Environmental Data

2017

STAATSMINISTERIUM
FÜR UMWELT UND
LANDWIRTSCHAFT

Freistaat
SACHSEN

Contents

Preface

This concise environmental data brochure is issued on an annual basis to provide insight into the foresighted environmental policies in the Free State of Saxony.

This year's issue places special emphasis on water and water protection. Water is essential to life. Clean potable, surface and ground waters have a significant impact on the quality of our lives and our natural environment. The information provided by the environmental data brochure of 2017 includes the economic aspects of water use, annual precipitation amounts, wastewater treatment and handling of water hazardous substances in Saxony.

Another specificity for this year is that the number of beehives is introduced as a new environmental indicator. About 80 per cent of the native crops and wild plant species rely on pollination by insects. Therefore, beekeeping is of utmost importance for the preservation of biodiversity. Honeybees as pollinators are essential to agriculture, because they improve both the yield and the quality of the crops. The continuous increase in the number of beehives since 2008 is very encouraging.

The charts and related descriptions in the 2017 environmental data provide relevant information on major environmental topics and trends in Saxony such as green economy, resource efficiencies, climate change, soil, air or nature. Many of the environmental areas covered by this brochure show positive trends. However, the brochure also deals with current and upcoming challenges such as at the example of climate change adaptation and mitigation.

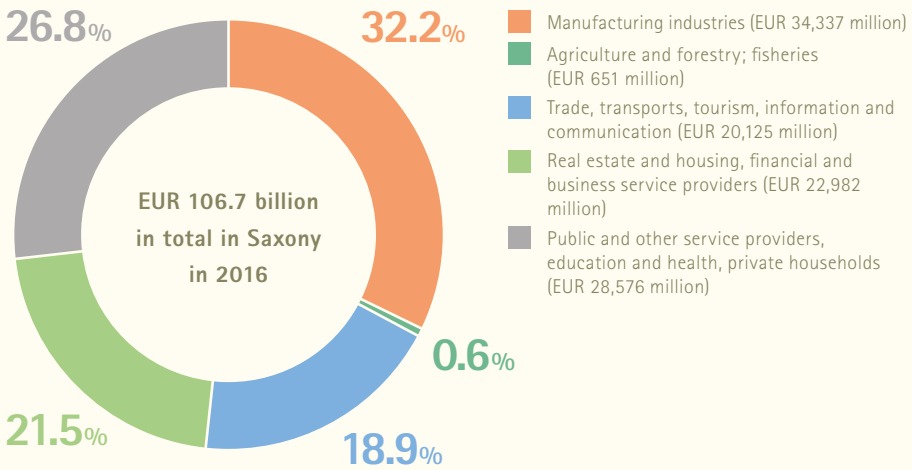
Latest and further information can be found on the Internet at www.umwelt.sachsen.de.

Thomas Schmidt
Saxon State Minister
of the Environment and Agriculture

Economic structure

The economy in the Free State of Saxony has undergone basic structural changes since German unification. Today, Saxony is a modern economy marked by the services sector and a comparatively strong manufacturing sector. Saxon economy increased by 2.7% (adjusted for price changes) in the prior year. For the third year in a row Saxony thus recorded above-average economic growth in comparison with Germany on a whole. The highly performing agriculture and forestry sector accounts for 0.6 per cent of the total gross value added. However, this does not show its upstream and downstream importance, nor its significance for services of general interest.

Gross value added by economic sectors in Saxony



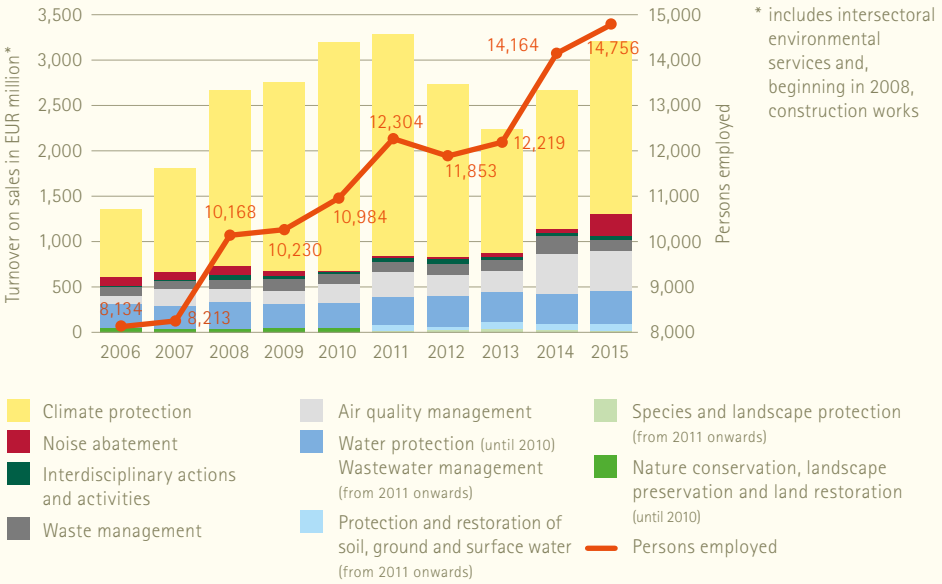
Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG); Federal Regional Accounts as of February 2017

Green economy

The environmental sector in Saxony has grown during the past few years to become a solid pillar of the Saxon economy as a whole, employing meanwhile more than 14,700 persons. Most segments in the environmental sector show a sustained positive trend in sales and employment. Between 2012 and 2014, however, this trend was weakened by falling sales in climate protection, which is the largest segment of the environmental sector. In 2015, sales volumes started to grow again also for this segment.

