Environmental Data

2015

STAATSMINISTERIUM
FÜR UMWELT UND
LANDWIRTSCHAFT

Freistaat
SACHSEN

Contents

Preface

This concise environmental data brochure is issued on an annual basis to provide exemplary insight into the foresighted and sustainable environmental policies in the Free State of Saxony. The charts and related descriptions give first-hand information on major environmental topics and trends in Saxony such as green economy, climate change mitigation, forest conditions, water, air, nature. In addition, this year's brochure places special emphasis on soils as 2015 has been declared the International Year of Soils by the United Nations. As can be clearly seen from the environmental data sets, the Free State of Saxony has made good progress in environmental control and nature conservation.

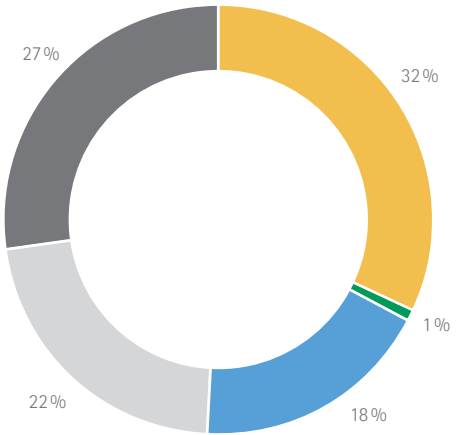
Thomas Schmidt

Saxon State Minister for the Environment and Agriculture

Economic structure

The economy in the Free State of Saxony has shown a generally increasing trend for years. The breakdown of the gross value added by economic sectors has remained the same for some time: The primary sector of agriculture & forestry, fisheries accounts for 1 per cent of the total gross value added. However, the chart does not include general interest services or upstream and downstream importance. Like in all West European countries, the biggest part of the gross value added is generated in the services sector. But the manufacturing sector here is comparatively strong.

Gross value added by economic sectors in Saxony



EUR 97.7 billion in total in Saxony

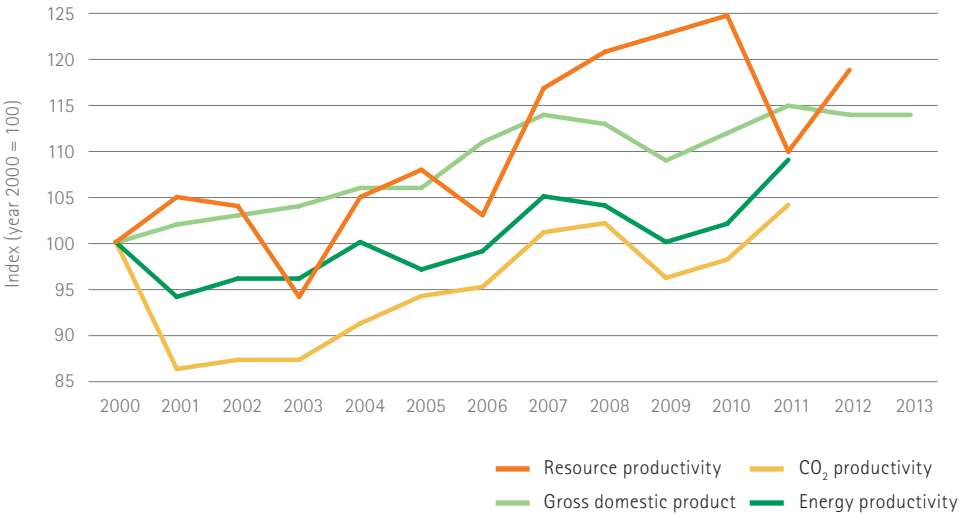
- Manufacturing industries (EUR 31,059m)
- Agriculture & forestry, fisheries (EUR 897m)
- Trade, transports, tourism, information & communication (EUR 17,977m)
- Real estate & housing, financial & business service providers (EUR 21,878m)
- Public & other service providers, education & health (EUR 25,916m)

Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG); Working Group „Regional Accounts", VGRdL, as of August 2014/February 2015

Environmental performance metrics

Productivities translate the relationship between economic performance and required resources, factors of production or pollutant emissions. They can be calculated on the basis of the economic output in relation to specific consumptions.
As key performance indicators for the economic efficiency they also provide information on how sustainable resources are used. During the past few years, some of the productivities in Saxony showed growth rates above federal average. Such an additional increase in resource efficiency both in households and businesses is of ever growing importance in a world of increasing prices in national and international commodity markets and can have a beneficial impact on the economic standing and environmental situation of the state.

