



Environmental Data

2016

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LANDWIRTSCHAFT



Freistaat
SACHSEN

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Preface



This concise environmental data brochure is issued on an annual basis to provide 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 on site decontamination, land use, municipal waste streams, air pollution control and nature conservation. Also, pending issues and challenges are represented, e.g. protection of water bodies.

The double page „25 years of environment policy in Saxony“ places special emphasis on the environmental changes since German re-unification

in 1990. The data selected for this part of the brochure is related to resource consumptions, environmental infrastructures and ecological conditions, providing impressive proof of the positive environmental results obtained in Saxony.

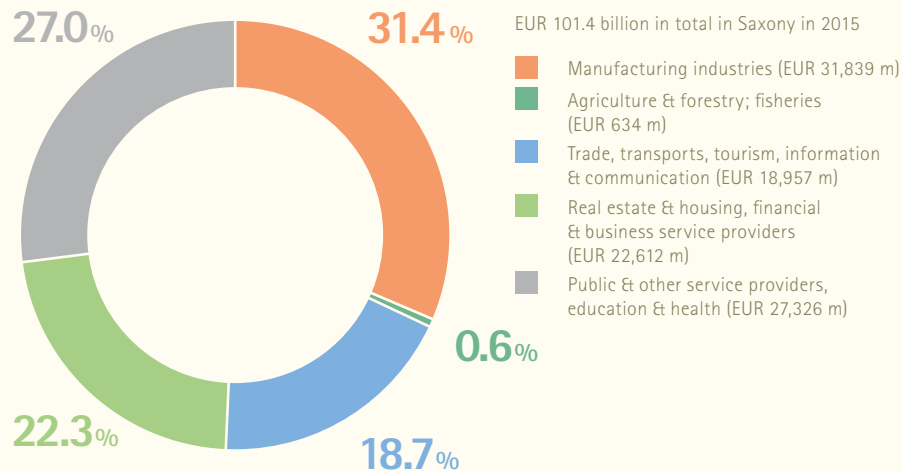
Thomas Schmidt
Saxon State Minister
for Environment and Agriculture

Economic structure

The economy in the Free State of Saxony has undergone basic structural changes during the past 25 years. Today, Saxony is a modern economy marked by the services sector and a comparatively strong manufacturing sector.

The highly performing agriculture & forestry sector accounts for 0.6 per cent of the total gross value added. However, this does not show its upstream and downstream importance, or its high significance for the rural areas and services of general interest.

Gross value added by economic sectors in Saxony



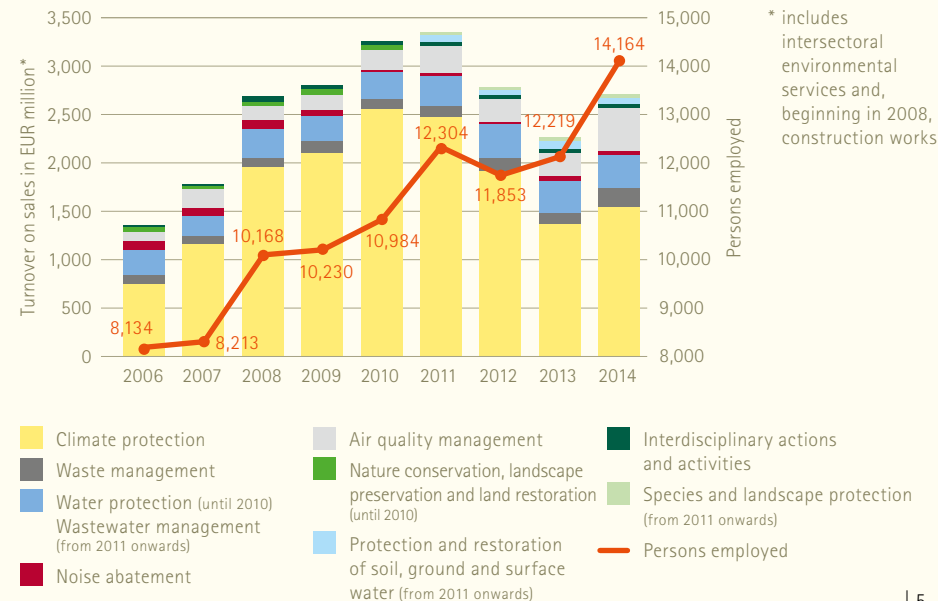
Source: Federal regional accounts, as of February 2016

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. Most segments in the environmental sector show a sustained positive trend in sales and employment. Since 2012, however, this general upward trend is overlapped by the sales decrease in climate protection, which is the largest segment of the environmental sector.

