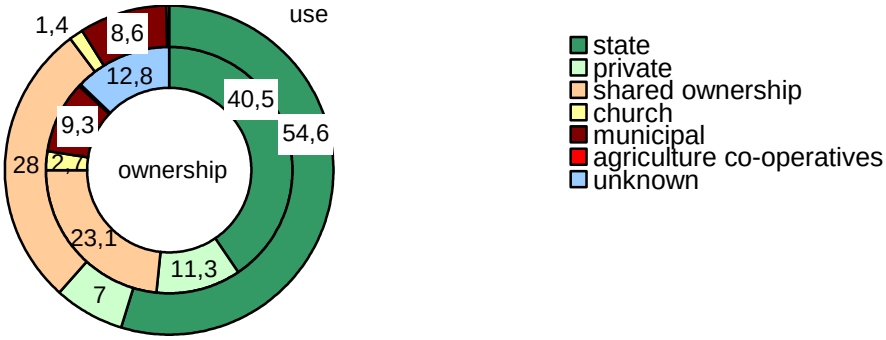


Source: FAO 2010

Ownership structure of forests

The process of **settlement of ownership and use-related rights** to forest land still continues under the effective restitution laws. In 2012, total monitored timber land in Slovakia pertaining to so-called **unknown owners** in Slovakia was **12.8%** (248 469 ha). **State** organisations **owned** in total **40.5%** of timber land (785 851 ha; compared to the previous year, this share declined by 0.3%) and administered as much as **54.6%** of timber land (1 059 297 ha; annual decline by 0.5%).

Structure of forests ownership and use

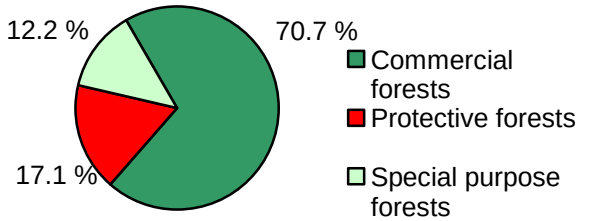


Source: NFC

Forest categorisation

Most frequently represented category is **commercial** forests (compared to 2011, their share increased by 0.3% at the expense of special purpose forests), followed by protective forests. Least represented forest category is special purpose forests. Majority of commercial forests belong to poly-functional forests that also have other associated ecological and social functions, while only 20.8% of commercial forests are located in purely production type.

Spatial representation of forest categories

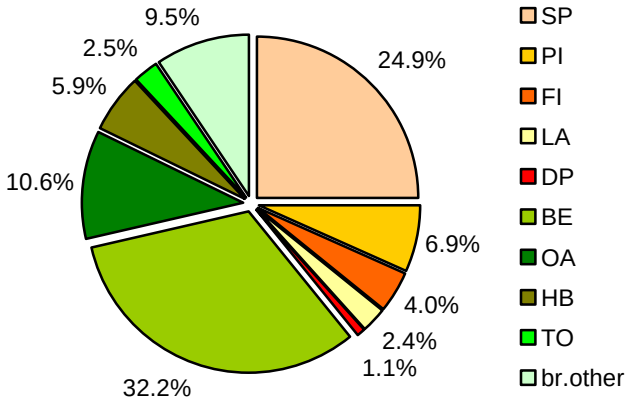


Source: NFC

Forest composition by species

Forest composition by species of Slovak forests is relatively diverse. There has been a gradual **decline in coniferous** trees (mainly spruce) especially due to the negative impacts of biotic and abiotic injurious agents. In terms of stability, however, this is a positive trend. Still, the favourable share of **broad-leaved** trees remains. Beech (32.2%) and spruce (24.9%) have long shown the **greatest** share. Spruce is expected to decline significantly. **The outlook** is to reach the share of broad-leaved trees at 63% (with their initial share having been as much as 79.3%) and a 37%-share of coniferous trees (with their initial share having been only 20.7%).

Share of the most significant tree types in the Slovak forests



Source: NFC

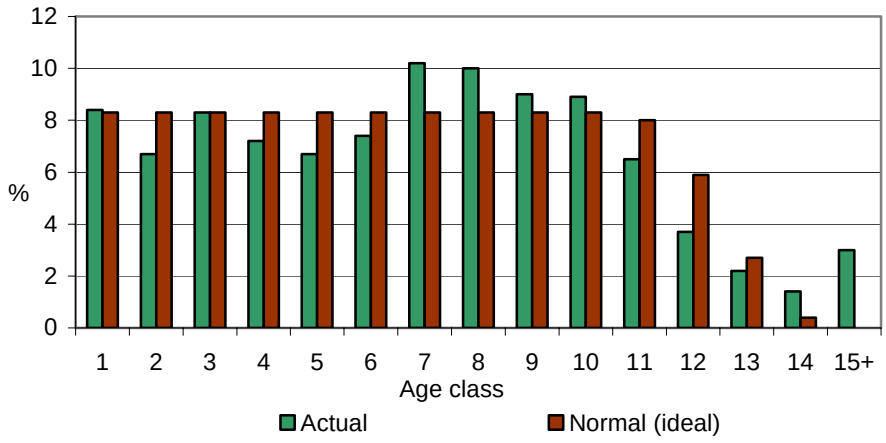
Note: SP - spruce, PI - pine, FI - fir, LA - larch, DP - dwarf pine, BE - beech, OA - oaks, HB - hornbeam, TO - turkey oak, br. other - broadleaved other

Our forests contain also **introduced trees species** (e.g. *Robinia pseudoacacia*, euroamerican poplars, *Pinus nigra*, and also *Pseudotsuga menziesii*, *Abies grandis*, *Pinus strobus*, *Quercus rubra*, *Castanea sativa*, *Aesculus hippocastanum* and *Negundo aceroides*). There are altogether **25 species** with total share of about 2.9% on the Slovak tree species. *Robinia pseudoacacia* is the most invasive tree type. *Negundo aceroides* and *Alianthus altissima* also become problematic.

Forest age composition

Real **forest age composition** of SR partially **differs** from the normal (theoretical) one. Most of them fall into the following age categories: 2,4,5,7,8,12, and 15. The age categories of 1-4 contain 30.5% of forests, the categories of 5-9 contain 43.3%, and the categories of 10 and beyond contain 25.8% of forests, with **clearing areas** taking up the size of 8 607 ha.

Age composition of the SR forests



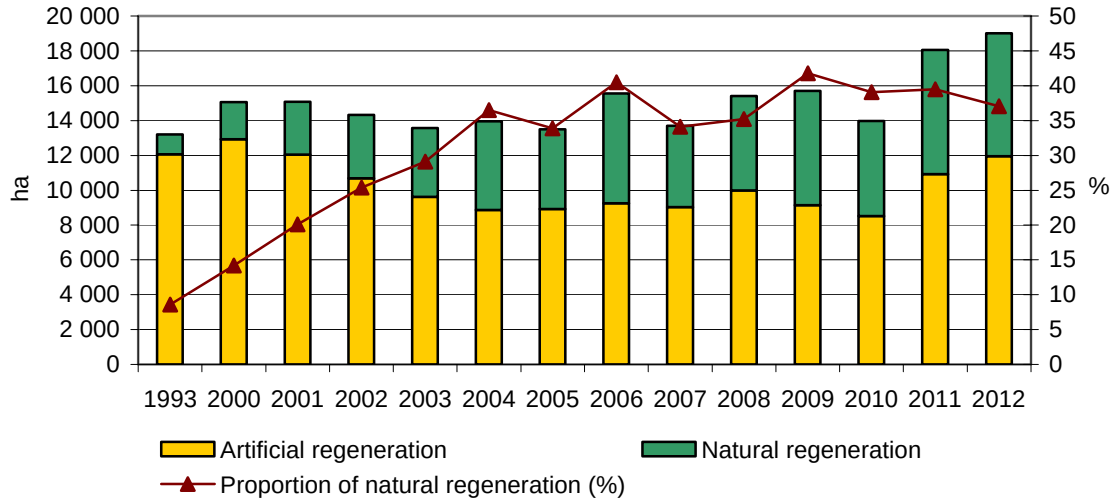
Source: NFC

♦ Forest management

Forest regeneration and afforestation

Compared to 2011, total scope of **forest regeneration** increased by 5.3%, to the present size of **19 011 ha**, of which **natural** regeneration slightly declined. Share of natural regeneration on total forest regeneration in 2012 reached **37.1%** and roughly has remained as such over the last years.

Trend in forest regeneration

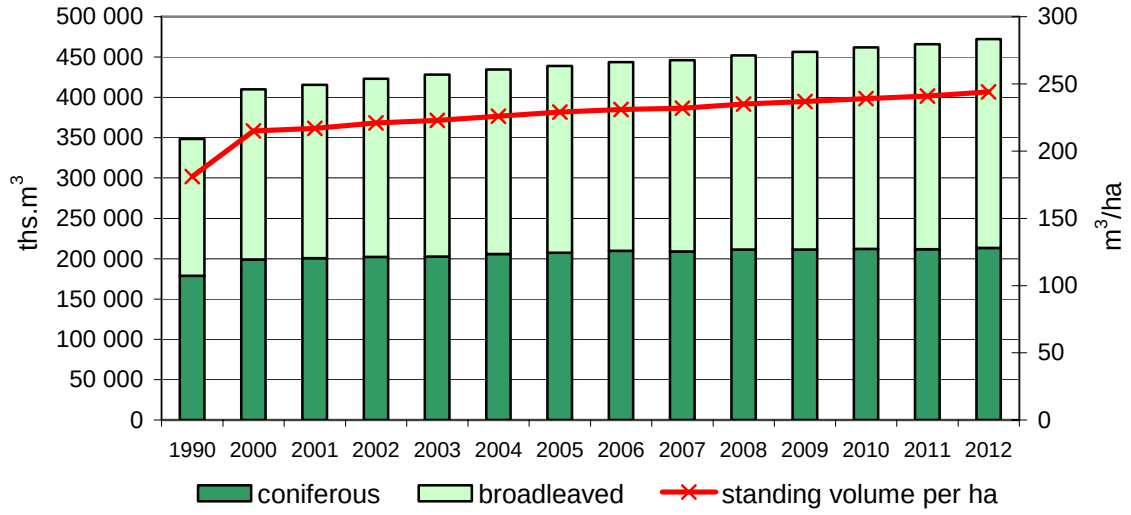


Source: NFC

Timber and carbon stocks

In the long-term horizon, **standing volume** in the Slovak forests has been on the rise, in 2012 reached **472.2 mil. m^3** of barkless wood matter. This has been 6 mil. m^3 more than in the previous year. Similar growth is shown in the average stock **per hectare** which represents **244 m^3**. The shown increase in standing volume has been mainly affected by the disproportion between the increment and the timber felling, which relates to a higher representation of forests within the 7-10 age categories.

Trends in total standing volume



Source: NFC

Carbon stocks in forest ecosystems, surface and underground biomass, have been continuously rising, which is related to and impacted by the increasing standing volume. Presently, it represents **529 mil. tons**, which is an increase by 3 mil. tons compared to 2011.