Economic performance and productivities

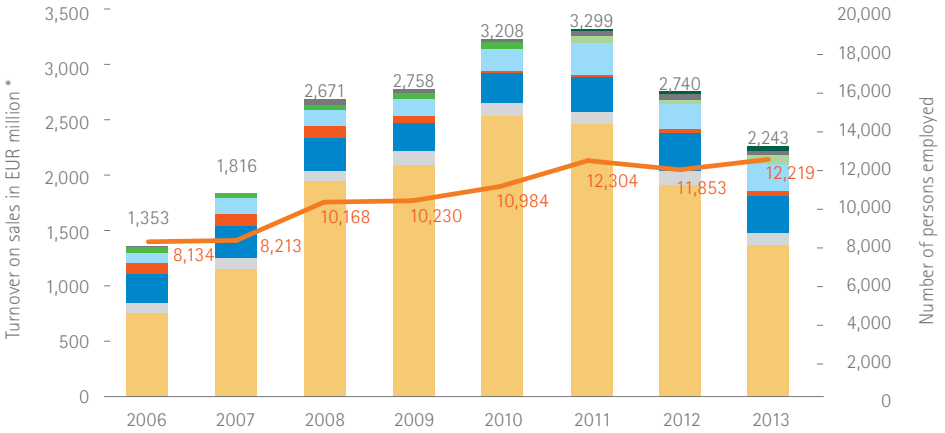


Source: Calculation by LfULG on the basis of the Environmental Economic Regional Accounts of October 2014 (data as available)

Green economy

The environmental sector in Saxony has grown constantly over the past few years to become a solid pillar of the Saxon economy as a whole. In 2012, however, total sales fell for the first time, but most of the specific environmental areas still show continued growth in revenues and workforce. This general upward trend, however, is overlapped by the sales decrease in climate protection, which is the largest segment of the environmental sector. Especially the photovoltaic manufacturing sector shows falling sales both for entire systems and components.

Persons employed & sales volume in the environmental sector



* includes intersectoral environmental services and, beginning in 2008, construction works

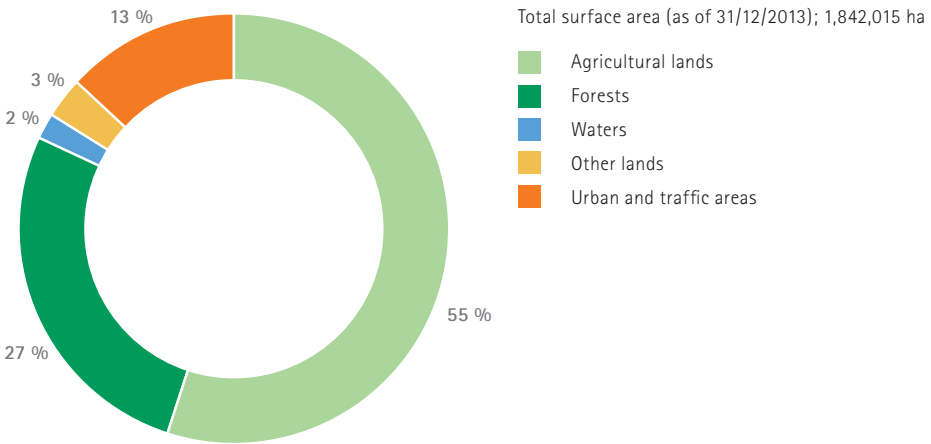
- Climate protection
- Waste management
- Water protection (until 2010)
  Wastewater management (from 2011 onwards)
- Noise abatement
- Air quality
- Nature conservation, landscape preservation and land restoration (until 2010)
- Protection and restoration of soil, ground and surface water (from 2011 onwards)
- Interdisciplinary actions and activities
- Species and landscape protection (from 2011 onwards)
- Persons employed

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

Land use

Land uses in Saxony are subject to dynamic change. The chart shows the situation in 2013, broken down by main types of land use. Agriculture is the dominating use. Agricultural lands take up 55 per cent of the territory. However, this percentage is still falling year on year, whereas urban and traffic areas often tend to increase. The Free State of Saxony has the objective to reduce this way of land consumption.

Land use in Saxony in 2013

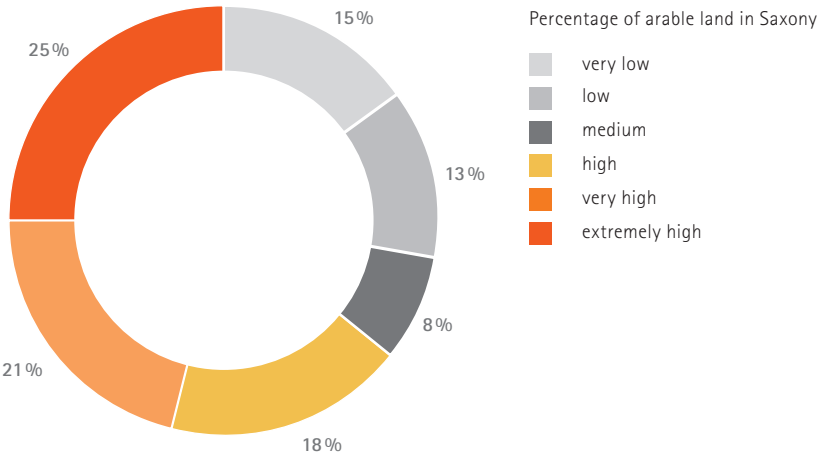


Source: Statistical Office of the Free State of Saxony, land use survey by actual uses in Saxony