Source: Statistical Office of the Free State of Saxony (StaLA)

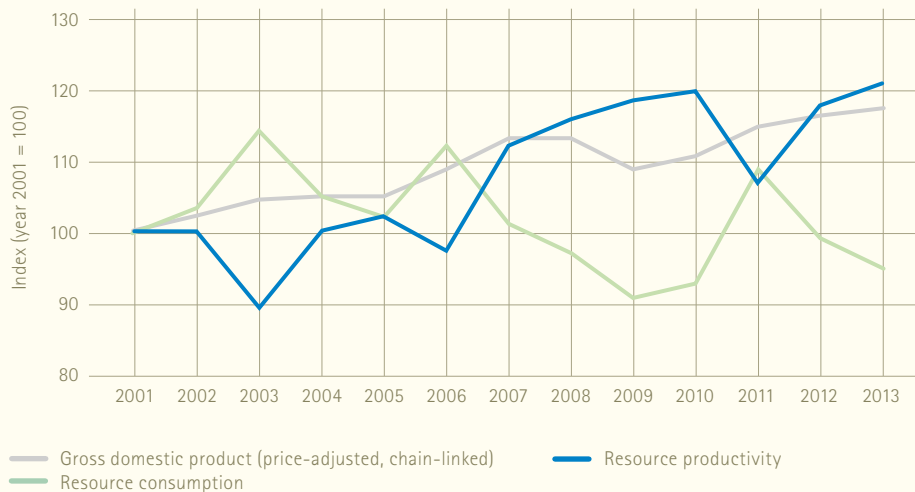
Persons employed & sales volume in the environmental sector



Resource productivity

The increase in resource productivity is one of the goals laid down in Saxony's sustainability strategy and a key performance indicator for measuring the efficiency in environmental use. This indicator captures the ratio of the volume of gross domestic product (GDP) over domestic consumption of non renewable resources. The quantity target for resource productivity within the German sustainability strategy is to double the productivity between 1994 and 2020. Despite the temporary decrease in 2011, Saxony is at present the only state within Germany to have met this target.

Resource productivity in Saxony



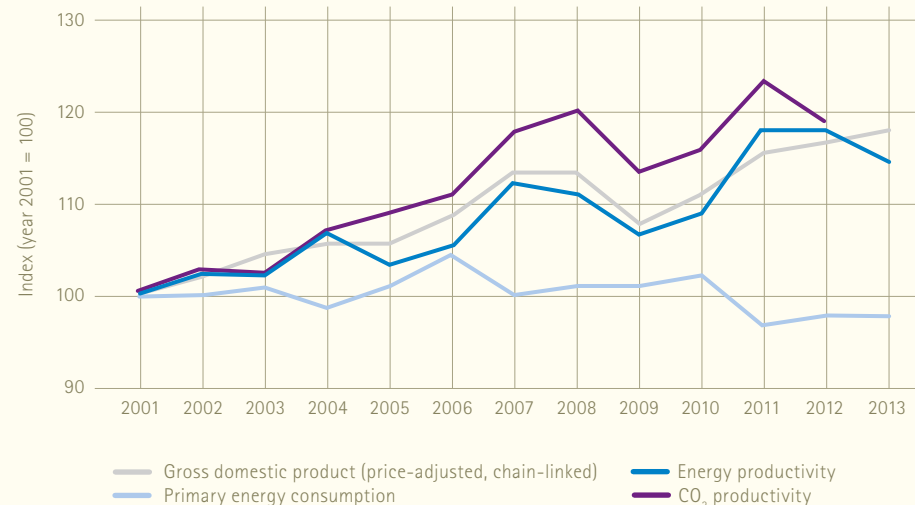
Source: Calculation by the Saxon State Office for the Environment, Agriculture and Geology (LfULG) on the basis of the Environmental Economic Regional Accounts of November 2015 and of the Federal Regional Accounts