Timber felling and the forest resources utilisation

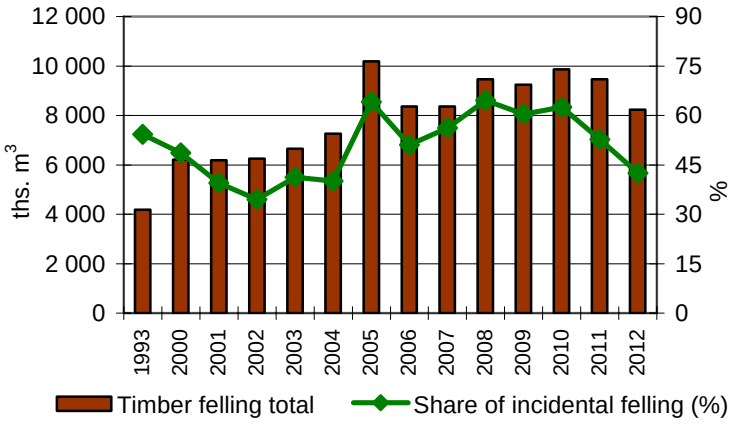
In 2012, timber felling reached **8 232 thous.m^3**, which is by 1 235.4 thous.m^3 (13%) less than in 2011. Since 2010, the historically rising trend in timber felling caused by large-scale incidental felling provoked by injurious agents has been declining. Compared to the previous year, the share of **incidental felling declined** by 10.1% to **42.6%** of total timber felling. Compared to 2011, even with the high volume of incidental felling of coniferous trees (as much as 67.8%), the volume of total planned timber felling in 2012 was not exceeded. **Intensity of forest resources utilisation** (share of felling volumes and increment) for this year is 67.9%, which represent decrease of 10.8% as compared to 2011.

Total volume of timber felling and incidental felling (thous. m^3)

Total felling volume	**8 232**
of which: coniferous	4 592
broadleaved	3 640
Incidental felling	**3 504**
of which: exhalation	77
insectual	1 889
disaster	1 257
other	281
share of incidental felling on total felling volume (%)	**42.6**

Source: NFC, SO SR

Trend in total volume of timber felling and share of incidental felling



Source: NFC

Forest transport

In 2012, density of forest accessibility by **transport network** has not changed much compared to the previous year, and represents 20.3 m/ha (increase by only 0.1 m/ha). Total length of forest transport network grew by 41 km and reached 40 740 km in 2012.

Forest certification

There are **two certification schemes** used in Slovakia for forest certification:

- Programme for the Endorsement of Forest Certification schemes (PEFC)
- Forest Stewardship Council (FSC).

Number of certified subjects and area of the certified forests

		PEFC	FSC	Total
Number		259	5	**264**
Forest size	**ha**	1 239 122	147 588	**1 386 710**
	% of timber land	63.9	7.6	**71.5**

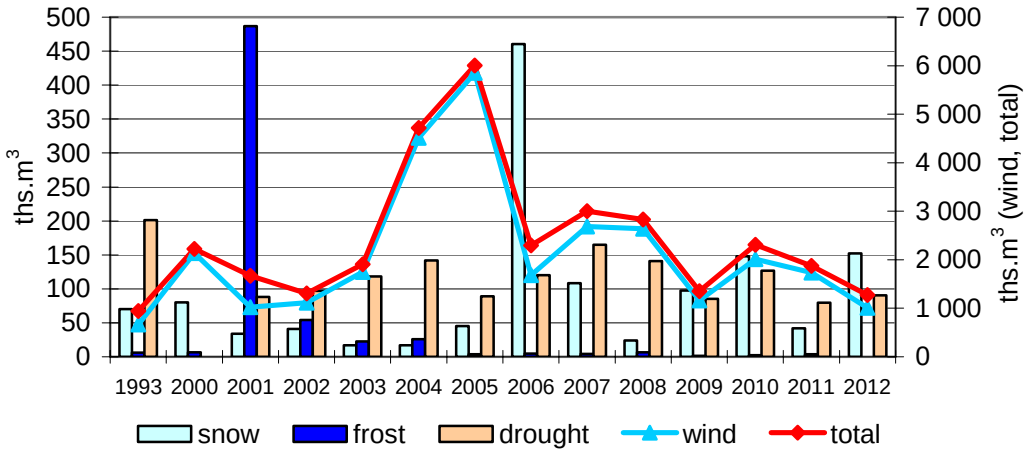
Source: Slovakia Forest Certification Association; www.fsc-info.org

♦ Injurious agents and forests condition

Abiotic injurious agents

As a consequence of negative impacts of wind, snow, frost, drought, and other **abiotic factors**, there was **1 272.5 thous. m^3** of wood matter damaged in 2012 (of which 920.4 thous.m^3 were coniferous trees), which is decrease by 604.5 thous.m^3 compared to the previous year. About 79.4% was caused by the wind. Processed was 98.8% of the wood matter.

Trend of damages caused by abiotic agents



Source: NFC

Biotic injurious agents

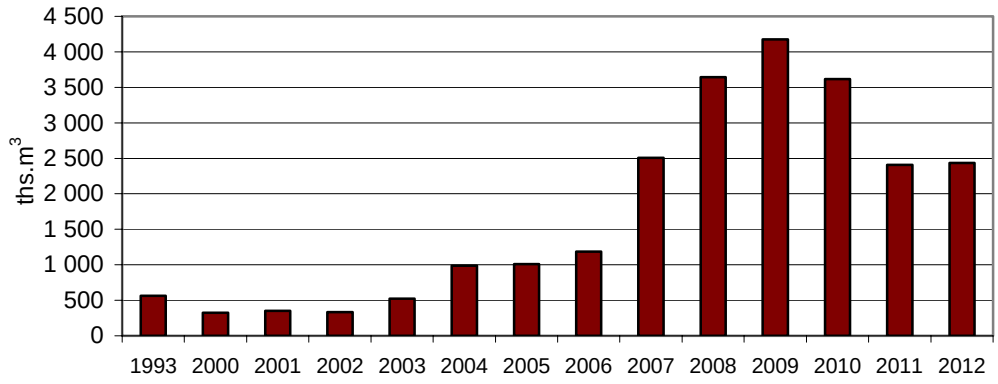
Among the **biotic injurious agents** to forest stand, most impacts have still been caused by bark-beetles and woodworms on incidental felling. This factor poses a threat to spruce forest ecosystems. However, damage caused by these factors has been reduced over the last 3 years.

In 2012, **bark-beetles and woodworms** damaged **2 436.9 thous.m^3** of wood matter (of which 2 430.7 thous.m^3 were coniferous trees), which is a slight increase compared to the previous year (by 27.5 thous.m^3). Of this volume, 87.6% has been processed. **European spruce bark beetle** is the most significant injurious agent, with more than 89% contribution to total affected wood matter.

Leaf-eating insects recorded increased activities again after 2 years and the related damage to **2 544 m^3** of wood matter.

In total, **phyto-pathogenic organisms** damaged **238.7 thous.m^3** of wood matter (mostly coniferous tree species) with **Armillaria** being the most significant pathogenic agent contributing to total damage by as much as **94%**.

Trend of damages caused by bark beetles and woodworms



Source: NFC

Anthropogenic injurious agents

In 2012, anthropogenic injurious agents accounted for **104.7 thous.m^3** of damaged wood matter, which is an **increase** by 31.2% compared to 2011. **Air pollution** contributed with as much as 73%, and thefts of wood accounted for 17%. Most damaged were coniferous trees (as much as 90%).

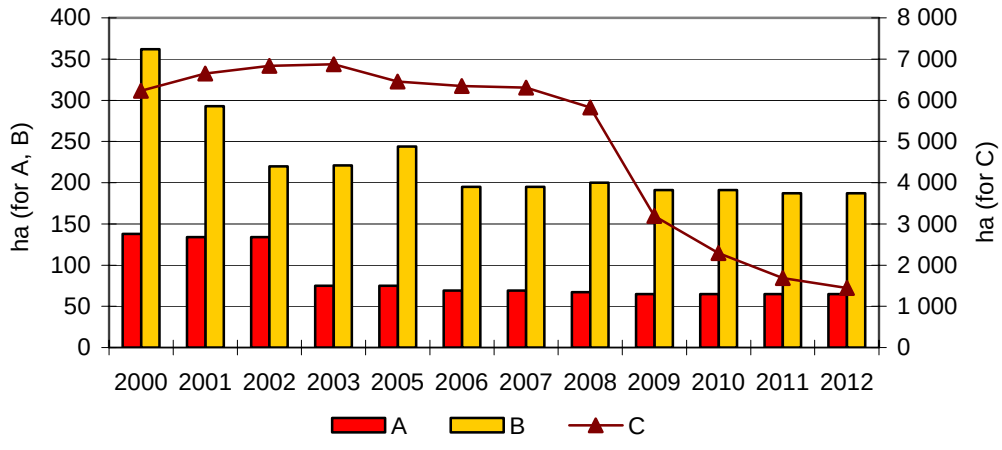
In 2012, individual **zones threatened by air pollution** were defined, taking up the area of **3 439 ha** (of which 82.9% were coniferous trees) which is 206 ha **less** than in the previous year. This has been caused by a **long-term gradual reduction** in the size of these zones as well as by the volume of calamity wood mass caused by air pollution.

Structure of forest damage caused by anthropogenic injurious agents

Agents	2011		2012	
	Affected	Processed	Affected	Processed
Immisions	66 052	61 580	76 752	76 735
Fires	1 870	1 866	8 291	8 291
Wood stealing	10 364	10 364	17 943	17 943
Other anthropogenic agents	1 538	1 534	1 748	1 748
Total	**79 824**	**75 316**	**104 734**	**104 717**

Source: NFC

Trend of forest damage in individual threatened zones



Source: SO SR

In 2012, Slovakia recorded **517 forest fires** (214 less than in 2011) on the territory of **1 683.5 ha** (compared to 403 ha in 2011) with direct damage amounting to 793.86 thous. EUR. Increase in the number of fires compared to the previous year related mainly to the dry character of seasonal weather. Most frequent **causes** of fires in forests include burning of dried grass and vegetation and negligence (setting fires in the nature, children, etc.).

Monitoring of forest condition

National programme of **forest ecosystems health condition monitoring** was implemented also in 2012. The programme operated 112 permanent monitoring areas (PMA) within the 16x16 km network (extensive monitoring), and 7 research PMA (intensive monitoring). Both monitoring levels are part of the European network of monitoring areas, in which presently participate 39 European countries.

Results of forest condition monitoring in 2000-2012

Year	Tree types	Representation of trees in various damage degrees in %							
		0	1	2	3	4	1-4	2-4	3-4
2000	Coniferous	18	44	35	2	1	82	38	3
	Broad-leaved	29	57	13	1	0	71	14	1
	Total	25	52	22	1	0	75	23	1
2005	Coniferous	6	59	33	2	0	94	35	2
	Broad-leaved	21	65	13	1	0	79	14	1
	Total	14	63	22	1	0	86	23	1
2010	Coniferous	6	48	44	2	0	94	46	2
	Broad-leaved	12	55	32	1	0	88	33	1
	Total	10	52	37	1	0	90	38	1
2011	Coniferous	4,3	49,1	43,2	1	2,4	95,7	46,6	3,4
	Broad-leaved	12,7	60,9	25,9	0,5	0	87,3	26,4	0,5
	Total	9,2	56,1	33	0,7	1	90,8	34,7	1,7
2012	Coniferous	6,7	49,8	41,8	1,5	0,2	93,3	43,5	1,7
	Broad-leaved	14,6	51,5	32,6	1,3	0,0	85,4	33,9	1,3
	Total	**11,4**	**50,7**	**36,4**	**1,4**	**0,1**	**88,6**	**37,9**	**1,5**

Source: NFC

Ratio of trees in the 2-4 degrees of damage is the determining factor for assessment of deterioration or improvement to the health condition of forests, with defoliation greater than 25%.