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG); Statistical Office of the Free State of Saxony – Issue: 06/2017

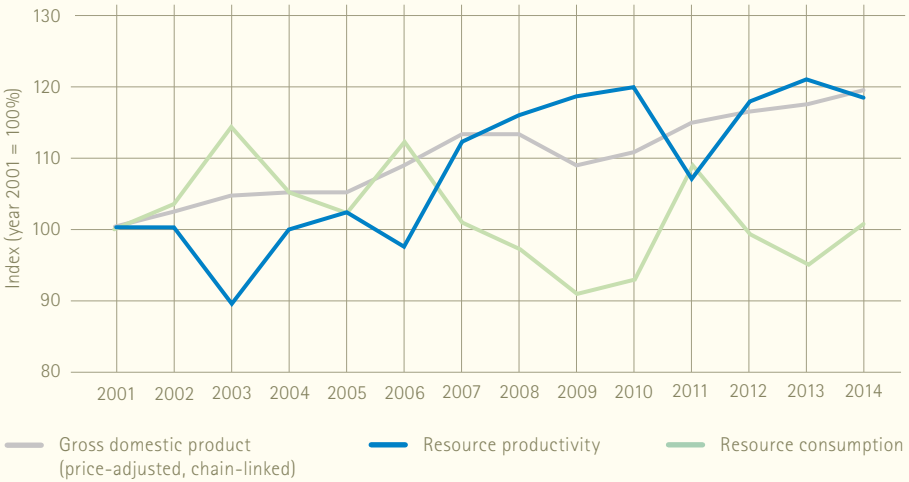
Persons employed and sales volume in the environmental sector



Resource productivity

Resource productivity is a key performance indicator for measuring the effective use of resources, as it represents the relationship between economic performance and use of non-renewable resources. The increase in resource productivity is one of the goals laid down in Saxony's sustainability strategy. In spite of temporary variations in the years of 2011 and 2014, Saxony is among the few states in Germany to have succeeded in doubling its resource productivity in comparison with 1994 levels.

Resource productivity in Saxony

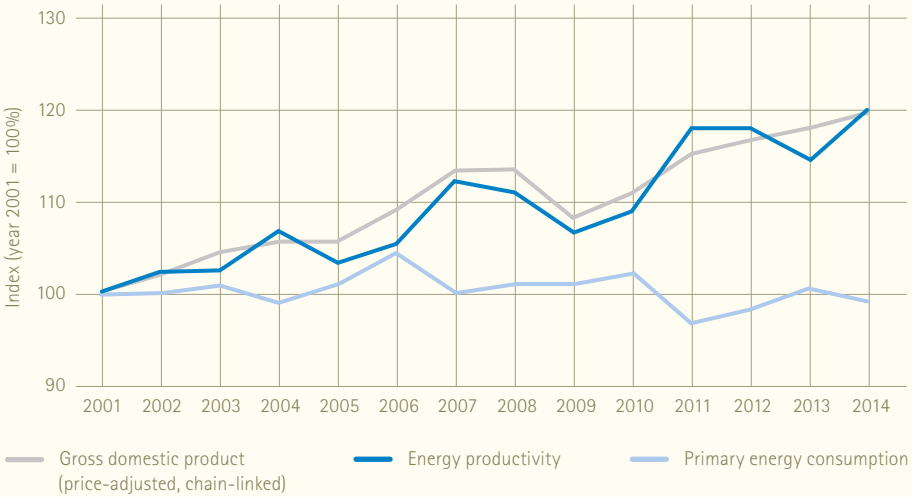


Source: Calculation by the LfULG on the basis of the Environmental Economic Regional Accounts of October 2016 and of the Federal Regional Accounts as of August 2015/February 2016

Energy productivity

Energy productivity is a measure for the efficient use of energy. It is calculated as the ratio of the economic performance (gross domestic product GDP) over primary energy consumption. This indicator shows the development over time of how the economic output is decoupled from energy consumption thereby outlining the energy efficiency of a national economy. The abandonment of energy-intensive production sectors enabled Saxony to make a great leap in energy productivity in the 1990s. On the other hand, there has been a constant and distinct increase in energy productivity since 2001. This places Saxony in a leading position on a Germany-wide scale.