Energy & CO₂ productivity

Energy productivity is considered a benchmark for the efficient handling of energetic resources in the production of goods and services. It is calculated as the ratio of the gross domestic product (GDP) over primary energy consumption. CO₂ productivity reflects the relationship between the economic performance and the energy-related CO₂ emissions of primary energy consumption.

Energy productivity in Saxony has improved continuously over the past few years. This places Saxony in a leading position on a Germany-wide scale.

Energy & CO₂ productivity in Saxony

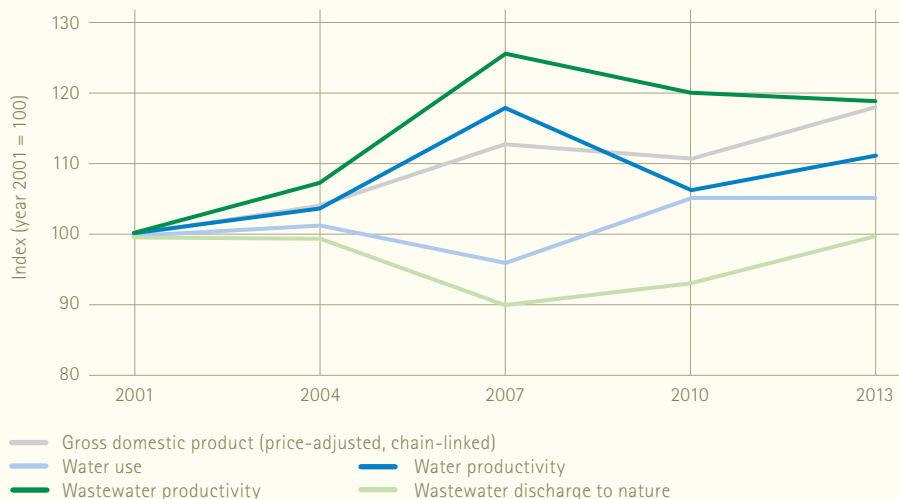


Source: Calculation by the LfULG on the basis of the Environmental Economic Regional Accounts of November 2015 and of the Federal Regional Accounts

Water productivity

Water productivity is a key performance indicator for 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 periodicity of statistical data collection for water use and effluent discharge to nature is 3 years. This has equivalent effects on the up-to-dateness of the statistical data.

Water & 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

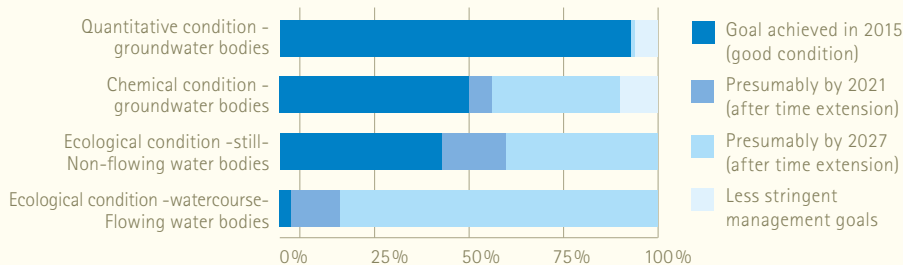
Implementation of Water Framework Directive

The European Water Framework Directive (WFD) was passed in 2000 to introduce a broad range of new regulations for water protection and water management in Europe. The general objective of the WFD is to ensure the maintenance and step-wise improvement of the aquatic environment.