Description of damage degrees of monitored trees:

0 - defoliation of trees between 0 - 10 % no defoliation (healthy trees)
1 - defoliation of trees between 11 - 25 % slight defoliation (slightly injured trees)
2 - defoliation of trees between 26 - 60 % medium defoliation (medium injured trees)
3 - defoliation of trees between 61 - 99 % strong defoliation (strongly injured trees)
4 - defoliation of trees between 100 % dying and dead

Compared to 2011, proportion of trees in 2-4 damage degrees for all tree types together **grew by 3.2% in 2012**. Proportion of coniferous trees in 2-4 damage degrees sank by 3.1% compared to the previous year, while the proportion of broad-leaved trees in the same degrees increased by 7.5%. **Larch** belongs to the **most damaged** tree type (increase by 10.3% in damage compared to 2011) followed by fir (by 3.4%), spruce (decline by 5.6%), and pine (decline by 1.4%).

Assessment of tree defoliation in selected European countries to 2011

Country	Number of assessed trees	Damage degree (%)				
		0	1	2	3+4	2+3+4
Czech Republic	5 418	15.2	32.1	50.9	1.8	52.7
Hungary	1 830	62.3	18.8	13.8	5.1	18.9
Poland	7 342	14.0	62.1	22.9	1.1	24.0

Austria	in 2011 non-realised					
Slovakia	4 017	9.2	56.1	33.0	1.7	34.7
EÚ	88 370	29.2	46.6	21.4	2.8	24.2

Source: NFC

♦ Relating activities and sectors

Nature protection and forest management

Forest land in **protected areas** (PA) currently take up as much as approximately **78%**, with forestation of **national parks** including their protective zones being **72%, PLA 71%, and "small-size" PA 71.7%**. It is a testimony of the quality and level of conservation of forest habitats, as well as to the adequacy of recent approaches to their conservation.. Forestry activities are totally inadmissible only within the strictest (5th) degree of protection.

Protected areas (2. degree of nature protection and higher) take up 1 132 037 ha within the total size of forest land, which represents **56.3% of total forest land size**. Size of national parks and protected landscape areas on forest land has not changed, compared to 2011. Such size of protected areas with their related limitations **has an impact on the ownership rights** and **cause material losses**.

Wood biomass for energy production

In the case of **use of potential sources** of wood biomass, **dendromass for fuel** may reach as much as 9% in the annual consumption of primary energy sources in Slovakia. Total annual usable potential of dendromass for fuel today represents 2.8 mil. tons and has been used on only 33%.

Available data for 2012 show that **3.8 mil. tons of** wood biomass were **consumed** by households, energy sectors, wood-processing industry, and other producers and consumers. **The sector of forest management** introduced to the market **1.31 mil. tons** of biomass for fuel in the form of fuelwood and wood chips. **Current supply** of biomass for fuel **covers up** approximately **1.5%** of the consumption of primary energy sources in Slovakia.

Trend in the volumes of dendromass in the forest management sector for energy production

	Wood chips		Fuelwood and other		Total	
	ths. t	TJ	ths. t	TJ	ths. t	TJ
1990	2	19	368	3 496	370	3 515
2000	5	48	471	4 475	476	4 523
2005	120	1 140	640	6 080	760	7 220
2010	250	2 375	695	6 602	945	8 977
2011	270	2 565	700	6 650	970	9 215
2012	530	5 035	780	7 410	1 310	12 445

Source: NFC

Game management

In 2012, **1 861 hunting areas** existed in Slovakia. Compared to the previous year, their **total size** reduced by approximately 21 thous. ha and takes up **4 442 thous. ha**. Of this, agricultural areas represent 53%, and forest land represents 44.4%.

Spring stock of game (SSG) of **ungulate game** were **stabilised** in 2012 and it was possible to stop their negative trend over the recent years, Nevertheless, damage caused by game especially in agriculture

increased. Their planned **hunting** by shooting was comparable with 2011, with the exception of wild boar where the numbers to be reduced by shooting were increased by 14 thous. individual animals.

In relation to **small game**, their SSG continue to decline. Numbers of **big predators** has been statistically assessed as stable, with a positive trend in their population. As to the other **rare game species**, population growth has been recorded in the number of the beaver. On the contrary, adverse trend exists in the populations of moorcook and wood-grouse. Hunting of rare game species is strictly regulated. 149 wolves and 47 bears were taken down.

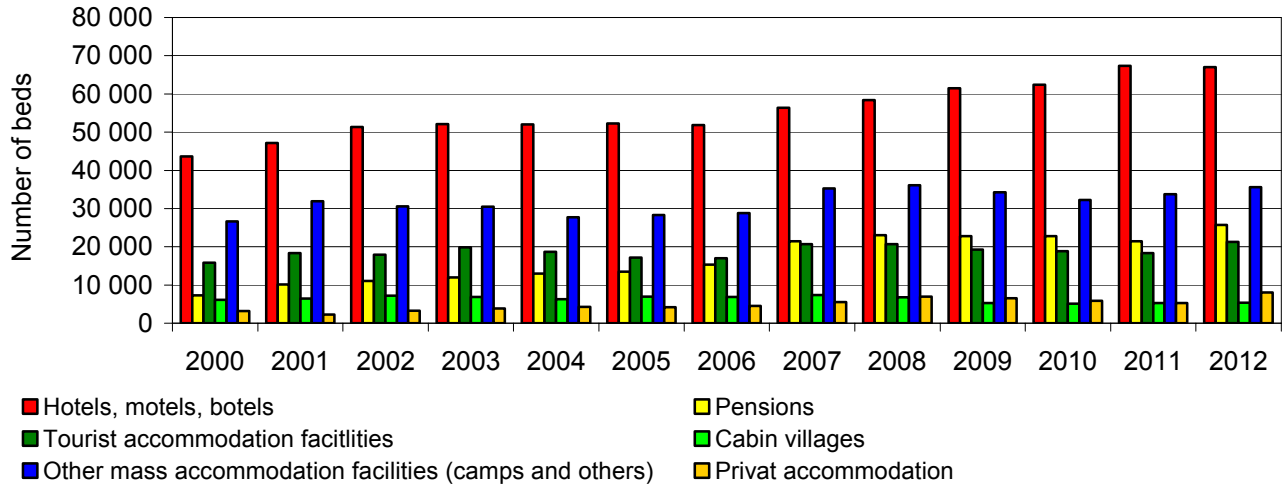
In 2012, forest sector and agricultural sector reported **damage caused by ungulate game** amounting to **1 338 thous. EUR**, which is an increase by 226 thous. EUR, compared to 2011. 12.5% of damage has been compensated. Damage caused by **large predators** amounted to **783 907 thous. EUR** (increase by 124 thous. EUR), of which only 3.5% has been compensated. Most damage has been caused by **wolves** (76.8%). In 2011, 47 attacks by brown bear on humans were recorded.

Recreation and Tourism

♦ Specific analysis of recreation and tourism

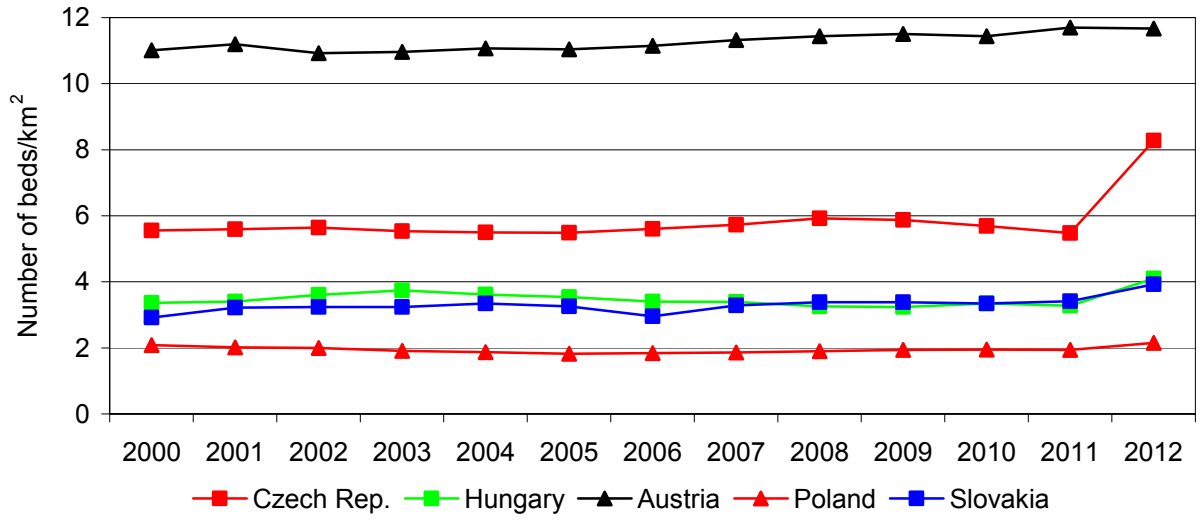
In 2011-2012 there was a significant **increase** in the number of beds. Specifically, major increase in the number of beds was in private accommodations (by more than 52.2%), followed by increased numbers of beds in boarding houses (increase by 20%), tourist accommodation facilities (increase by 15.6%). A very slight increase was recorded in other mass accommodation (increase by 5.5%), cabin villages (increase by 2.4%). On the contrary, a very **small decline** was recorded only in hotels, motels and botels (decline by 0.5%). In view of long-term trends (comparison between 2000-2012) number of beds in all monitored accommodation categories increased.

Number of beds in accommodation facilities in the Slovak Republic in the years 2000-2012



Source: SO SR

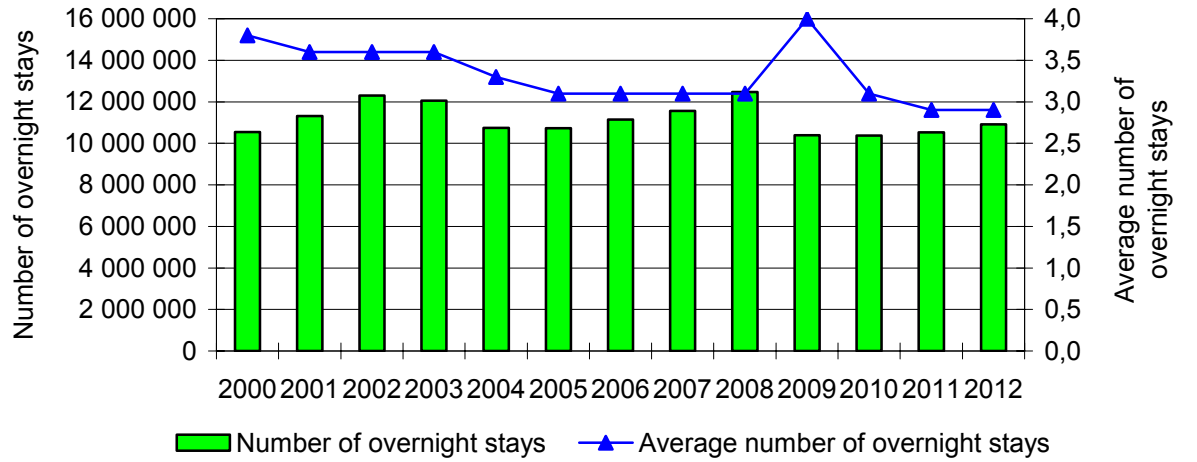
Tourist density (number of beds/km^2) in selected countries in 2000-2012



Source: SO SR

Notwithstanding the significant fluctuation in statistical data, **the number of overnight stays is still stagnant**, with alternating periods of longer slight increments and short significant drops. Such significant reduction in the number of overnight stays (reduction by almost 17%) compared to a longer period of growth over the years 2005-2008, occurred in 2009. Most importantly; however, in the period of 1999-2008, average number of overnight stays declined continually. This relates to the attractiveness of the tourist destination and the level of development of its infrastructure. This is what influences the length of actual stays. **In 2012,** compared to 2011, **there was a slight increase in the number of overnight stays (by 3.6%) with the average number of overnight stays remaining unchanged.**

Performance of accommodation facilities in the Slovak Republic in 2000-2012



Source: SO SR

♦ Demand of tourism on exploitation of resources

In terms of national economy, **tourism with its little demand on material resources does not represent a significant demanding sector**. This fact is especially important for a country like Slovakia, that depends much on import.