Energy productivity in Saxony

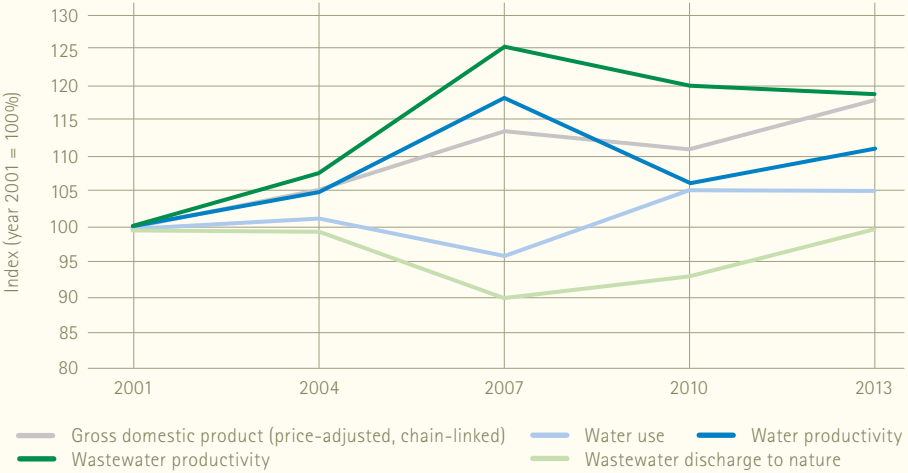


Source: Calculation by the LfULG on the basis of the Environmental Economic Regional Accounts of November 2015; of the Federal Regional Accounts of August 2015 / February 2016; and of the Energy Balances Regional Working Group: as of August 2016

Water productivity

Water productivity is a key performance indicator for measuring the economic performance per unit of water used (gross domestic product per cubic metre of water used). Its development is largely dominated not only by "real" productivity improvements or impairments, but also by the economic structure and the percentage shares of high water consumption industries and production segments. A comparatively high water productivity indicates lower water consumption rates for the economic and industrial structure of the measured region. The information on water use and effluent discharge to nature is collected every 3 years. This has an impact on the up-to-dateness of the statistical data.

Water and wastewater productivity in Saxony

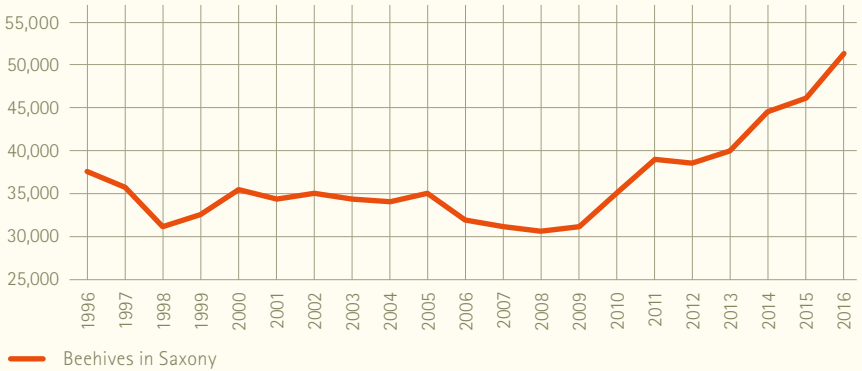


Source: Calculation by the LfULG on the basis of the Environmental Economic Regional Accounts of October 2016 and of the Federal Regional Accounts as of August 2015/February 2016

Beehives in Saxony

The number of beehives in Saxony has shown a steady increase over the past few years. 6,048 beefarmers and 52,061 beehives were registered with the Saxon Animal Epidemics Control Body TSK (Tierseuchenkasse) in 2016. This upward trend is mainly due to public aid schemes for new beefarmers and enhanced public awareness programmes. About 80% of native crop and wild plant species rely on insect pollination, more than 75% of which is by honey bees. So beefarmers and their beehives make a huge contribution to the preservation of our natural environment, in addition to making honey and other beekeeping products.

Beehives in Saxony



Source: Annual report of the Saxon Animal Epidemics Control Body TSK

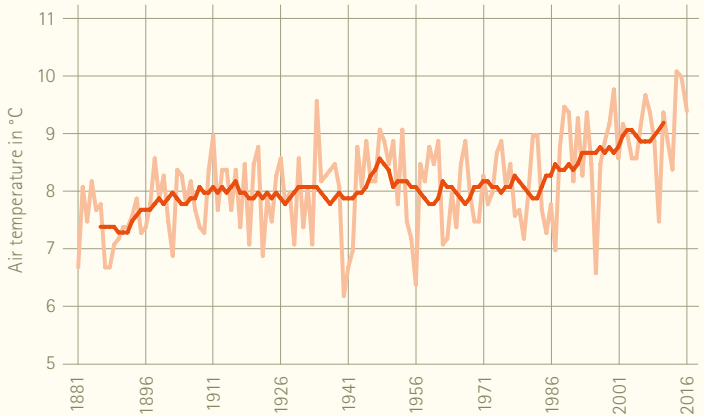
Climate trends in Saxony

The charts show the annual mean air temperatures and precipitation totals for vegetation period I (April to June) in Saxony during the period from 1881 to 2016. The 11-year running average allows for better illustration of the long-term trend as it is less dependent on year-to-year variations. The air temperature over time curve is a highly suitable form of representation of the climate change. Higher temperatures lead e. g. to longer growth periods and more frequent occurrences of weather extremes (e. g. heat waves, droughts) with associated risks. From 1971 to 2010, every decade was warmer than the decade before, and the past two decades saw a striking accumulation of warmest years in Saxony. The year 2016, although a little cooler than the record years of 2014 and 2015 due to local weather circumstances, is among the then warmest years recorded since first data availability in 1881.