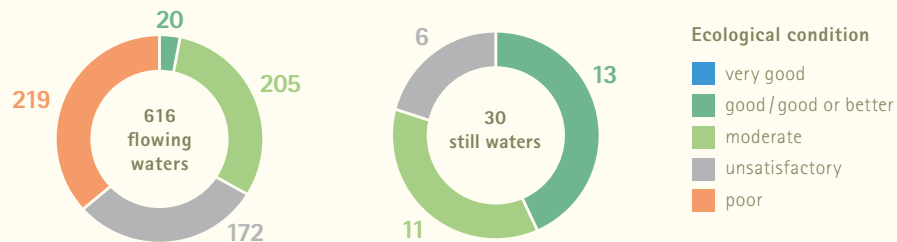
In detail, the goal is to put the 646 Saxon surface water bodies and the 70 groundwater bodies into a "good condition" as defined by the strict requirements laid down in the WFD. The major tools for its implementation are the watershed management plans and action plans.

Source: LfULG

Water Framework Directive – Management goals for Saxon water bodies



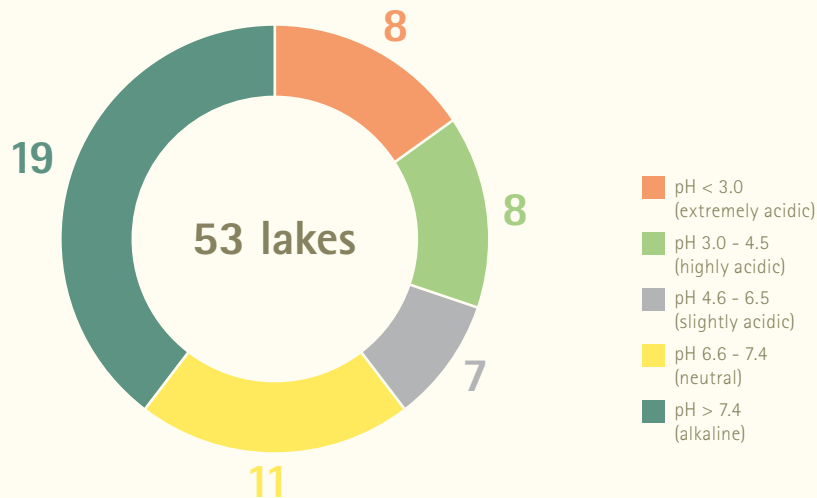
Ecological condition of the Saxon surface water bodies in 2015



Post-mining lakes

Saxony looks back on more than 150 years of lignite mining activities. The rehabilitation of former mining areas is a huge challenge. Abandoned opencast lignite mines are flooded with water to form artificial lakes. Often, the resulting post-mining lakes carry acid, iron and/or sulphate loads as a result of previous pyrite weathering reactions. As a whole, however, there is a trend towards better lake water qualities. 53 artificial post-mining lakes covering a surface area of more than 10 hectares were analysed, of which 27 lakes in 2010, or 30 lakes in 2015, were in a neutral or alkaline condition, the remaining lakes being slightly to extremely acidic.

Degree of acidity of post-mining lakes in 2015

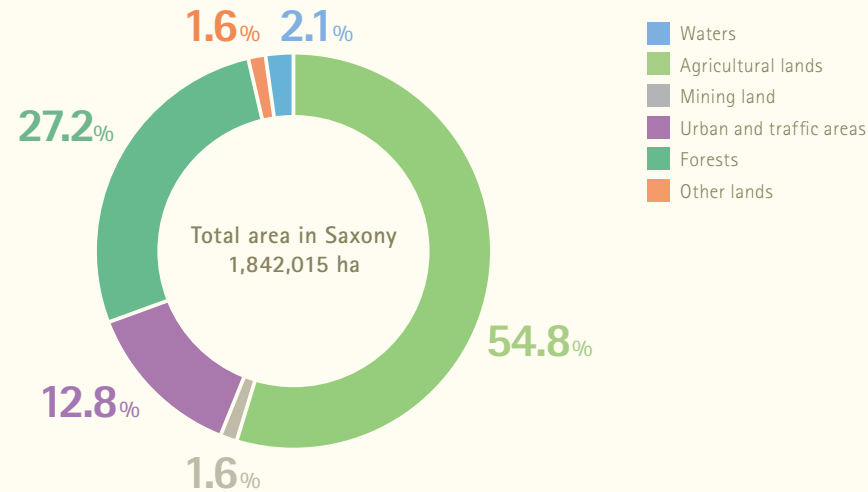


Source: LfULG/Lausitzer und Mitteldeutsche Bergbau-Verwaltungsgesellschaft mbH (LMBV)

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 almost 55 per cent of the territory. However, there still is a strong decrease in agricultural lands while urban and traffic areas continue to grow. The Free State of Saxony has the objective to reduce this way of land consumption. Land use distributions have changed as of 2016 as a result of a new statistical land assignment rules.