Demand of tourism on the exploitation of natural resources and land occupation is **important especially on the local** level. This phenomenon is caused by major seasonal differences in the number of tourists to individual tourist destinations. Compared to other economic activities, **it is not possible, for example, to supply data on the energy and material demand of tourism**, due to the lack of good data retrieving and collecting mechanisms to meet specific indicators. **Tourism** being a sector of economic activity **does not have high demands on water or fuel consumption.** These requirements; however, are in general more typical for major fluctuations between the high and low tourist seasons.

♦ Environmental impact of recreation and tourism

Intensity of visitor stays is not uniformly distributed throughout the territory. The most attractive but also potentially endangered tourist destinations, mainly due to the influence of mountain tourism,

include mainly national parks. Sites for the activities of mountain tourism are concentrated in the region of the Tatra National Park (NP), Low Tatras NP, and the Malá Fatra NP. In terms of density of **marked biking trails and marked hiking trails,** the **most fragmented territories,** in consideration of their size, are areas of the **Pieninský NP, NP Muránska Planina and the NP Slovenský raj**.

Continuing increase in the length of erosion-impacted hiking marked trails presents a significant environmental issue. These trails are **in the zone above the upper forest border and in precipices** where, due to extreme climate conditions, exist greatly deteriorated local conditions for regeneration of the soil and the flora. **Critical soil erosion** can be seen at marked trails in the territory of the national parks of the **Low Tatras and Malá Fatra, and the Muránska Planina NP. In 2004-2008, significant increase in erosion of marked hiking trails** was recorded also **in the territory of the Tatra NP. On the contrary, significant or slight decline in the erosion** of tourist marked trails in 2009 was recorded in the territory of the **Pieninský NP, and a slight decline appeared in the Veľká Fatra NP. In 2011, there was a slight increase in the length of erosion-affected cyclo-tourist trails in the territory of the Tatra NP. Veľká Fatra NP recorded a very slight increase in the length of erosion-affected tourist marked trails. In 2012, the territory of Tatra National Park showed a slight increase in the length erosion-affected tourist marked trails.**

Highest **degree of endangerment** of small-size protected areas from tourism-related activities exists in the following territories: Tatra NP, Low Tatras NP, Malá Fatra NP, Pieniny NP, Slovenský raj NP, PLA Dunajské luhy /Danube marshes/, PLA Malé Karpaty /Small Carpathians/, PLA Strážovské hills, PLA Poľana, PLA Cerová hills, and PLA Vihorlat.

Categories of protected areas take up 60-80% of the assessed impacts into nature and landscape that require permission of a pertinent nature protection authority (especially the areas of Tatra NP, Low Tatras NP, Slovenský raj NP and Malá Fatra NP). In terms of the categories of protected areas, **most assessed impacts** over the period of 2003-2012 **always related to the protective zones within national parks, as well as protected landscape areas and national parks. Open landscape shows the least number of assessed impacts, with the exception of the years 2008 and 2009.**

• WASTE

Key questions and key findings

Is the production of waste placed on the marked being reduced?

- **In 2012 were generated 8 668 104.18 tonnes of waste introduced on the market. When compared with 2011, waste introduced on the market in Slovakia decrease app. 20% in 2012.**
- **There were generated 1 747 569.05 tons of total municipal waste in Slovakia in 2012. This volume represents 323 kg of municipal waste per capita. Compared to 2011, this is an decrease 1.2%. When compared with the EU countries, generation of the municipal waste per capita is low, still below the average EU 27 value.**

Is the proportion of landfilled waste decreasing?

- **There has been a long and negative high share of waste landfilling on total waste disposal almost 81% for waste other than municipal, and 74% for total handled municipal waste**

Is Slovakia complying with the waste limits set forth by international criteria?

- **In 2012, 4.2 kg per capita of waste electrical and electronic equipment was collected in 2010. Slovakia reached the limit of 4 kg/capita set by the EC.**
- **Slovakia reached the proportion for re-utilisation, recycling, and reclamation of old vehicle parts as defined by the EC Directive and thus fulfilled the set limit.**
- **Slovakia managed to comply with the obligation to collect and reclaim waste from electrical and electronic equipment. (WEEE)**

Is packaging waste reclamation on a rise?

- **Of total volumes of generated packaging waste in 2012, 59.8% of waste was recycled, and 62.4 % was recovered.**

♦ Waste generation

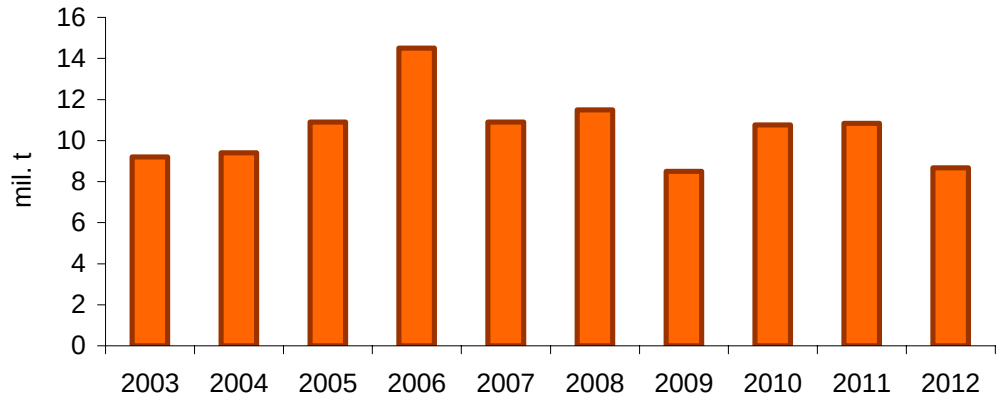
When compared with 2011, decrease in waste introduced on the market shows app. 20% in 2012.

Waste generation in 2012 (t)

Waste category	Amount (t)
Hazardous waste	371 553.28
Other waste	6 548 981.85
Municipal waste	1 747 569.05
Total	**8 668 104.18**

Source: SEA, SO SR

Waste generation (t)



Source: SEA, SO SR

**Growth in the generation of other waste types in 2006 by app. 40% compared to 2005 and 2007, was caused especially by the growth in generated construction waste, specifically in the category of excavation soil generated at the construction of highway exits, the Sitina tunnel in Bratislava, and single declaration of dross volumes produced at U.S. Steel Košice.*

In the area of waste generation by economic activities classification SK NACE, manufacturing industry has been the dominating component over the recent years, with 38% share in 2012. Sector of Electricity, gas, steam and air conditioning supply follow with 15% and sector of Construction with 12%. It is necessary to point out that the total amount of waste produced by particular economic sectors does not include municipal waste.

Waste generation by particular economic sectors in year 2012 (t)

SECTION	Total (t)	Hazardous waste (t)	Other waste (t)
A - Agriculture, Forestry, Fishery	549 390.77	5 554.82	543 835.95
B - Mining and quarrying	310 579.33	645.98	309 933.34
C - Manufacturing	2 644 941.77	203 213.95	2 441 727.82
D - Electricity, gas, steam and air conditioning supply	1 045 757.25	4 603.30	1 041 153.96
E - Water supply; sewerage; waste management and remediation activities	670 564.62	79 384.21	591 180.42
F - Construction	806 186.76	34 082.02	772 104.74
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	337 444.57	13 154.63	324 289.94
H - Transporting and storage	112 606.17	11 994.20	100 611.97
I - Accommodation and food service activities	3 234.32	102.62	3 131.70
J - Information and communication	4 599.74	421.47	4 178.27
K - Financial and insurance activities	532.29	53.03	479.26
L - Real estate activities	121 661.90	2 972.46	118 689.44
M - Professional, scientific and technical activities	98 091.79	1 746.32	96 345.47
N - Administrative and support service activities	12 093.88	1 986.40	10 107.48
O - Public administration and defence; compulsory social security	21 497.40	899.04	20 598.36
P - Education	810.54	104.16	706.38
Q - Human health and social work activities	154 566.21	3 741.29	150 824.92
R - Arts, entertainment and recreation	1 205.23	97.41	1 107.82
S – Other services activities	1 513.09	176.50	1 336.59
Unknown	23 257.48	6 619.45	16 638.03
Total	**6 920 535.12**	**371 553.28**	**6 548 981.86**

Source: SEA

♦ Waste handling

Waste recovery

There were 3 431 134.67 tons of waste recovered in the SR in 2012. This represents 50% of total volume of waste located on the market (not included MW). R3 activity – Recycling or reclamation of organic substances which are not used as solvents has the greatest share on waste recovery with a 21% share.

Waste recovery following codes R1 – R13 in year 2012 (t)

Code	Activity	Total (t)	Hazardous waste (t)	Other waste (t)
R01	Used mainly as fuel or to extract energy through different approach	111 486.61	4 256.77	107 229.84
R02	Solvent reclamation/regeneration	2 229.69	2 229.69	0.00
R03	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)	725 561.73	1 044.11	726 605.84
R04	Recycling or reclamation of metals and metal compounds	684 321.71	6 396.96	677 924.75
R05	Recycling or reclamation of other inorganic material	478 030.00	8 393.49	469 636.51
R06	Regeneration of acids and bases	1 140.98	1 126.46	14.52
R07	Recovery of components used for pollution abatement	151.87	82.09	69.78
R08	Recovery of components from catalysers	2 573.66	2 573.58	0.08
R09	Oil re-refining or other re-uses of soil	12 944.97	12 622.10	322.87
R10	Treatment of soil to benefit the agricultural production or to improve environment	582 428.45	1 748.78	580 679.67
R11	Use of waste obtained from the activities R1 to R10	74 059.32	241.38	73 817.94
R12	Treatment of waste generated by any of the R1 to R11 activities	174 410.55	13 043.35	161 367.20
R13	Storing of waste before using any of the R1 to R12 activities (besides temporary storage prior to collection at the place of waste generation).	580 795.13	19 765.59	561 029.54
Total		**3 431 134.67**	**73 524.35**	**3 358 698.54**

Source: SEA

Waste disposal

Of total volumes of generated waste placed on the market was disposed 3 342 470.32 t, what means 48% on total waste placed on the market (without MW). Dominance of landfill waste is a historical rule with and 81% share on total waste disposal. As of December 31, 2012, there were 118 landfills operated in Slovakia.