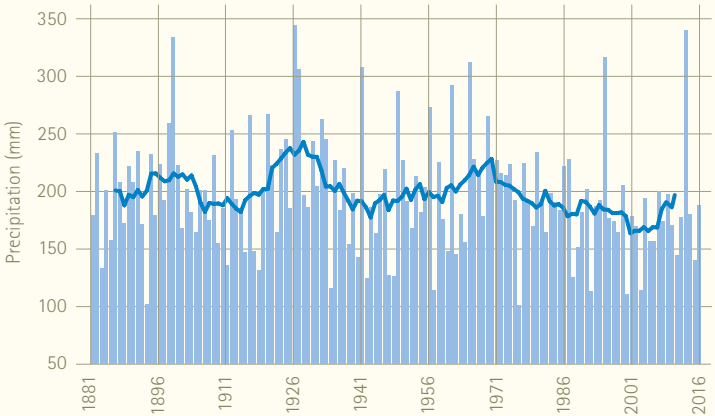
Precipitation is rather heterogeneous both in space and time, compared with the temperature graph. Lower precipitation volumes in vegetation period I slow down the growth of plants and increase the risk of crop loss. This has an increasing impact e.g. on agriculture, especially in conjunction with rising temperatures. From 1971 until 2010, every decade was drier than the one before. Saxon farmers can rely on better water management strategies for adaptation to these changing conditions. Such strategies include the selection of appropriate varieties or field crops, adapted soil cultivation and fertilisation methods, and irrigation in certain crops and crop rotations.

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG), German Weather Service (DWD), 2017

Annual mean temperature in Saxony, 1881 – 2016
(11-year running average)



Precipitation in vegetation period 1 (April – June) in Saxony, 1881 – 2016 (11-year running average)



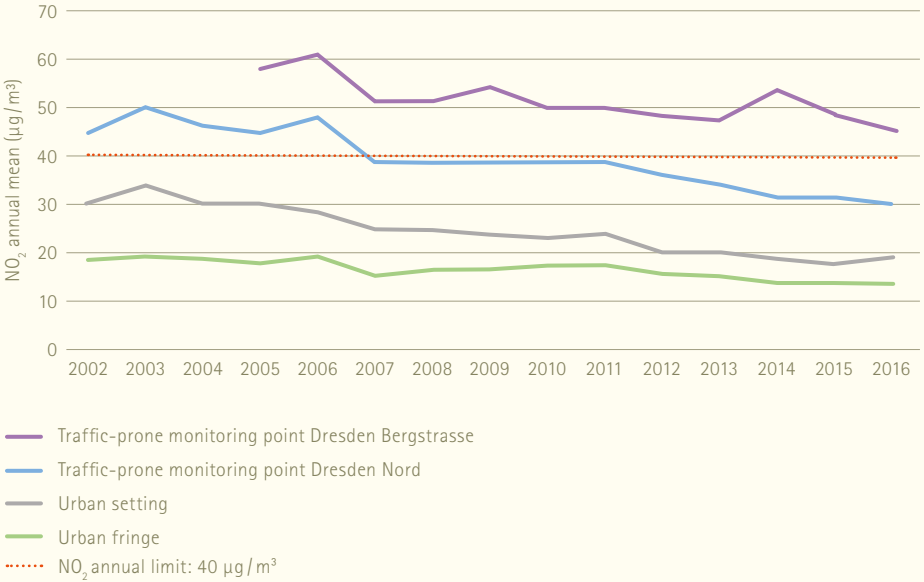
Temperature Precipitation

Air pollutants – impacts

The impact of air pollutants is shown at the example of nitrogen dioxide in the Dresden city region. Road traffic is the largest source of emissions having immediate local impact. Therefore, the limit values are occasionally exceeded at monitoring points in traffic-prone locations, but there is a noticeable trend for the better. As of 2015, compliance with the EU air quality limits has to be ensured, which is no problem in general urban and regional settings.

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Impact of nitrogen oxides in the Dresden area