Land use in Saxony



Source: Calculation of LfULG based on the Saxon Statistical Office (StaLA)

25 years of environment policy in Saxony

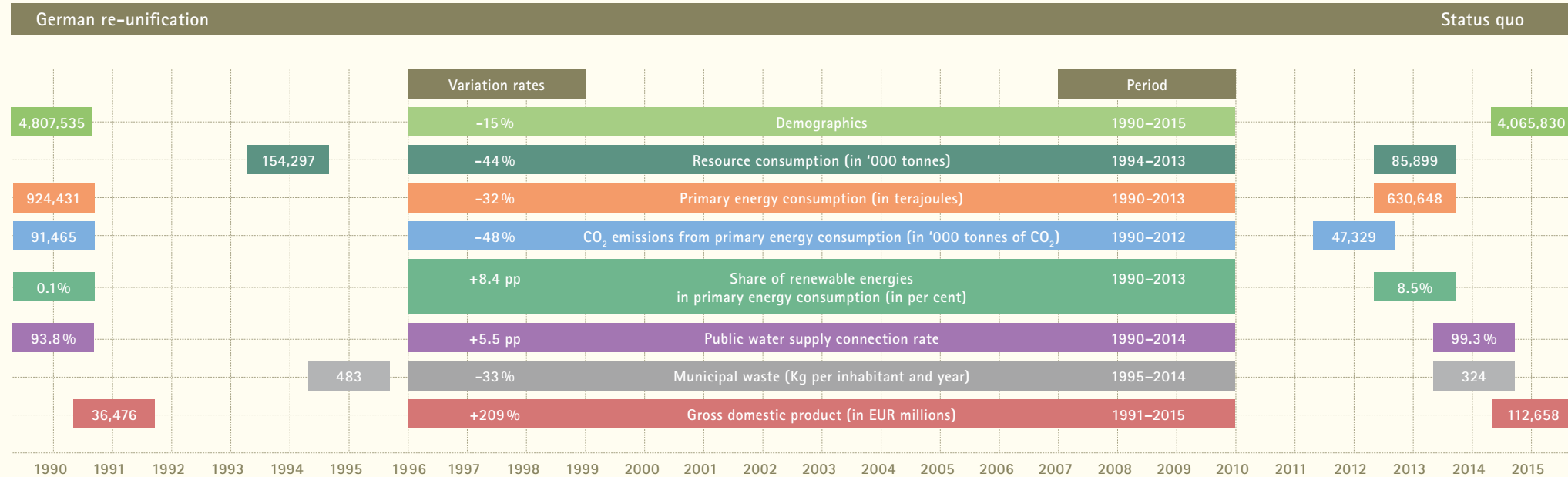
The environmental conditions prevailing in east Germany at the end of the 1980s can be properly called an alarming situation. The east German environmental laws were applicable on a purely formal basis and compliance was secondary to the constraints of the industrial sector.

Since German re-unification in 1990, the environmental situation in Saxony has significantly improved, largely due to the consistent environmental policy of the Saxon and federal governments and due to the dismantling, closing down

or upgrading of the most-polluting industrial facilities from pre-unification times, but also as a result of improved monitoring of compliance with existing laws and enhanced environmental protection laws and pollution limits.

Today's environmental policy in Saxony is designed to strengthen especially regional business cycles and support individual responsibility with special focus on efficient and innovative solutions for further improvement of the environmental situation.