Number of landfills (towards 31.12.2012)

Region	Hazardous waste landfills	Landfills for not hazardous waste	Inert waste landfills	Total
Bratislava	2	7	2	11
Trnava	2	7	1	10
Trenčín	2	11	1	14
Nitra	3	14	2	19

Žilina	2	14	0	16
Banská Bystrica	2	13	1	16
Prešov	1	15	1	17
Košice	3	9	3	15
Total	**17**	**90**	**11**	**118**

Source: SEA

Waste disposal following codes D1 – D15 in year 2012 (t)

Code	Activity	Total (t)	Hazardous waste (t)	Other waste (t)
D01	Underground or surface waste disposal (e.g. landfill)	2 717 345.60	84 537.68	2 632 807.92
D02	Treatment by soil processes (e.g. biodegradation of liquid or sludge waste in soil, etc.)	132 613.08	49 586.91	83 026.17
D08	Biological treatment non-specified in this annex that generates compounds and mixtures eliminated by any of the D1 to D12 activities	255 231.49	42 967.84	212 263.65
D09	Physical-chemical treatment non-specified in this annex that generates compounds and mixtures eliminated by any of the D1 to D12 activities (e.g. vaporizing, drying, calcinations, etc.)	99 538.22	77 105.48	22 432.74
D10	Incineration on land	67 469.27	20 354.78	47 114.49
D13	Mixing or blending prior to any of the D1 to D12 activities	4 869.99	363.36	4 506.63
D14	Placing into other packaging prior to any of the D1 to D12 activities	308.31	228.79	79.52
D15	Storage before implementing any of the D1 to D14 activities. (besides temporary storage prior to collection at the place of waste generation)	65 094.36	21 062.01	44 032.35
Total		**3 342 470.32**	**296 206.85**	**3 046 263.47**

Source: SEA

Other waste handling

Handling with waste by means DO, O and Z codes (t)

Disposal code	Activity	Total (t)	Hazardous (t)	Others (t)
DO	Handing over of waste for domestic use	32 777.07	0	32 777.07
Z	Storage of waste	114 153.10	1 822.10	112 331.00
Total		**146 930.17**	**1 822.10**	**145 108.07**

Source: SEA

♦ Waste from electrical and electronic equipment (WEEE)

The EP and Council Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) sets a unified limit for the collection of electrical household waste to 4 kg/capita. Slovakia met this limit in 2012. Amount of collected WEEE was 22 671 tons.

Summary reports by producers of electrical equipment for the year 2012 (kg)

	Recovered		Recycled	
Category under Annex 3 of the waste law	**kg**	**%**	**kg**	**%**
1. Big domestic appliances	10 258 184.13	90.69	10 141 002.66	89.65
2. Small domestic appliances	1 710 559.19	85.75	1 646 333.97	82.53
3. IT and telecommunication devices	2 649 077.03	89.18	2 618 220.00	88.14
4. Consumer electronic devices	2 811 231.82	88.81	2 721 069.01	85.96
5. Sources of light	890 379.97	91.46	870 260.62	89.39
5a. Gass lamps	275 405.85	93.25	275 405.85	93.25
6. Electrical and electronic instruments	1 036 819.75	90.39	1 005 467.19	87.66
7. Toys, devices designated for sport and recreational use	176 606.36	83.06	169 827.77	79.87
8. Medical devices	124 193.17	85.83	123 173.66	85.12
9. Machines for monitoring and testing	115 663.30	88.31	114 168.33	87.17
10. Vending machines	213 072.41	91.41	210 980.50	90.51
Total	**20 261 192.98**	**89.73**	**19 895 909.56**	**88.12**

Source: SEA

Notwithstanding the reduction in the sale of electrical and electronic equipment in 2012 by almost 1.5% compared to 2011, Slovakia managed to comply with the obligation to collect and reclaim waste from electrical and electronic equipment. (WEEE) The obligation to collect and reclaim 21 724 tons of electrical and electronic waste was exceeded in Slovakia by 1.04%. In total, producers of electrical and electronic equipment who sell electrical equipment in 2012 collected 22 671 tons of WEEE and carried out processing of 22 579 tons of electrical and electronic waste which is approximately 46% of the number of electrical and electronic equipment introduced to the market in 2011. Slovakia today reaches the level of collection and processing of electrical and electronic waste set by the EU for the horizon following 2014. Slovak Ministry of Environment enforces the policy whereby individual producers are obliged to collect and process all electrical and electronic waste found in Slovakia.

In 2012, Slovakia complied with the limits for recovery and recycling of individual electrical and electronic waste categories set by the Regulation of the Slovak Government no. 206/2010 Coll.

♦ Polychlorinated biphenyls

Polychlorinated biphenyls (PCB) are synthetically prepared oily liquids. These compounds showing excellent technological properties were used in technology as fillings for transformers and as hydraulic liquids in condensers, hot-air media, additives to paints and plastic material, printing colors, glues, cements, as lubricants, burning inhibitors, etc.

Inventory of contaminated equipment (CE) with PCB contents is performed by the SAE, COHEM pursuant to Act 223/2001 Coll. on waste. The process of inventory is the result of reports by CE holders. Since the start of the inventory activities in 2001 until the end of 2012, 300 holders were

registered into the register. Total number of reported equipment with PCB contents is 49 197 pieces. By the end of 2012, the information PCB system still showed 5 522 units of CE with their holders no having complied with the provisions of the quoted law regarding the obligation to eliminate this equipment before December 31, 2010.

Results of the inventory of contaminated equipment (CE) as of December 31, 2012

Number of CE in the IS - KZ (pcs)		
Total numbers	**Functional**	**Eliminated**
49 197	5 522	43 675

Contaminated installations (%)	
Functional	**Eliminated**
11%	89%

Source: SEA

Results of the inventory as of December 31, 2012 clearly show that the register still shows 11% of total number of reported CE. A number of them still contain PCB in the volume below 5 dm^3, however, pursuant to Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT), in the case of power condensers the limit of 5 dm^3 shall be understood as the sum of separate volumes of the combined instrument. Holders of this equipment act contrary to the national and European legislation.

List of holders with CE still in operation: "List of holders of contaminated equipment containing PCB" can be found at http://www.sazp.sk/public/index/go.php?id=2098&lang=sk

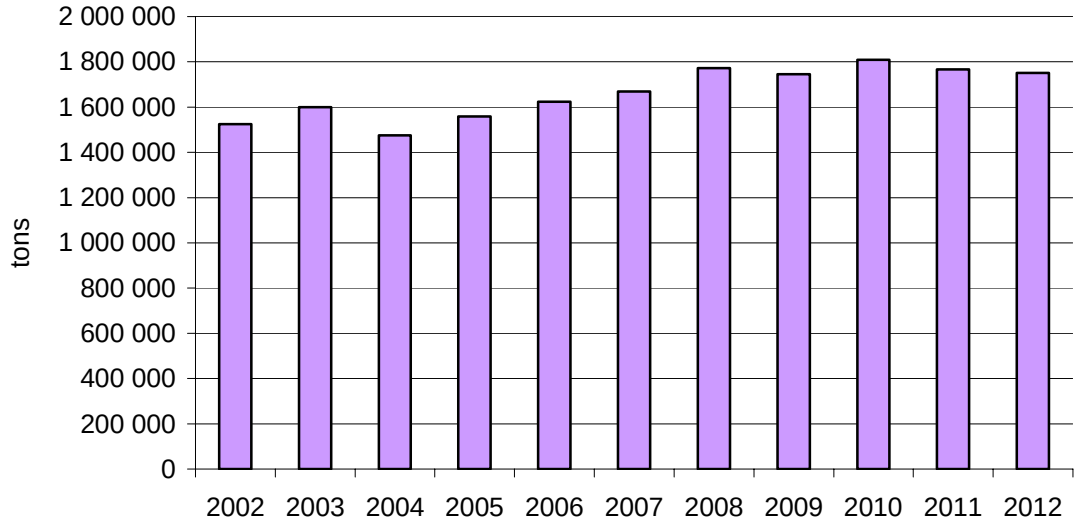
♦ Old vehicle

When compared with 2011 (39 171 pcs of old vehicle) there was in 2012 (33 469 pcs) reduction about 14.5% in the number of handled old vehicles.

♦ Municipal waste

According to data from the SO SR, there were 1 747 569.05 tons of total municipal waste generated in Slovakia in 2012. This volume represents 323 kg of municipal waste per capita. Compared to 2011, this is an increase by 4 kg per capita. Long-term waste disposal on landfills 74.18% is the most frequent method of municipal waste handling, following by incineration with energy recovery (6%).

Municipal waste generation (1000 tons)



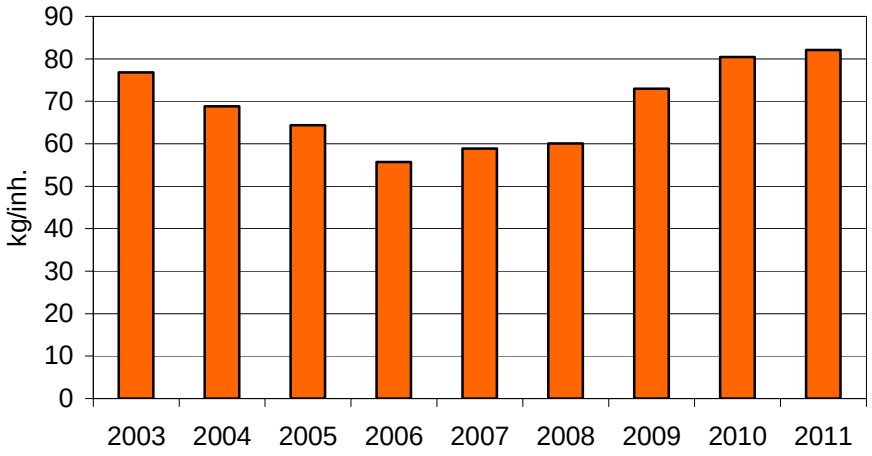
Source: SO SR

In terms of municipal waste composition, mixed municipal waste (67.35%) constitutes the major component of municipal waste together with bulky waste (9.83%), biologically degradable waste was 5.48 %, small construction waste (5.39%) and waste paper and cardboard was 3.37% and glass 2.78%.

♦ Packaging and waste from packaging

Total volumes of packaging waste show rising characteristics. The number of recovered packaging waste material grew from 45.21% in 2005 to 46.22%, in 2008 to 62.4% in 2012.

Trend in packaging waste generation (kg/inh.)



Source: Eurostat

♦ Financial mechanism of waste management

Recycling Fund

Total revenues into the fund from the contributions for the monitored commodities in 2012 represented more than 12.14 mil. EUR. Contributions for the commodity of "cars" amounting to more than 9.4 mil. EUR showed the highest share within the Recycling Fund. Successful applicants in 2012 together received more than 10.15 mil. EUR from the fund. This sum may include also the funds approved in the previous years but paid as late as in 2012.

♦ Transboundary movement

In 2012 was permitted to be imported into Slovakia 270 300 tonnes of waste classified under Annex IV (Yellow Register of Waste), Annex V, part 1, register A of the European Parliament and of the Council (EC) Directive no. 1013/2006 on waste shipment and 301 809.5 tonnes of waste was permitted for export. On the basis of licences issued by the MoE SR, for transit shipment in 2012, 93 138 tonnes of waste was licensed for transit through the Slovak territory.

Total amount of transported and imported waste in 2012 (t)

Country	Import (t)	Export (t)
Belgium	-	1 000
Bulgaria	-	8 000
Czech republic	2 500	28 180.5
Holland	-	1 000
Hungary	8 000	-
Germany	8 000	1 769
Poland	-	204 270
Austria	178 000	7 500
Slovenia	14 000	-
Serbia	-	50 000
Italy	59 800	-
Great Britain	-	90
Total	**270 300**	**301 809.5**

Source: SEA

• CLIMATE CHANGES

Key questions and key findings

What is the trend in the greenhouse gases emissions in Slovakia?