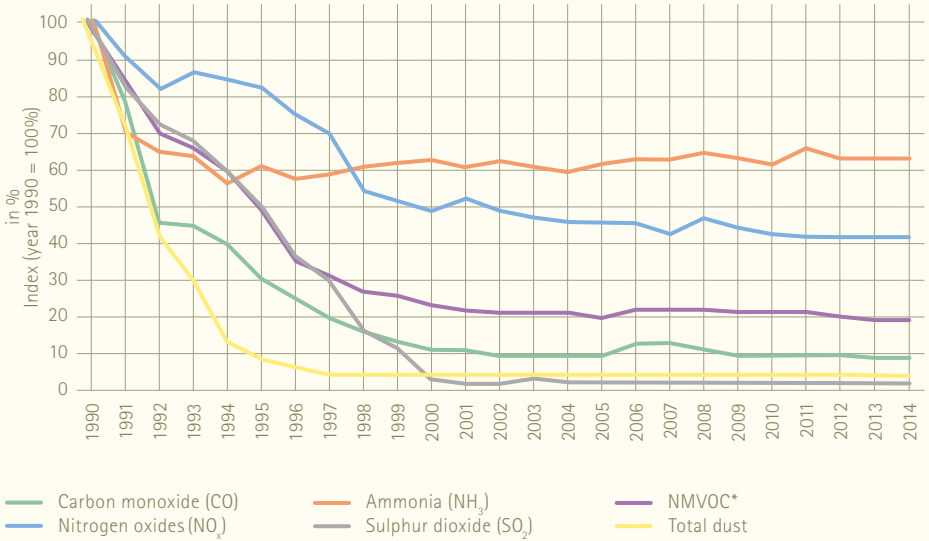


Air pollutants – emissions

Air pollutants can trigger a variety of negative impacts on human health and environment. Air pollutant emissions in Saxony have dropped considerably since 1990. This is mainly due to the restructuring of the east German economic landscape during the 1990s. Relevant reductions have no longer been observed over the past few years. The levels of emission of ammonia and nitrogen oxides are still too high. Especially urban agglomerations face excessive loads of nitrogen oxides and particulate matter (PM).

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG); Emissions Registry

Air pollutant emissions in Saxony



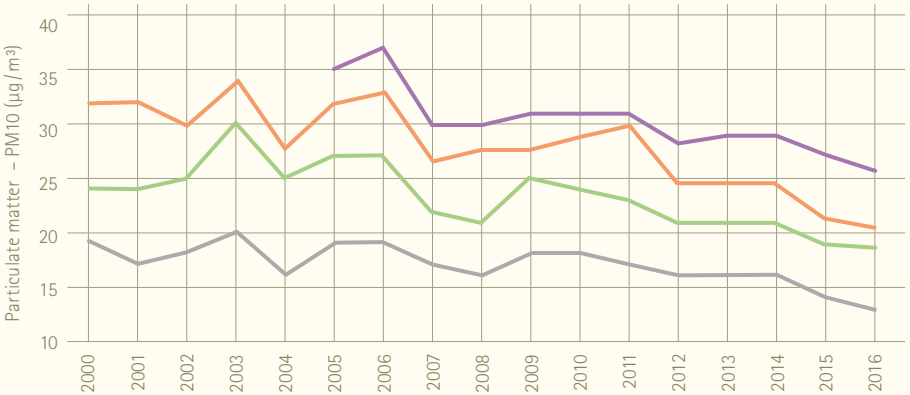
* Non-methane volatile organic compounds

Particulate matter (PM)

Combustion processes and road traffic are the major emission sources for atmospheric particulate matter (PM). As PM can travel long distances in the atmosphere, the measured concentrations are not limited to Saxon sources. Meteorological conditions have a strong impact on the levels of particulate matter in the atmosphere and also are the cause for inter-annual fluctuations. The datasets of the regional annual mean values show a minute but gradual decline in concentration levels.

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Area-related annual mean PM10 levels in Saxony

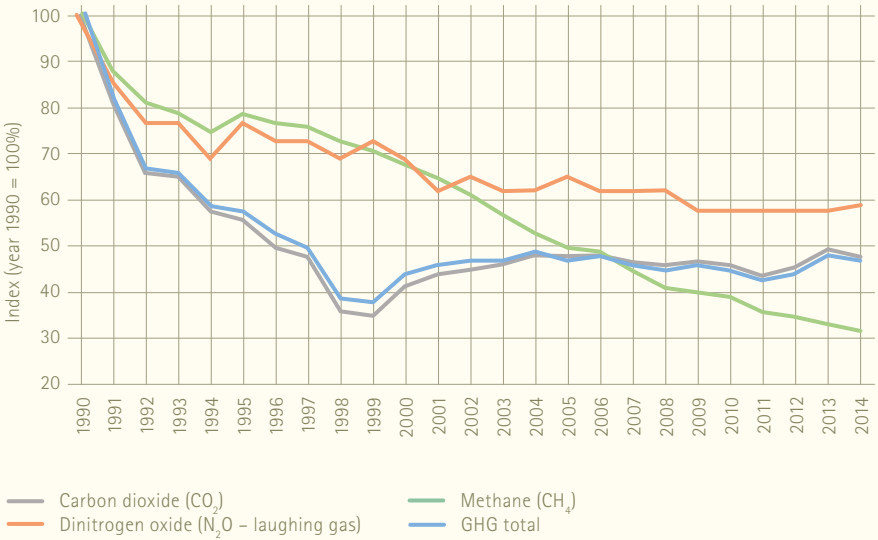


Greenhouse gases in CO_2 equivalents

Greenhouse gas emissions (composed of carbon dioxide: CO_2, dinitrogen monoxide: N_2O and methane: CH_4) dropped by about 53% from 1990 until 2014. Whereas CO_2 and N_2O emissions showed a fluctuating trend over the last decade, CH_4 emissions continued to decrease. The main reason lies in the waste management sector (landfill ban on untreated waste).