Source: LfULG; StaLa; Environmental Economic Regional Accounts of November 2015

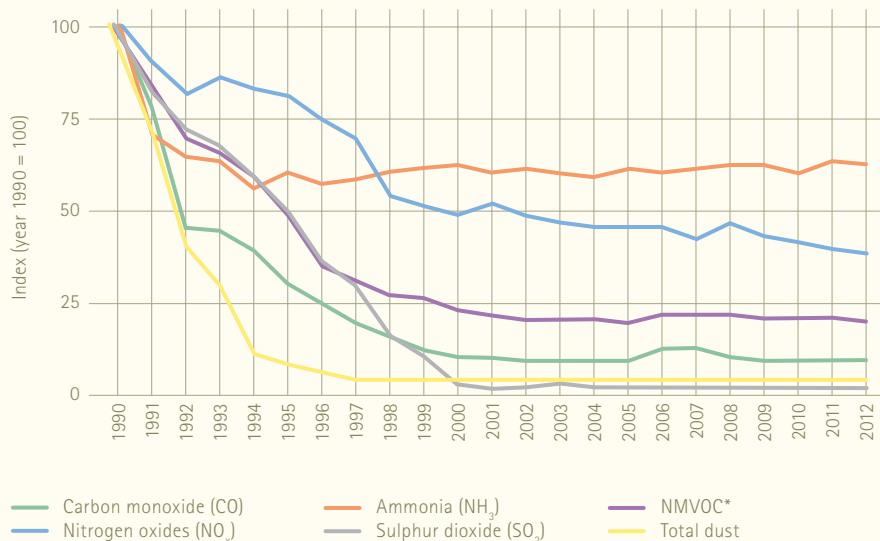


Air pollutants – emissions

Air pollutants can trigger a variety of negative impacts on human health and environment. Air pollutant emissions in Saxony have dropped considerably from 1990 until 2012. 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 10 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: LfULG, Emissions Registry

Air pollutant emissions in Saxony



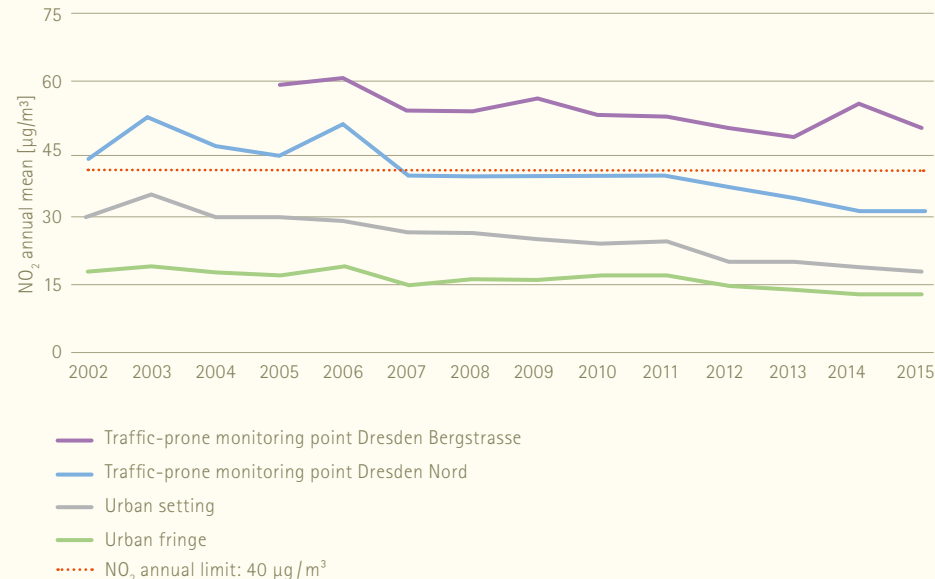
* Non-methane volatile organic compounds

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 urban and regional settings.