Soil erosion risk

About 60 per cent of the arable land in Saxony is highly exposed to water erosion risks due to slopes, frequent heavy rains and local soil conditions. Soils with a permanent vegetation cover (permanent grassland, forests) are usually well protected from soil erosion. The Middle Saxon loess hill country, however, is particularly prone to erosion. The erosion risk maps issued by the Saxon State Office for the Environment, Agriculture and Geology (LfULG) show the erosion potential in local sites in higher detail. For more information please consult the soil-related online map service at www.boden.sachsen.de.

Soil erosion potentials

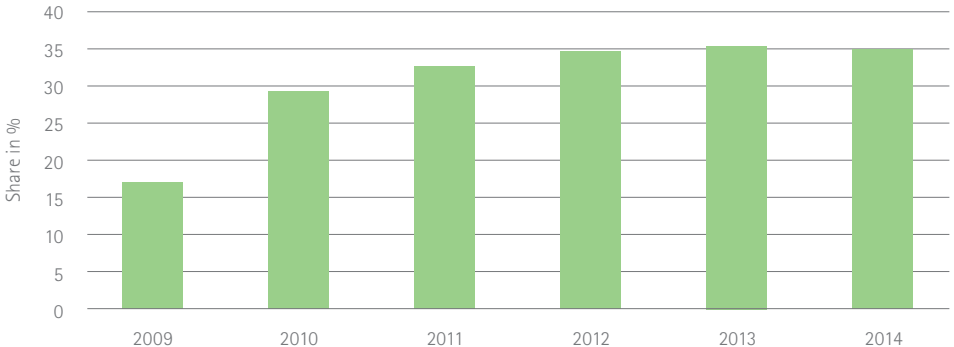


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Erosion reduction in agriculture

Soil erosion is a major problem for agriculture in Saxony. This can be counteracted by various strategies such as soil conservation or intercropping and undersown catch crops. Permanent soil conservation and no-till farming is the most effective anti-erosion method available. The erosion mitigation area in Saxony is defined by the percentage of those parts of Saxon's total arable land surface area that are managed by permanent soil conservation and no-till farming practices as defined and supported by the „Agri-environment measures and forest enhancement" (RL AuW/2007, Part A) support scheme. The new „Agri-environment and climate change mitigation measures" state aid scheme (AUK/2015) will no longer support soil conservation (support ends in 2015). It can be assumed that the new soil management practices are meanwhile well established in Saxon agriculture and will be continued on a high level of arable lands. In addition, many farmers use soil conservation techniques periodically within crop rotation.

Permanent soil conservation/no-till farming lands over time as percentage of total arable land surface in Saxony

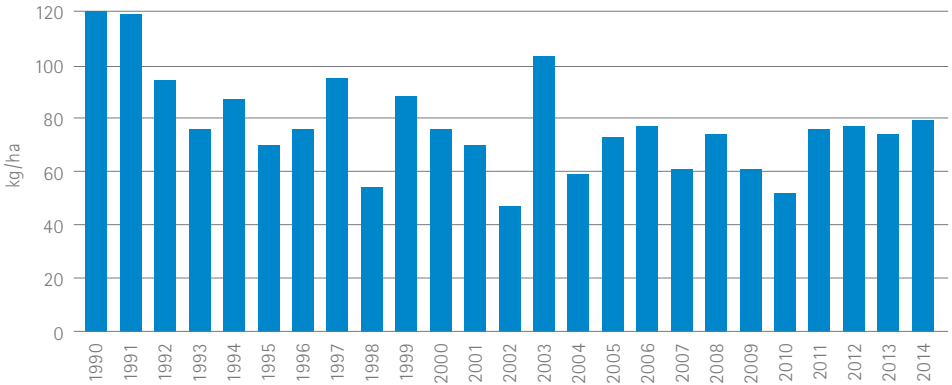


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG); Statistical Office of the Free State of Saxony

Residual soil nitrate levels

The chart illustrates the development of residual nitrate levels in agriculturally used soils as determined in depths of 0 - 60 cm during the annual autumn sampling campaigns, and thus shows the Saxony-wide trend for all soil and climate landscapes. The values result from approximately 1,000 permanent test sites (approx. 870 since 2007) managed and analysed by the Saxon State Office for the Environment, Agriculture and Geology. The observation of nitrate levels in agricultural soils in the autumn season provides indications for the nitrogen leaching potential of soils during the subsequent winter seepage period. Soluble nitrate nitrogen levels should be kept as low as possible to avoid the contamination of water bodies. Constant progress has been made since 1990/91. Annual variations are due to changing temperature and rain conditions. Autumn nitrate-nitrogen levels also vary by crop type, nitrogen fertilization, soil type and type of post-harvest soil cultivation.