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG); Emissions Registry

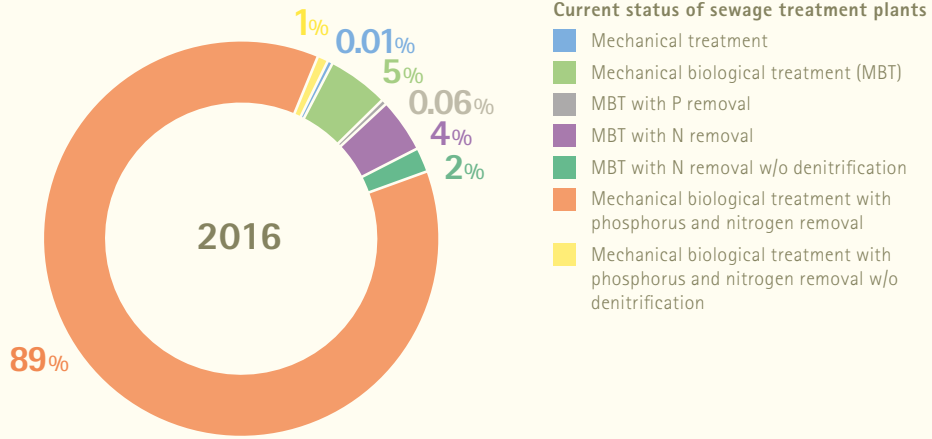
Emissions of selected greenhouse gases in CO_2 equivalents in Saxony since 1990



Current status of sewage treatment plants

Saxony has invested a lot in sewage treatment facilities during previous years. About nine in ten plants have been built, restored or extended since 1991. Almost all municipal plants include at least a biological sewage treatment step. This ensures 95% elimination of the chemical oxygen demand, as well as phosphorus and nitrogen removal rates of 88% and 83%, respectively.

Current status of sewage treatment plants as referred to treatment capacity

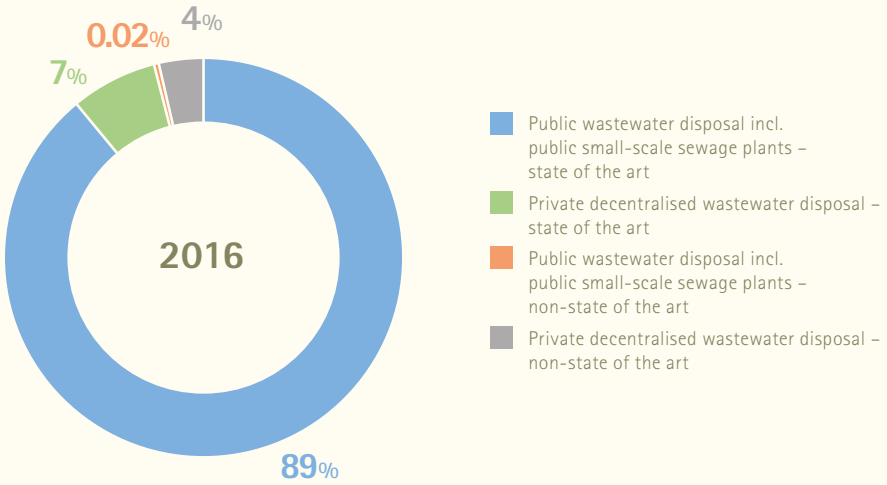


Rounded values, **Source:** Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Wastewater

The highest possible number of people should have their wastewater and sewage treated according to the state of the art. This ensures limited input of hazardous substances into the natural environment and protects the natural resources of life. Since 2016, sewage from about 96% of the Saxon population is treated, at least biologically, in centralized or decentralized plants operated according to the state of the art. Public sewage treatment plants account for the highest share.

Percentage of state-of-the-art sewage treatment

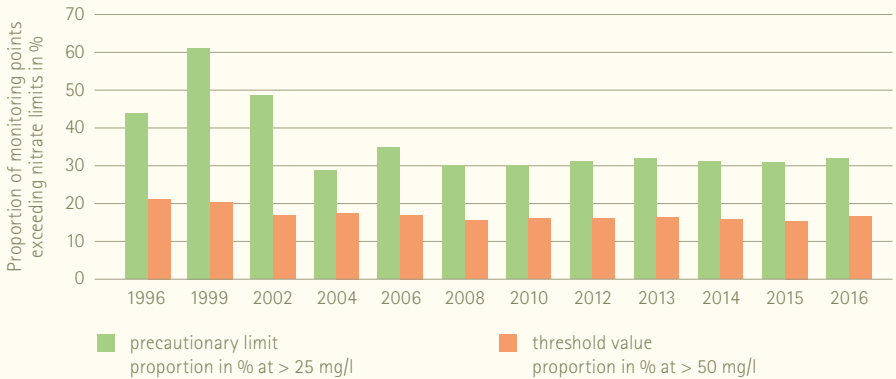


Rounded values, **Source:** Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Nitrates in groundwater

In 2016, 32% of the monitoring points within the surveillance monitoring network recorded nitrate levels in excess of 25 mg/l (precautionary limit value specified in the European Nitrate Directive). On the other hand, the proportion of monitoring points recording nitrate concentrations higher than 50 mg/l (threshold value in the Groundwater Directive and action value in the European Nitrate Directive) was 16.5%. Since 2008, the share of monitoring points measuring excessive levels has remained almost the same. The evaluations until 2005 were based on the monitoring points of the previous "basic monitoring network". Starting in 2006, the monitoring network was adjusted to the requirements of the EC Water Framework Directive (WFD). As a result, the number of monitoring points has almost doubled and can be considered representative for the entire territory. The density of monitoring points is about 1 monitoring point per 100 square kilometres. Therefore, a direct comparison between the periods before 2006 and after 2006 is not possible.