Source: LfULG

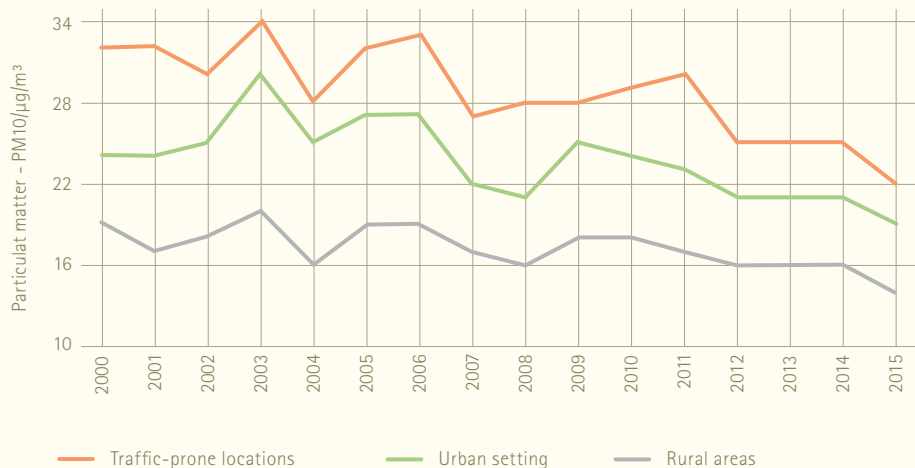
Impact of nitrogen oxides in the Dresden area



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 since 2000.

Area-related annual mean PM10 levels in Saxony



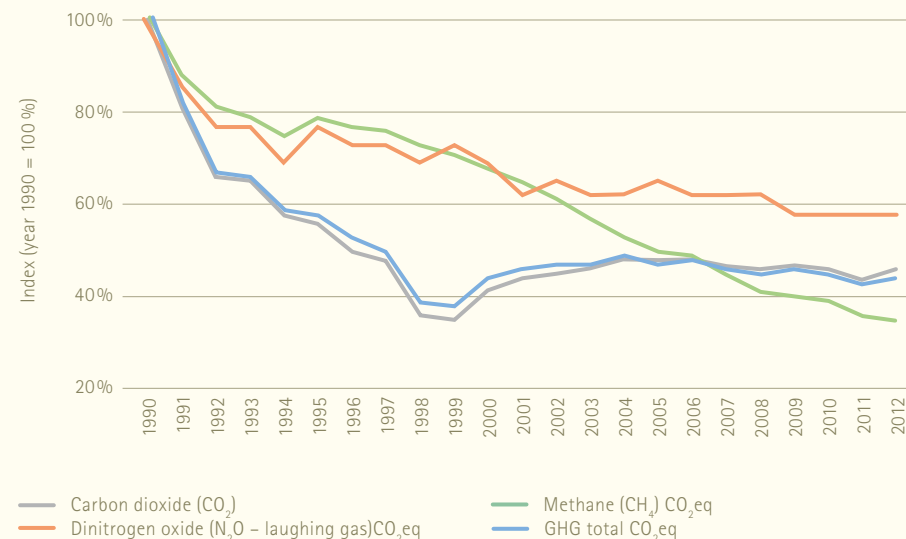
Source: LfULG

Greenhouse gases in CO₂ equivalents

Greenhouse gas emissions (composed of carbon dioxide: CO₂, dinitrogen monoxide: N₂O and methane: CH₄) dropped by about 55% from 1990 until 2012. Their reduction during the past ten years was around five percent. Whereas CO₂ and N₂O emissions showed a fluctuating trend over the last decade, CH₄ emissions continued to decrease. The main reason lies in the waste management sector (landfill ban on untreated waste).