Autumn nitrate-nitrogen levels in soils from agricultural use



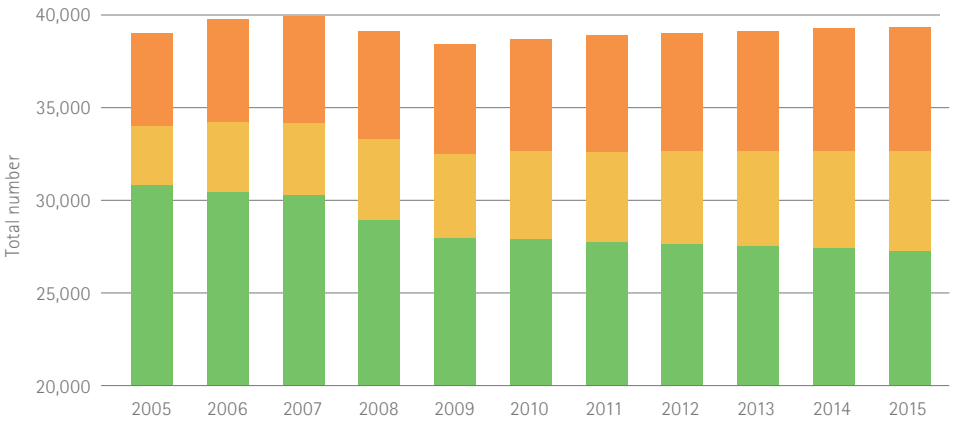
Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Number and percentage of decontaminated lands

The total number of lands recorded in the Registry of Contaminated Sites has remained unchanged over the past few years. But there is an upward trend in sites which 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.

- Found to be not contaminated
- Decontaminated lands
- Further lands (with suspected contamination in need, or currently without need, of action, sites being treated)

Lands recorded in the Saxon Registry of Contaminated Sites



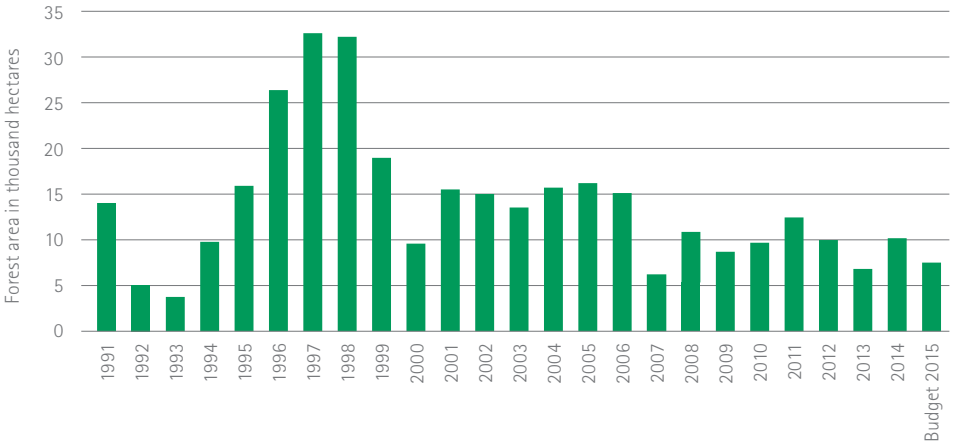
Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Lime treatment for soil stabilisation in forests

Forest soils with their filter, buffer and storage functions are critical to the balance of nature. Healthy soil and clean water are the only guarantee for vital forest ecosystems. Scientific findings indicate that the forest soils in Saxony still are deeply acidified and highly deficient in nutrients. Forest soil stabilisation by treatment with natural limes plays a key role in damage control, together with near natural forest management practices and moving away from single-species coniferous stands to mixed woodland that is stable, productive and rich in structures and species.

Lime treatment is performed under the control of the public enterprise Staatsbetrieb Sachsenforst on the basis of well-founded site-specific soil stabilisation plans in strict accordance with forest functions.