- **Trend in the development of total emissions suggests that measured greenhouse gases emissions have been decreasing. In terms of international comparisons, Slovakia shows values that are below the EU-27 average. Greenhouse gases emissions over a longer time horizon have been permanently declining. (when the figures for 2011 are compared to 1990, there is a 36.9% reduction) However, it must be said that during the years 1996-2008, emissions showed roughly the same values. Following the years of 2008 and 2009 affected by the recession, there was a slight increase in emissions, spurred by the reviving economy. Between years, (2010-2011) greenhouse gases emissions experienced a decline by 1.3%.**

What is the observable impact of climate changes in the Slovak territory?

- **Change in climate has been most noticeable in the change to air temperatures. Rise in air temperature is definite. Average annual air temperature over the years 1981-2010 at Hurbanovo reached 10.6°C, which is 0.7°C more than in 1951-1980.**
- **Over the last twenty years the rising air temperature has been most prominent. 8 out of 10 warmest years since 1871 at the Hurbanovo station in terms of the average annual air temperature fall into this time period. The following years were included: 1992, 1994, 2000, 2002, 2003, 2007, 2008, 2009.**
- **There was also a declining trend in total annual atmospheric precipitations, relative air humidity, and snowcap for almost the whole Slovak territory (slight increase in upper mountain regions)**
- **Characteristics of the potential and actual evaporation, soil humidity, global radiation and radiation balance also prove that the south of Slovakia is gradually drying up (potential evapo-transpiration rises and soil humidity decreases); however, no substantial changes were detected in solar radiation characteristics (with the exception of temporary reduction in the years 1965-1985).**
- **There has been a significant increase in weather variability, especially rainfall totals. Over the last 15 years, there has been a significant increase in the occurrence of extreme daily precipitation figures, which consequently produced an increased risk in local floods in various regions of Slovakia.**
- **On the other hand, much more often than before there would occur local or large-scale droughts caused mostly by prolonged periods of relatively warm weather with little rainfall totals during a particular part of the vegetation period. Especially harmful were droughts in the periods of 1990-1994, 2000, 2003, 2011, and 2012.**
- **Reactions of flora and fauna are the practical consequence of the trend in the climate system. Within the phenological phases i.e. expressions of the life cycle of plants and animals, certain destabilising tendencies were noticed. These tendencies may relate also to the complex natural conditions that exist in Slovakia. Noticeable also are changes in the distribution areas of animals and in the changes of their behaviour.**

Balance of greenhouse gases emissions

Total anthropogenic greenhouse gases emissions in 2001 were 45 294 620 tons (expressed as CO_2 equivalents).

Compared to 1990, total emissions **declined** by 36.9% and compared to 2010 they declined by 1.3%. Following a significant decline in 2009 due to the economic crisis, the trend in total

anthropogenic emissions for the years 2010 and 2011 has remained relatively stable and the emissions still have not reached the level from before 2009.

After a significant reduction in emissions after 1990 due to declining economic performance, Slovakia was able to maintain the trend in reducing the carbon intensity also after 1997, e.g. during the period of revived economic growth. While the country was able to maintain the so-called "decoupling" e.g. slower growth in emissions compared to the GDP growth dynamics.

Road transport is a significant sector where Slovakia has not been able to stabilise the growth in greenhouse gases emissions. Share of emissions within the sector of **power industry,** including transport, in total greenhouse gases emissions in 2011 was almost 70% (expressed in CO equivalents), with the emissions from transport within power industry generating 20%. While the share of emissions from stationary sources declines, share of emissions from transport still continues to grow. Since 1950, emissions from transport have grown by 27% and in 1990 reached only 9%. Another area where the greenhouse gases emissions have yet been effectively regulated is **burning fossil fuels in households**, so-called local heating places.

The sector of **industrial processes** is the second most significant sector with 18.2% share in total greenhouse gases emissions in 2011.

The sector of **agriculture** in 2011 contributed with 6.9% to total greenhouse gases emissions. Emissions within this sector declined sharply as early as after 1990. Since 2000, their trend has remained stable and affected only by prices and subsidies of agricultural commodities. More significant decline in the nineties was caused mainly as a consequence of total reduction in the consumption of nitrogen fertilisers and reduction in the volume of livestock. Improvements in agricultural practices together with the introduction of ecological farming create further conditions for positive trend in emissions within this sector also for the years to come.

The sector of **waste** in 2011 contributed with almost 5% to total greenhouse gases emissions. After the introduction of methodology for determining the methane emissions from municipal waste landfills, more exact data were obtained, which resulted in the increase of emissions estimates for this category.

The sector of **using solvents** is less significant and contributed to total greenhouse gases emissions in 2011 only by less than 1%. Emissions in this sector are produced mainly in cleaning facilities, car paint shops and the industries using volatile organic substances.

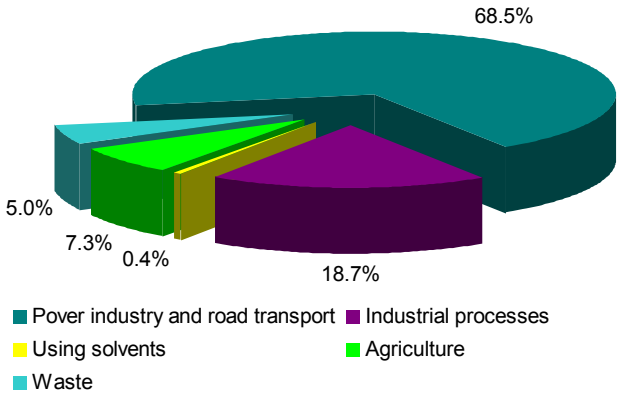
Share of individual sectors in total greenhouse gases emissions in 2011 has not differed much since the separation in 1990.

Aggregated emissions of greenhouse gases (Tg) in CO_2 equivalents

Year	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Net CO_2	59.61	30.57	33.61	31.60	32.55	33.06	36.07	33.22	31.72	33.24	28.32	30.96	30.16
CO_2*	60.75	41.37	44.17	42.41	42.84	42.74	42.22	41.72	39.86	40.49	35.80	37.91	37.67
CH_4	4.41	4.25	4.29	4.90	4.73	4.60	4.36	4.44	4.36	4.38	4.20	4.11	4.14
N_2O	6.35	3.58	3.76	3.74	3.79	3.81	3.77	4.04	3.97	3.85	3.54	3.42	3.01
HFCs	NA, NO	0.08	0.10	0.13	0.15	0.18	0.21	0.25	0.28	0.34	0.38	0.42	0.44
PFCs	0.27	0.01	0.02	0.01	0.02	0.02	0.02	0.04	0.02	0.04	0.02	0.02	0.02
SF_6	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Total (with net CO_2)	**61.76**	**38.58**	**41.85**	**40.44**	**41.31**	**41.74**	**44.49**	**42.04**	**40.42**	**41.90**	**36.52**	**38.98**	**37.83**
Total*	**71.78**	**49.30**	**52.36**	**51.21**	**51.54**	**51.38**	**50.60**	**50.50**	**48.52**	**49.11**	**43.96**	**45.90**	**45.30**

Emission were assessed by 15.04.2013 Source: SHMI
The table shows calculated years 1990-2010
** Emissions without deducting the sinks in the sector of LULUCF (Land use-Land use change and forestry)*
NA = no applicable, NO = no occurrence

Share of individual sources on greenhouse gases emissions in 2011



Emission were assessed by 15.04.2013 Source: SHMI

Aggregated emissions of greenhouse gases (Tg) by sectors in CO_2 equivalents

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Power Industry*	53.86	35.65	38.13	35.85	36.52	35.44	35.50	34.43	32.75	33.55	30.20	31.79	31.53
Industry Processes**	9.54	8.29	8.77	9.15	9.02	10.13	9.41	10.25	10.01	9.90	8.37	8.62	8.25
Using solvents	0.15	0.09	0.10	0.13	0.14	0.16	0.17	0.17	0.17	0.17	0.16	0.16	0.17
Agriculture	7.12	3.50	3.54	3.48	3.36	3.17	3.17	3.12	3.23	3.13	3.05	3.10	3.12
LULUCF	-10.02	-10.71	-10.51	-10.77	-10.24	-9.63	-6.10	-8.46	-8.10	-7.22	-7.44	-6.92	-7.47
Waste	1.09	1.78	1.81	2.58	2.50	2.47	2.35	2.53	2.36	2.37	2.16	2.22	2.23

Emission were assessed by 15.04.2013 Source: SHMI
The table shows calculated years 1990-2010
** Including the traffic ** Including the F-gases*

International obligations in the area of climate changes

At the UN Conference on Environment and Development (Rio de Janeiro, 1992) was adopted **framework UN Framework Convention on climate change** – basic international legal instrument for

protection of global climate. The Convention became effective in Slovakia on March 21, 1994. Slovak Republic accepted all the obligations of the Convention ratified by 183 countries and the EU as to date.

The Kyoto Protocol (KP) was adopted at the COP - Conference of Parties in December 1997. Slovakia along with other EU countries (EU obligation was assumed as a joint obligation, the so-called burden sharing agreement) approved a reduction target for the period of 2008-2012 not to exceed the average level of greenhouse gases emissions of 1990 reduced by 8%.

In the spring of 2007, the European Parliament adopted a unilateral obligation to reduce the greenhouse gases emissions within the EU by at least 20% by 2020, compared to 1990. Next, there was a declaration that the EU will extend this obligation to a 30% reduction provided that such is adopted also by other world developed countries and that developing countries with more advanced economies will follow, assuming obligations adequate to their responsibility and capacities.

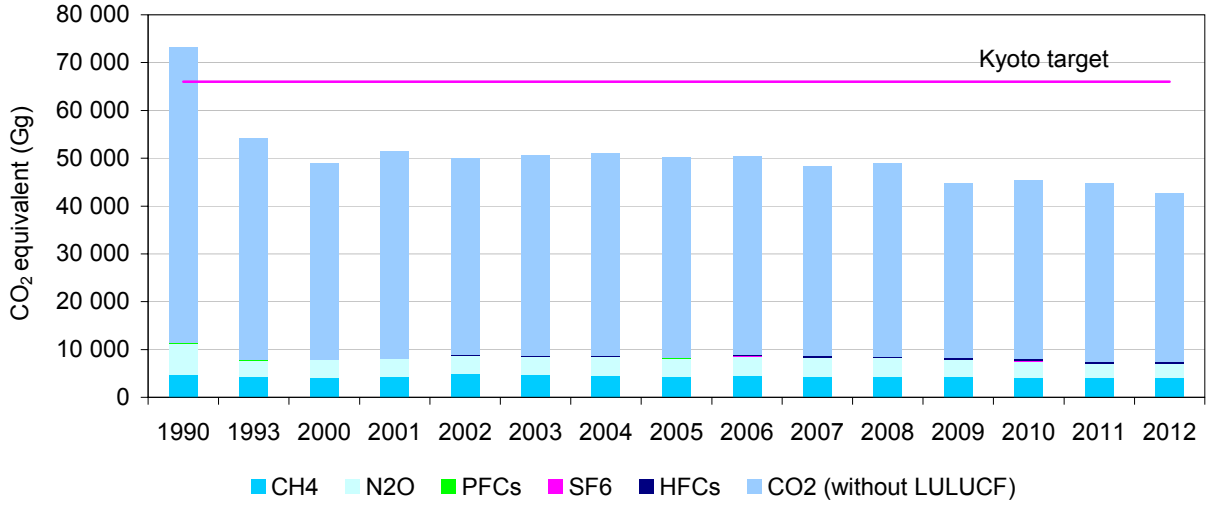
The integrated climate-energy package officially presented by the European Commission in January 2008 is a basic, complex and very ambitious approach to reduce greenhouse gasses emissions, increase the energy efficiency, reduce the consumption of fossil fuels, and support innovative, low-carbon technologies.