Monitoring points exceeding limits

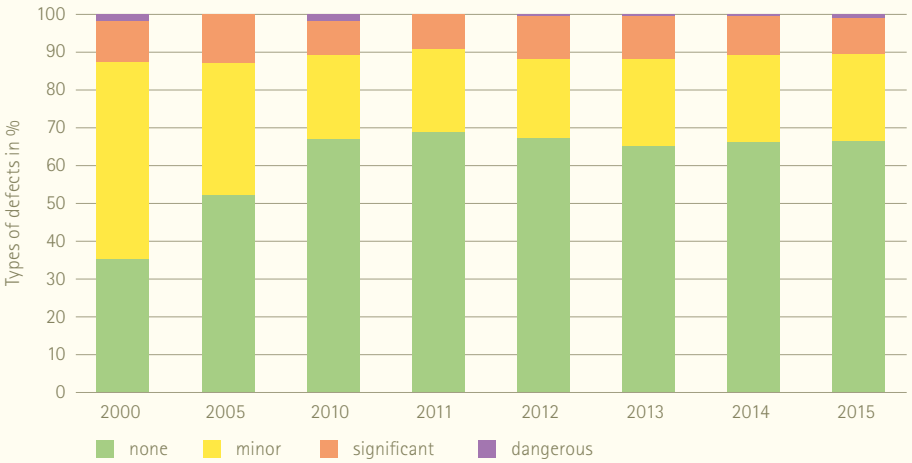


Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Inspections of facilities for handling water hazardous substances

Approximately 4,700 inspections were carried out in installations handling water hazardous substances in Saxony in 2015. During the past few years, the proportion of initial inspections has gone down in favour of re-inspections. The number of compliant installations increased during previous years and has reached a high level. The percentage of plants with significant non-compliances has remained relatively constant (9%). Dangerous non-compliances across all inspections were found to exist in the per-thousand range only. On a Germany-wide scale, initial inspections in Saxony give a higher number of compliant installations and a considerably lower number of significant non-compliances than in other German states.

Plant inspections in Saxony

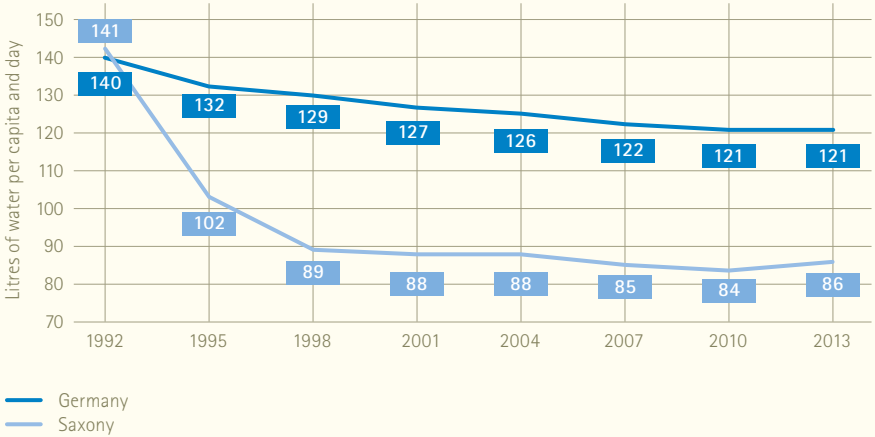


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Water consumption by private households and small businesses

The specific water consumption rate of households and small businesses in Saxony was largely reduced, especially in the 1990s, by introducing water-saving technologies, water metering equipment and cost-covering water pricing. Over the past few years, the per capita consumption rate has been about 85 litres of water per day with just minor fluctuations. When compared with the German-wide average of 121 litres per capita and day, specific water consumption in Saxony is very low.

Specific water consumption by households and small businesses

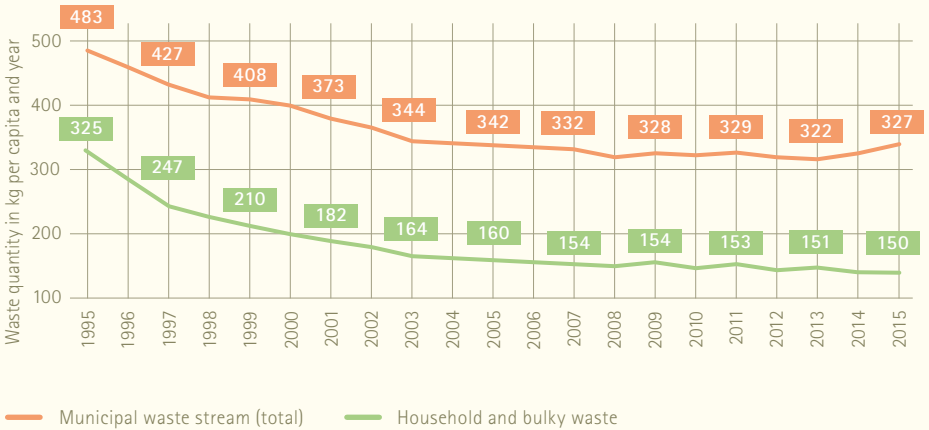


Source: Federal Statistical Office of Germany, Statistical Office of the Free State of Saxony