Surface area of lime-treated forest soils in Saxony



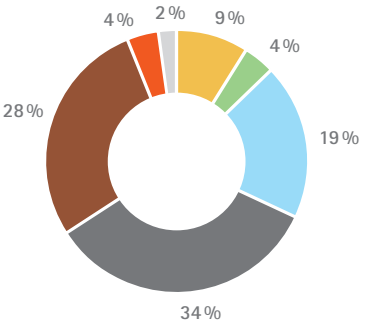
Source: Staatsbetrieb Sachsenforst

Tree species distribution in forests

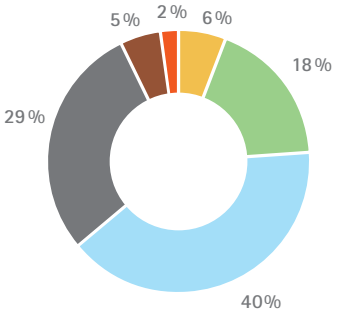
For historical reasons, the Saxon woodlands are dominated by coniferous stands of spruce and pine, which account for two thirds of the forest area in Saxony. These mainly even-aged single-species stands are very sensitive to windfalls, snow breakage, pollutants and infestation by numerous pests such as bark beetle or pine moth. At the same time, these stands are particularly affected by the already more and more apparent impacts of climate change.

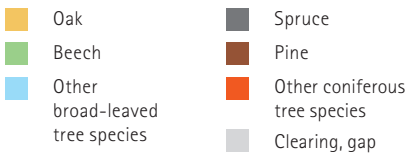
These are the reasons why the predominant objective in forest policy has for years been to create permanent mixed woodland that is stable, productive and rich in structures and species. This ecological forest conversion is consistently implemented especially in the state-owned forests within the scope of sustainable multi-functional forest management concepts. Early adjustment of the woodlands to the challenges of climate change is the only way to ensure that future generations will be able to enjoy the benefits and amenities that the forests provide.

Current tree species distribution in the high canopy layer



Current tree species distribution in the low canopy layer





Source: Federal German Forest Inventory 2012

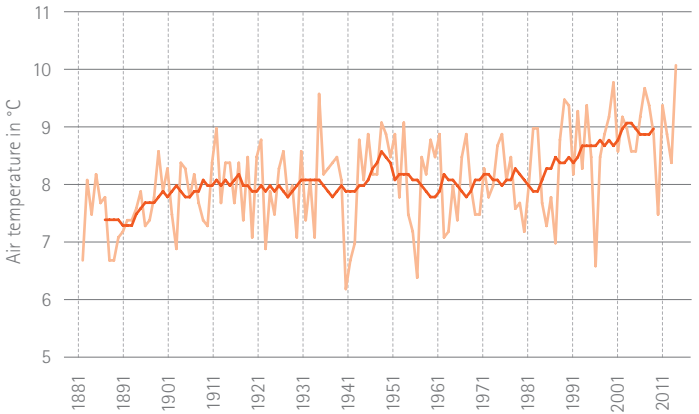
Climate trends

The charts show annual mean air temperatures and precipitation totals for vegetation period I (April to June) in Saxony from 1881 to 2014. The 11-year running average is for better illustration of the long-term trend because it is less dependent on year-to-year variations. Air temperature over time is an important measurement of 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. 2014 was the warmest year ever recorded since measurement started in 1881.
Precipitation over time is rather heterogeneous when compared with the temperature graph. Lower precipitation volumes in vegetation period I slow down the growth of plants and increases the risk of crop loss. This has a strong impact e.g. on agriculture, especially in connection with rising temperatures. From 1971 to 2010, every decade was drier than the last. Saxon farmers can use better water management strategies for adaptation to these changes. Such strategies include the selection of appropriate varieties or field crops, adapted soil cultivation methods and fertilisation, and irrigation in certain crops or crop rotations.

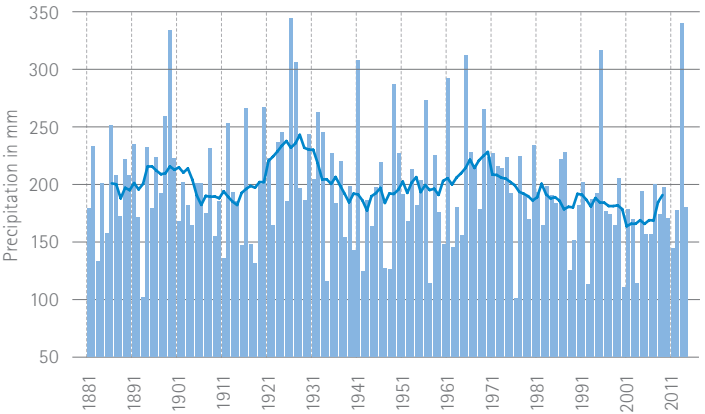
Temperature
Precipitation

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

Annual mean temperature in Saxony, 1881 – 2014
(11-year running average)