Slovakia has been meeting the mentioned international obligations and expects to do so in the years to come.

Trading with the emission allowance as mentioned in article 17 of the Kyoto Protocol constitutes one of the flexible mechanisms how to achieve the Protocol's objectives. The EU has undertaken to adopt, beyond the scope of the international trade with the emission allowance limits, its own instrument through which it sets its own rules.

Adopting the European Parliament and of the Council Directive 2003/87/EC of October 13, 2003 establishing the scheme for greenhouse gas emission allowance trading within the Community gave rise to the legal framework for the function of EU ETS.

Assessment of anthropogenic emission of greenhouse gases under compliance with the Kyoto protocols outcomes



Source: SHMI

Trend in the selected climate change assessment indicators

Trend in the development of the climate has been assessed on the basis of trends that exist within large-scale time sequences (1951-2012) for individual climate elements, and on the basis of a comparison of individual years to the normal reference period of 1961-1990. Beside the climate elements, assessed are also the selected hydrological flow characteristics that immediately react to the trends in climate development. (i.e. atmospheric precipitations, air and vapour temperature) Two monitoring stations were selected for the purposes of carrying out a representative assessment of indicators in relation to Slovakia's altitude. The station of Hurbanovo is to provide data for the lowland-type areas, and the stations of Liptovský Hrádok or Oravská Lesná will gather data from the areas of higher altitude.

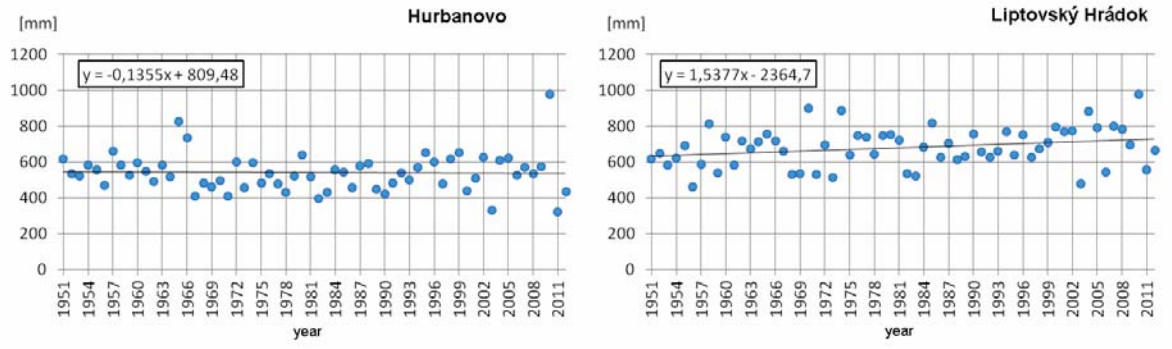
♦ Climate elements

Total annual atmospheric precipitations (1951 - 2012)

The lowland areas of Slovakia showed a **declining trend** of total annual precipitations over the years 1951-2012 (8 mm at Hurbanovo), while the trend was rising in the northern and high-altitude areas. (94 mm at Liptovský Hrádok)

Significant below-the-limit years assessed at the Hurbanovo station on the basis of the annual total precipitations within the interval below 10% of occurrence compared to the normal level included the following years: 1967, 1971, 1978, 1982, 1990, 2003 and 2011and at the Liptovský Hrádok station: 1956, 1968 - 1969, 1973, 1983 and 2003. On the contrary, **significantly humid years** with the annual total precipitations above 90% compared to the normal values recorded at Hurbanovo included the years 1957, 1965-1966, 1980, 1995, 1999, 2010, and in 1958, 1970, 1974, 1985, 2004, 2007, 2010 at Liptovský Hrádok.

Total annual atmospheric precipitations in Hurbanovo and Liptovský Hrádok (1951-2012)



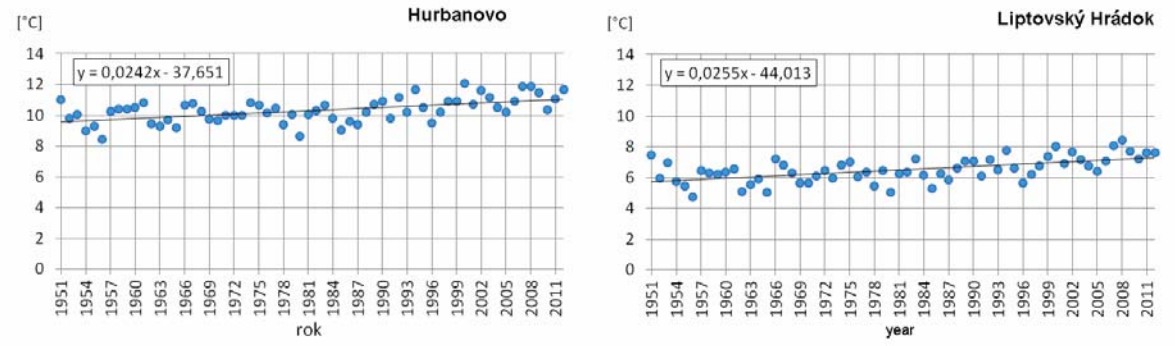
Source: SHMI

Average annual air temperature (1951-2012)

Both, lowland and highland areas show a **rising trend** in the average annual air temperature. (1.5°C at Hurbanovo, and 1.6°C at Liptovský Hrádok)

Significantly **below normal temperatures** recorded at Hurbanovo were the years 1954-1956, 1963, 1965, 1980, 1985, and 1955-1956, 1962, 1965, 1978, 1980, 1985 at Liptovský Hrádok. Significantly **above normal temperatures** recorded at Hurbanovo were the years 1994, 2000, 2002, 2007-2009, 2012 and in 1994, 2000, 2002, 2007-2009, 2011 at Liptovský Hrádok.

Average annual air temperature in Hurbanovo and Liptovský Hrádok (1951-2012)



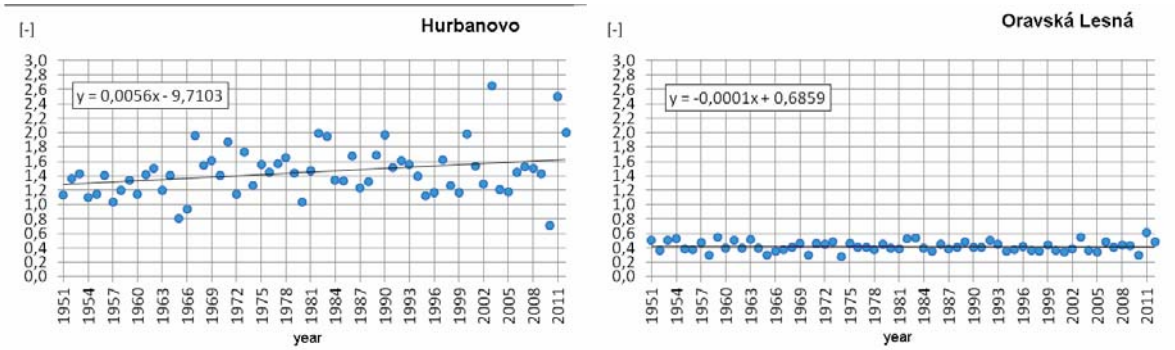
Source: SHMI

Drought index (1951-2012)

Drought index is based on the comparison (ratio) of the annual sum of potential evapo-transpiration and the total annual atmospheric precipitations. The lowlands of Slovakia recorded a rising trend in the drought index (0.34 at Hurbanovo), while in the highland areas this index shows practically zero trend. (0.01 at Oravská Lesná)

Statistically **significant drought** occurred especially in the southern parts of Slovakia (Hurbanovo) in the years 1967, 1982, 1990, 2000 and 2011-2012. On the contrary, **very humid years** detected at Hurbanovo included the year 1954, 1957, 1965-1966, 1980, 1995 and 2010 while the far northern part of the territory did not record any significant dry seasons.

Drought index in Hurbanovo and Oravskaá Lesná (1951-2012)



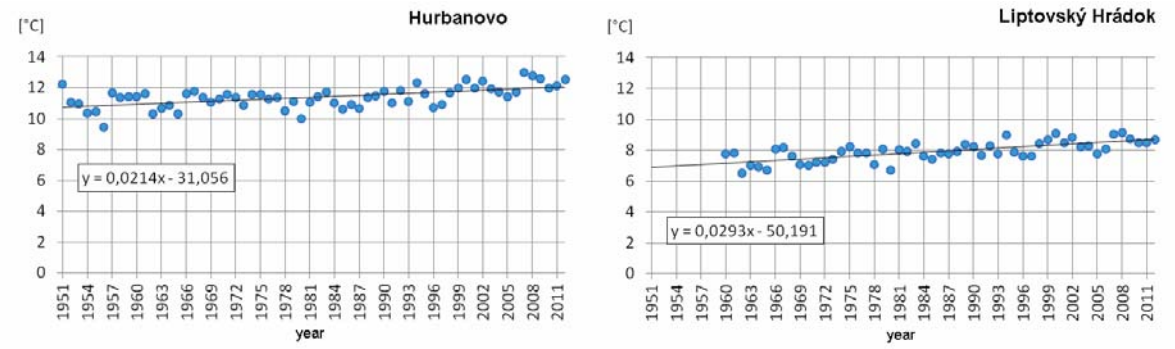
Source: SHMI

Annual soil temperature in the depth of 10 cm (1951-2012)

Both, lowland and highland areas show a **rising trend** in the average annual soil temperature in the depth of 10 cm (1.3°C at Hurbanovo, and 1.8°C at Liptovský Hrádok).

Statistically **above-normal years** in annual soil temperature in the depth of 10 cm at Hurbanovo were 1994, 2000, 2002, 2007-2009, 2012 and at Liptovsky Hrádok 1994, 2000, 2002, 2007-2009.

Annual soil temperature in the depth of 10 cm in Hurbanovo and Liptovský Hrádok (1951-2012)



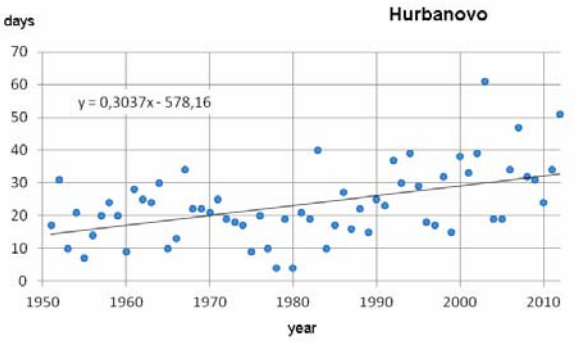
Source: SHMI

Heat waves (number of tropical days) (1951-2012)

Both, lowland and highland areas show a rising trend in the number of tropical days. (19 more at Hurbanovo and 8 more at Liptovský Hrádok)

Strong, **above-normal number** of tropical days occurred at Hurbanovo in 1983, 1994, 2000, 2002-2003, 2007, 2012, and in 1992, 1994, 1998, 2006-2007, 2010 and 2012 at Liptovský Hrádok. On the contrary, strong **below-normal number** of tropical days was recorded at Hurbanovo in 1953, 1955, 1960, 1965, 1975, 1977-1978, 1980, 1984 and at Liptovský Hrádok in 1953, 1955-1956, 1960, 1966, 1970, 1973, 1975, 1977-1980, 1982, 1985-1986 and 2008.