Municipal waste

Household goods for private consumption are produced by the use of energy and resources and discarded at the end of their product life cycles. The municipal waste stream from private households, and especially the collected quantities of household waste and bulky items, are intrinsically linked to a variety of individual measures of waste avoidance. The municipal waste stream and the collected quantities of household and bulky waste show a downward trend during the period under review, but this decrease has become significantly less pronounced during the past five years. A wide range of waste avoidance measures (low-waste consumption, re-use of second-hand goods, or avoidance incentives via waste charges) contribute to reducing the waste stream.

Municipal per capita waste stream from private housholds



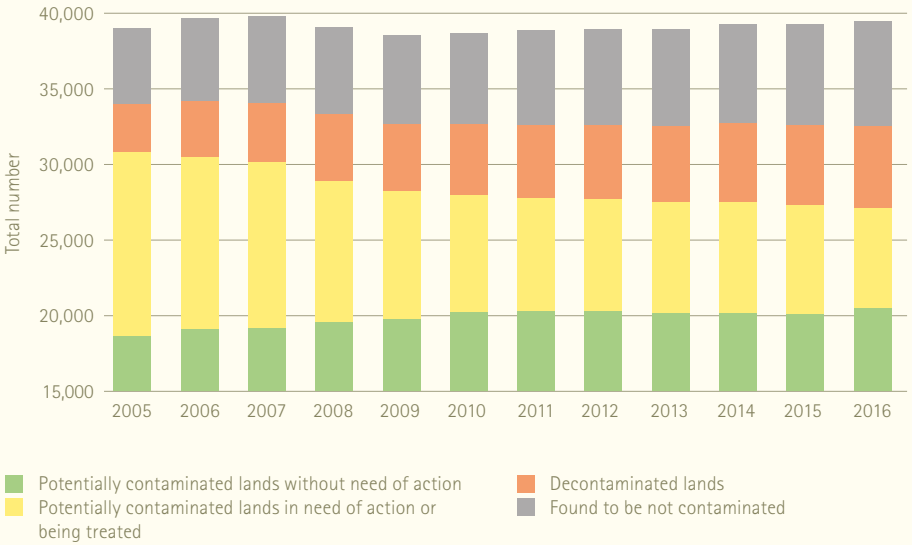
Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Number and percentage of decontaminated lands

The total number of lands recorded in the Registry of Contaminated Sites has remained almost unchanged over the past few years. That means that the identification and registration of potentially contaminated lands is largely complete. There is an upward trend in the percentage of sites that were investigated and found not to be contaminated. The continuous progress of rehabilitation can also be seen from the positive trend in the number of decontaminated lands. The success of the decontamination work is illustrated by the decreasing number of lands in urgent need of action or being currently treated.

Source:
Saxon State Office for the Environment, Agriculture and Geology (LfULG)

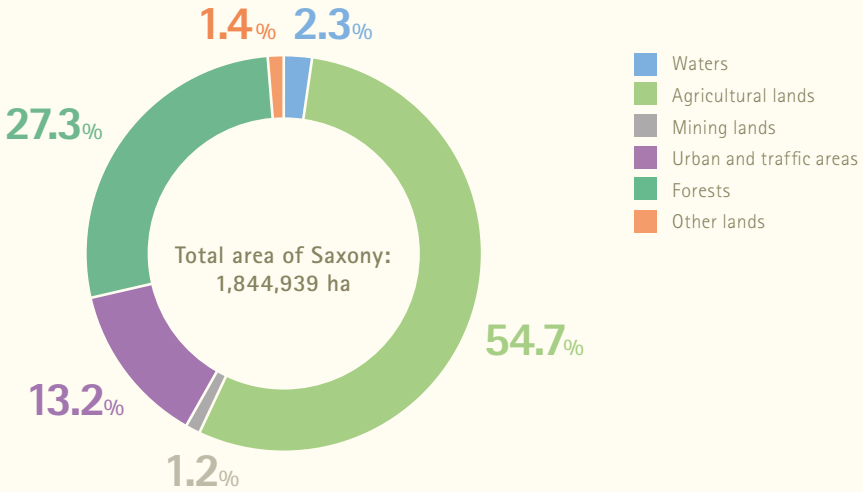
Lands recorded in the Saxon Registry of Contaminated Sites



Land use

Land uses in Saxony are subject to dynamic change. The chart shows the four-year-average situation broken down by main types of land use. Agriculture is the dominating use, taking up 55 per cent of the territory. However, there is a continued downward trend in agricultural lands while urban and traffic areas tend to grow. The Free State of Saxony endeavours to reduce this way of land consumption.

Land use in Saxony



Rounded values, **Source:** Calculation of LfULG based on the Saxon Statistical Office (StaLA)

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