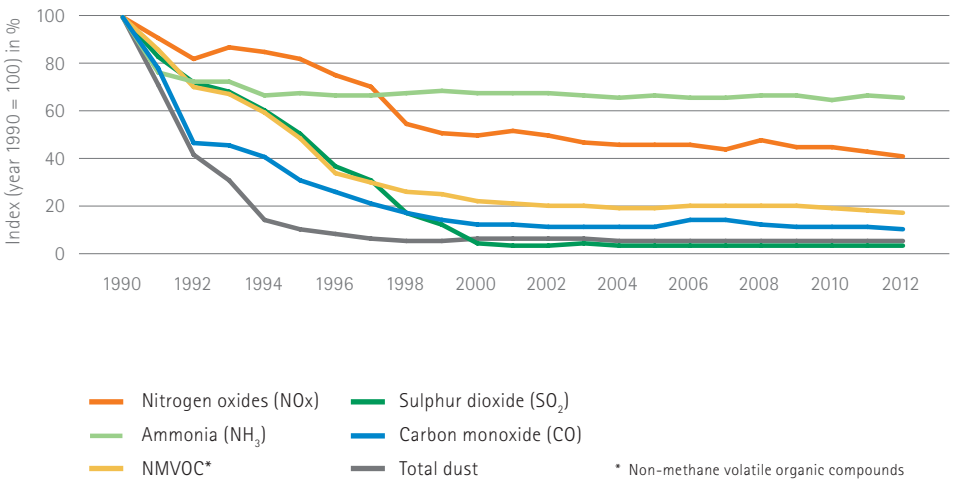
Precipitation in vegetation period 1 (April-June) in Saxony, 1881– 2014
(11-year running average)



Pollutants – emissions

Air pollutants can cause a variety of negative impacts on human health and environment and should therefore be avoided. Saxony has been very successful in air quality management during the past 20 years. Today, pollutants like sulphur dioxide or carbon monoxide are virtually no longer an issue. The main concerns are ozone, nitrogen oxide and particulate matter, especially in urban agglomerations.

Emissions of air pollutants

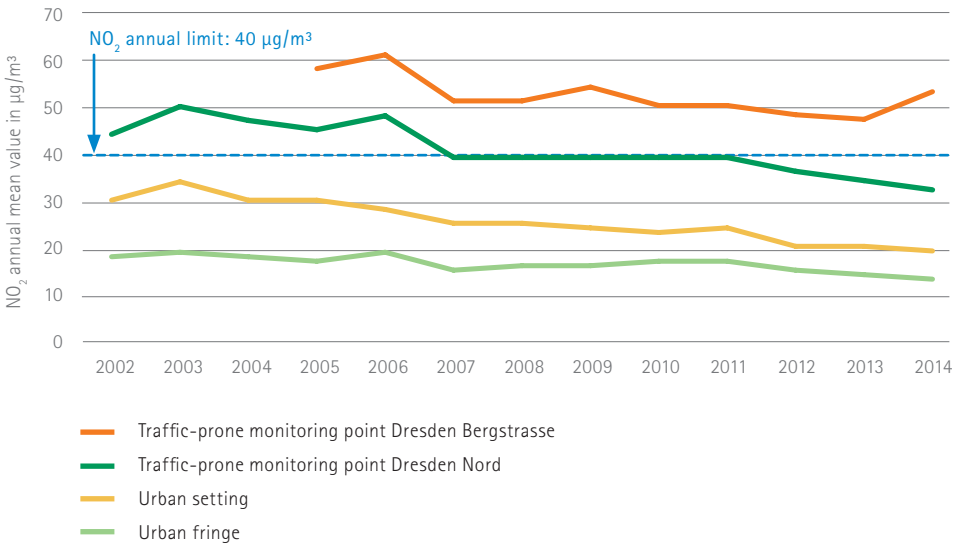


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG); Emissions Registry

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 from 2015, compliance with the EU air quality limits has to be ensured, which is no problem in urban and regional settings.

Impact of air pollutants at the example of nitrogen dioxide

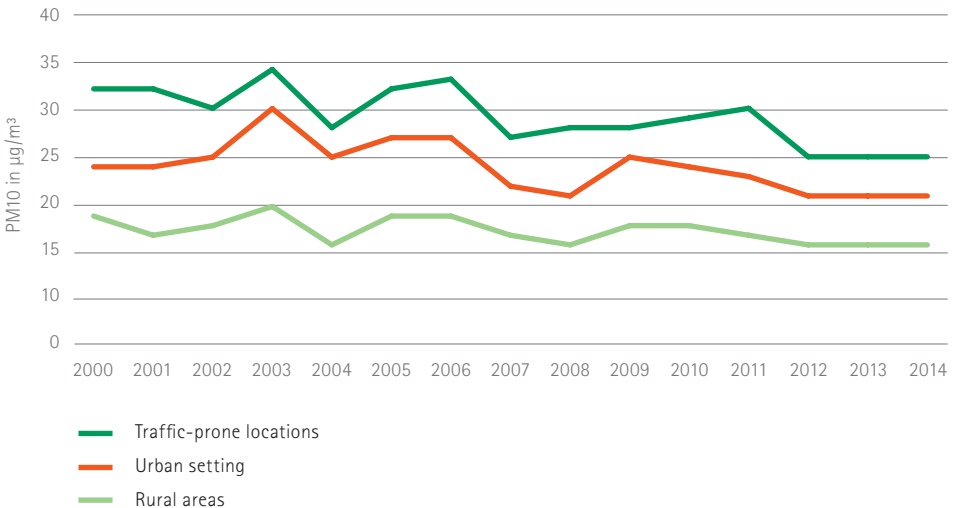


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

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. The area-related annual mean values show no uniform trend. The variability in the past few years is related to changing meteorological conditions.