Number of tropical days in Hurbanovo (1951-2012)



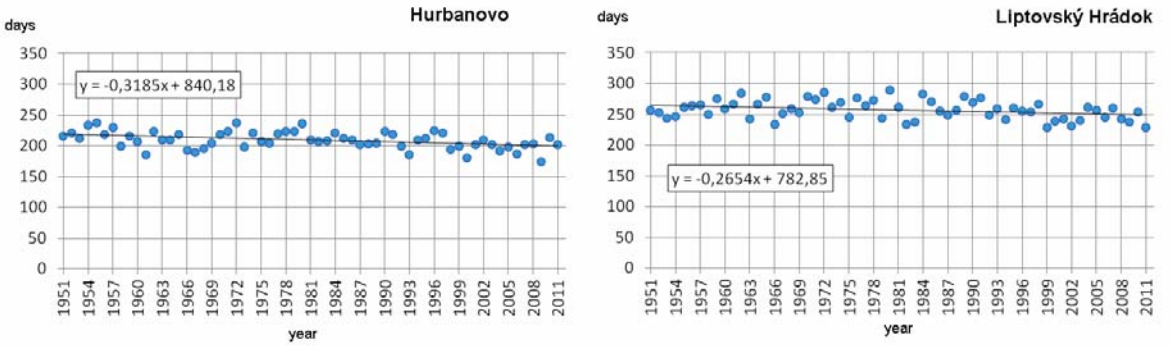
Source: SHMI

Heating period of 1951-2012

Lowland as well as highland areas show a declining trend in the **number of heating days,** specifically by 20 days less at Hurbanovo, and 17 days at Liptovský Hrádok.

Statistically significant **low number of heating days** was recorded at Hurbanovo in the years 1961, 1967, 1993, 2000, 2004, 2006, 2009 and in 1966, 1982-1983, 1999, 2002, 2009 and 2011-2012 at Liptovský Hrádok. On the contrary, statistically strong **high number** of these days was recorded at Hurbanovo in 1954-1955, 1957, 1972, 1980, 1996 and at Liptovský Hrádok in 1962, 1965, 1970, 1972, 1980, 1984 and 1989.

Number of heating days in Hurbanovo and Liptovský Hrádok (1951-2012)



Source: SHMI

♦ Hydrological elements

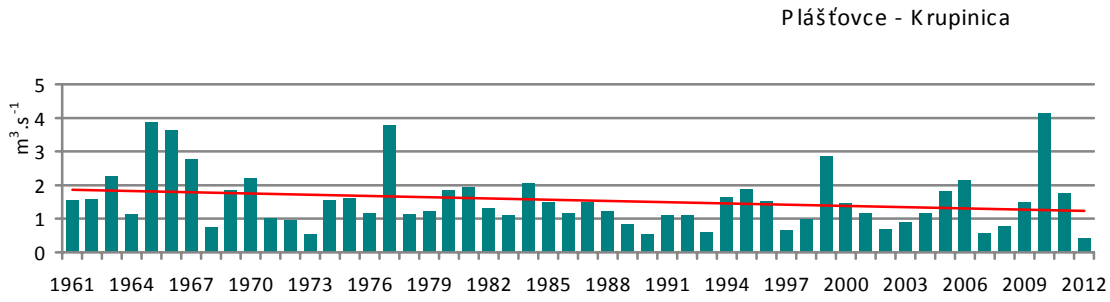
Annual flows

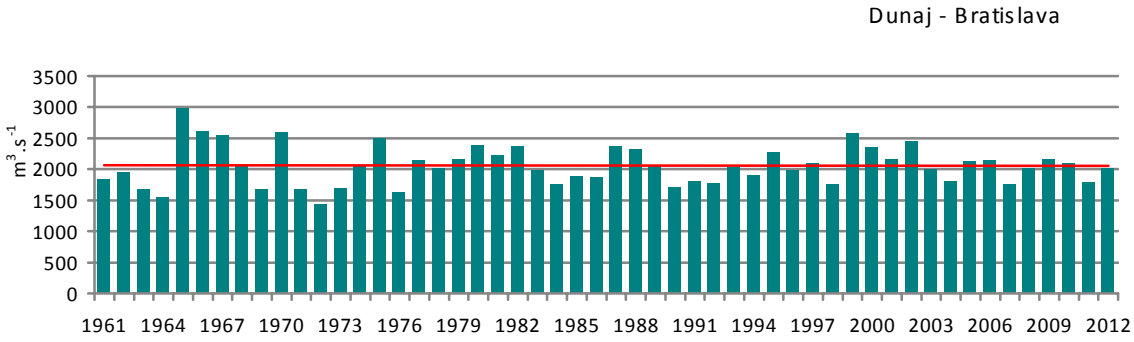
Watershed area of the southern part of Slovakia (Slovakian part of the Morava river watershed along with the watersheds of Nitra, Hron, Ipeľ, Slaná, and Bodva) show slight to significant decreasing trend in **average annual flows** for all monitored periods. (e.g. Krupina in Plášťovce) Watershed areas of the north-western, northern, and north-eastern Slovakia show, over the entired monitored period, very slightly declining, balanced, or even slightly rising trend in average annual flows for all monitored periods. (e.g. Kysuca in Čadca). Notwithstanding the legth of the period, introduced water course of Danube has shown a balanced characteristics in average annual flows.

Trends in **minimum annual flows** essentially copy the trends in average annual flows in southern and northern watersheds of Slovakia. (e.g. Krupina in Plášťovce) Minimum annual flows recorded on Danube in Bratislava show a slightly rising trend.

Unlike the average annual flows, the trend in **maximum annual flows** provides no sufficient basis to **define similar areas.** Surprisingly, most monitored watercourses over the last decades show declining or balanced trend in maximum annual flows. (e.g. Krupina in Plášťovce). Trend in maximum annual flows on Danube in Bratislava for the period beginning at the start of the last century as well as since the start of monitoring in 1961, has been rising significantly.

Average annual flows (1961-2012)





Source: SHMI

♦ Run-off distribution over the year

No significant changes in run-off distribution over the long-term horizon have been detected in Slovakia for selected time periods.

• PUBLIC HEALTH

Key questions and key findings

What is the trend in the basic indicators relevant to the demographic trend and the level of public health?

- **The average life expectancy at birth in Slovakia has been permanently rising. In the course of the years 1993-2012, the average life expectancy at birth grew by 4.12 years in men and 2.79 years in women. In 2012, compared to 2000, it grew by 3.33 years in men, and by 2.23 years in women. Over the last year, the average lie expectancy at birth grew by 0.30 years in men, and 0.10 years in women**
- **The number of live births per 1 000 inhabitants grew from the level of 13.96 pro mile in 1993 to 10.27 pro mile in 2012. In the middle-term perspective, the number of live births also grew from 10.21 pro mile in 2000. The last year-to-year change in the number of live births reached the value of 1 pro mile.**
- **Number of deaths per 1 000 inhabitants dropped from the level of 9.9 in 2000 to 9.8 in 2010. Trend in the number of deaths per 1,000 inhabitants remains balanced over a long period of time. Over the period of 1993-2012, this trend declined from the level of 9.9 pro mile to 9.70 pro mile, while in the period between the years 2011-2012 it declined only by 0.08 pro mile.**

Morbidity and mortality

Average life expectancy at birth is rising for both genders, reaching 72.47 years for men and 79.45 years for women in 2012. The SR population is aging at the base of the age pyramid, i.e. from the bottom, due to a reduction in fertility and natality, as well as near the top of the age pyramid due to an increasing average life expectancy. **Structure of population** by gender is the result of natality, mortality, and external migration. The secondary masculinity index, i.e. the number of born boys per 1 000 born girls, shows generally fluctuating characteristics.

In 2012, there were 26 884 deaths for men and 25 553 deaths for women. Compared to 2011, this is higher by 87 deaths in men, and higher by 446 deaths in women. In 2012, men comprised 51.3% of deaths, while women 48.7%.

Greatest public mortality both in men and women over a long time period has been from **circulatory system diseases** in 2012, with 27 773 deaths, which is 44.7% in men and 55.3% in women. Second most frequent cause of death for both, men and women, are still **neoplasms**. Compared to the last year, **cancer** shows a slightly increasing tendency, with 12 197 deaths in 2012, which is 25.8% of men and 20.6% of women. For men, third most frequent cause of death is **external causes** (7.7%). For women, third most frequent cause of death are **other diseases** (6.7%).

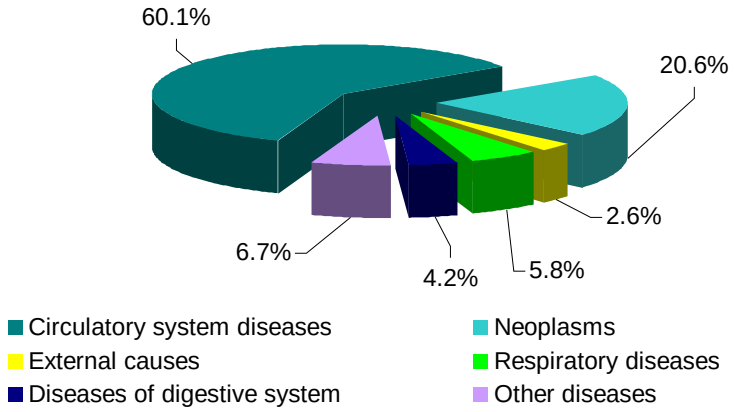
Public Health – selected indicators

Indicator	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Life expectancy at birth												72.47
• Men	69.51	69.77	69.77	70.29	70.11	70.40	70.51	70.85	71.27	71.62	72.17	79.45
• Women	77.54	77.57	77.62	77.80	77.90	78.20	78.08	78.73	78.74	78.84	79.36	
Live births per 1 000 inhab.	9.5	9.5	9.6	10.0	10.1	10.0	10.1	10.6	11.3	11.1	11.3	10.3
Deaths within 1 year of age per 1 000 live births	6.2	7.6	7.8	6.8	7.2	6.6	6.1	5.9	5.7	5.7	4.9	5.8
Infant mortality rates	4.1	4.7	4.5	3.9	4.1	3.5	3.4	3.4	3.1	3.6	2.9	3.3
Deaths	51 980	51 532	52 230	51 852	53 475	53 301	53 856	53 164	52 913	53 445	51 903	52 437
Deaths per 1 000 inhab.	9.7	9.6	9.7	9.6	9.9	9. 9	10.0	9.8	9.8	9.8	9.6	9.7

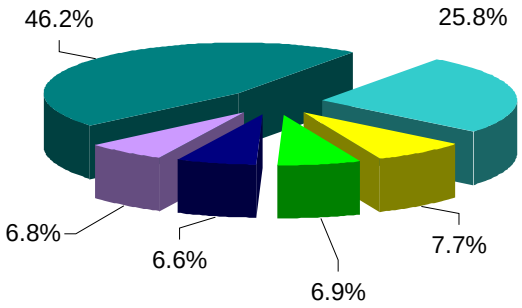
Source: SO SR

Structure of causes of death in SR in 2012

females



males



Source: SO SR