Area-related annual mean PM10 levels in Saxony

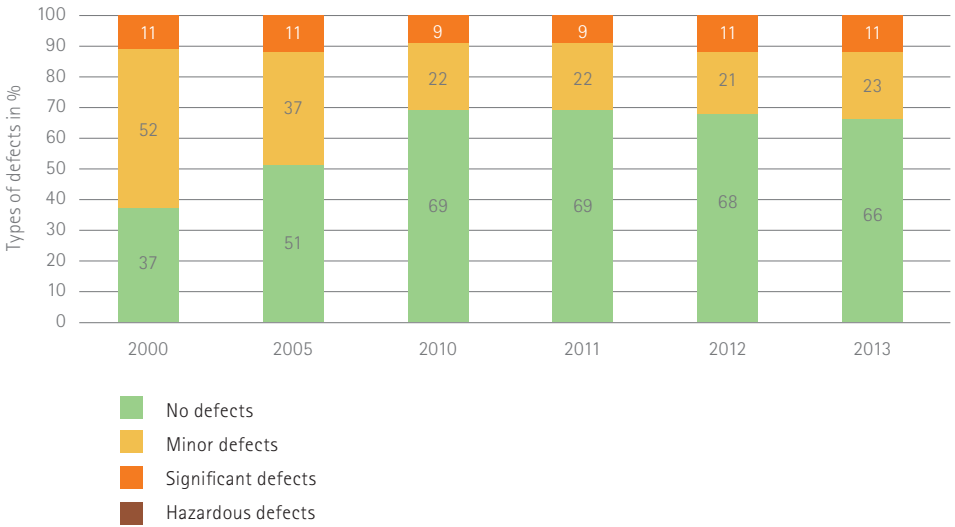


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Inspections of facilities for handling water hazardous substances

In 2013, approximately 3,700 inspections were carried out in installations handling water hazardous substances in Saxony. 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 defects has remained relatively constant (11 %). Dangerous deficiencies 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 flawless installations and a considerably lower number of significant defects than in other German states.

Plant inspections in Saxony

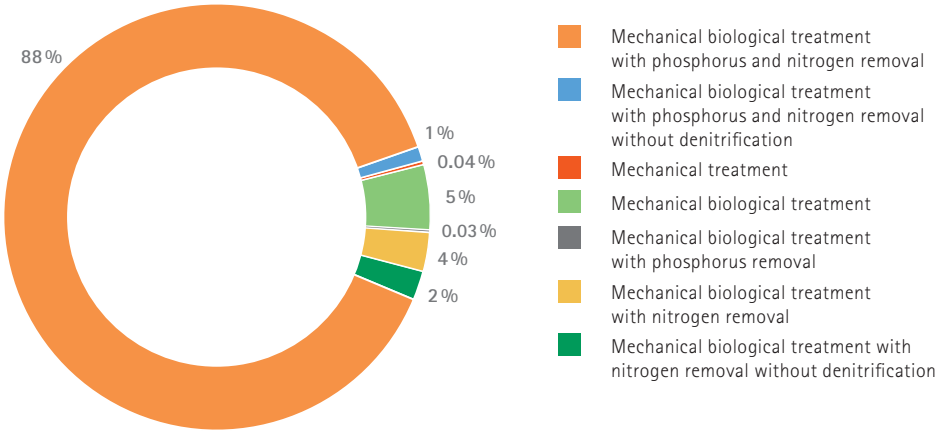


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

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. Meanwhile, about 92 % of the Saxon population can rely on state-of-the-art sewage treatment plants. The overall phosphorus and nitrogen removal rates in the sewage treatment plants are 87 % and 79 %, respectively.

Current status of sewage treatment plants in 2014 (as referred to treatment capacity)

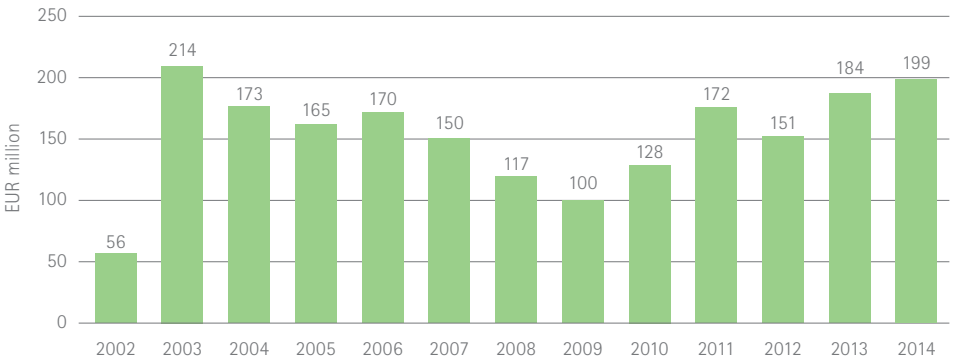


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

Flood control

In the recent past, Saxony was repeatedly hit by floods. After the big flood in 2002, which caused great damage almost in the entire territory, various flood control concepts were developed for the watercourses to be maintained by the Saxon state. The concepts proposed a catalogue of about 1,600 actions for improving flood protection all over Saxony. This has been the basis for the current Saxon Flood Control Investment Programme (HIP) which is being implemented and includes measures such as the construction of dykes, flood walls, flood retention basins, means of debris retention, widening of first-order water bodies etc... The result is better flood protection as already proven by the significantly reduced damage during the flood in 2013.

Damage repair and flood control expenses spent by the State Reservoir Administration (LTV)

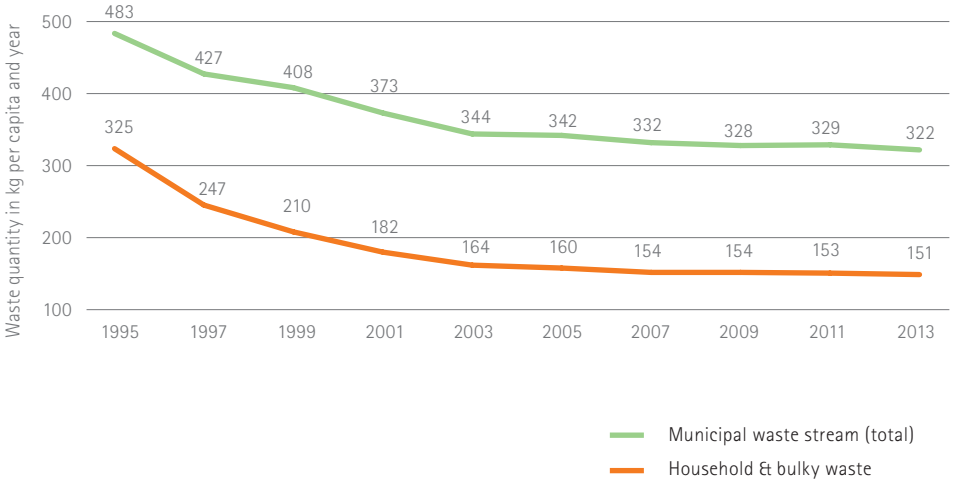


Source: State Reservoir Administration of the Free State of Saxony (LTV)

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 & 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 variety of waste avoidance efforts (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

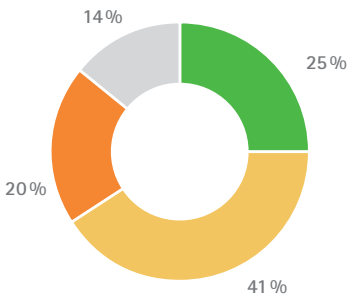


Source: Saxon State Office for the Environment, Agriculture and Geology (LfULG)

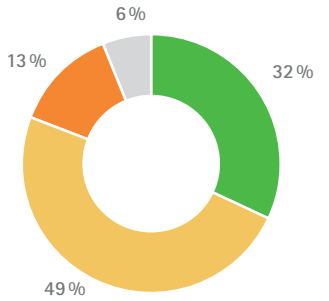
Nature conservation/biodiversity

The FFH report 2007-2012 provides a comprehensive description of the status of FFH species and habitats in Saxony. A direct comparison with the figures of the previous report (2001 – 2006) is not possible, because the new report for the first time includes data from a systematic and unified Germany-wide monitoring approach.
In Saxony, the percentages for each of the status categories (favourable, inadequate, poor, unknown) across all FFH species are within the federal average range. The results for the FFH habitat types are comparatively better. However, the conservation status of two thirds of the species and two thirds of the habitats is inadequate or poor and needs to be improved. For this purpose, Saxony has started a series of improvement measures under its „Biodiversity 2020" programme with specific financial support schemes.

Conservation status of the 95 FFH species/species groups in Saxony
(Reporting period 2007 – 2012)



Conservation status of the 47 FFH habitat types in Saxony
(Reporting period 2007 – 2012)



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

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