Source: LfULG, Emissions Registry

Emissions of selected greenhouse gases in CO₂ equivalents in Saxony since 1990



Climate trends in Saxony

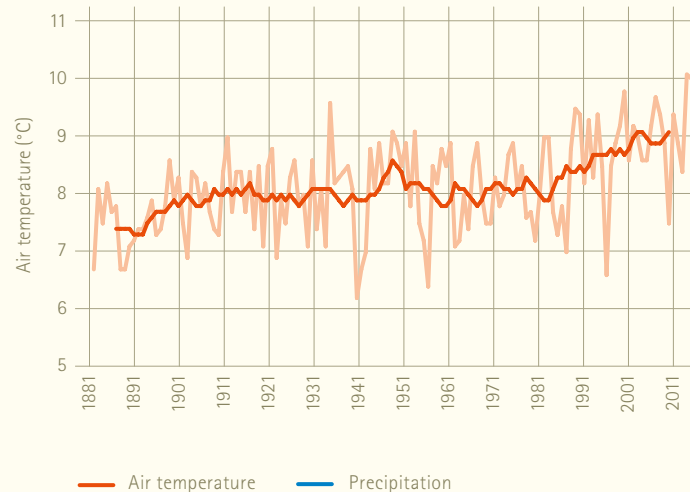
The charts show annual mean air temperatures and precipitation totals for vegetation period I (April to June) in Saxony from 1881 to 2015. The 11-year running average allows better illustration of the long-term trend as it is less dependent on year-to-year variations. The air temperature over time curve 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 until 2010, every decade was warmer than the decade before, and the past two decades saw a striking accumulation of warmest

years in Saxony. 2015 was the second warmest year ever recorded since measurement started in 1881; the warmest year was 2014.

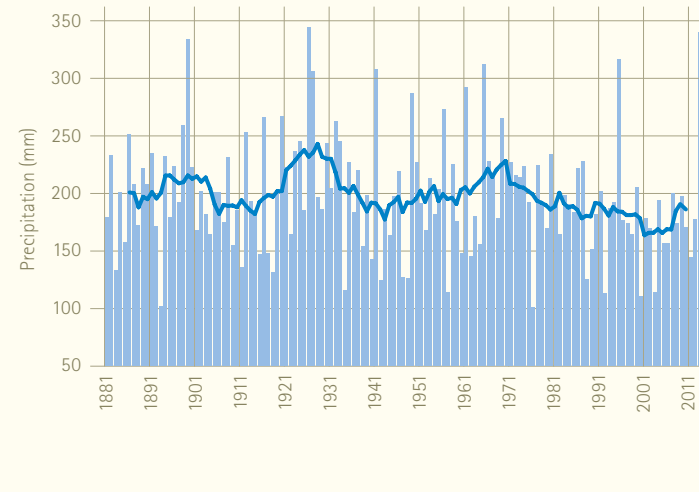
Precipitation over time is rather heterogeneous both in space and time, compared with the temperature graph. Lower precipitation volumes in vegetation period I slow down the growth of plants and increase the risk of crop loss. This has an increasing impact e.g. on agriculture, especially in conjunction with rising temperatures. From 1971 until 2010, every decade was drier than the one before. Saxon farmers can use 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.

Annual mean temperature in Saxony, 1881–2015
(11-year running average)



Precipitation in vegetation period I (April–June)
in Saxony, 1881–2015 (11-year running average)

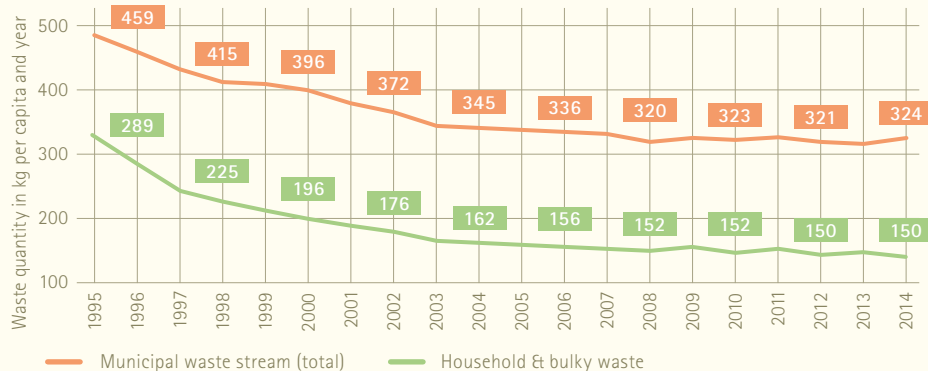


Source: LfULG, German Weather Service (DWD), 2016

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 ten years. A number of waste avoidance measures (low-waste consumption, re-use of second-hand goods, or

Municipal per-capita waste stream from private households



Source: LFULG

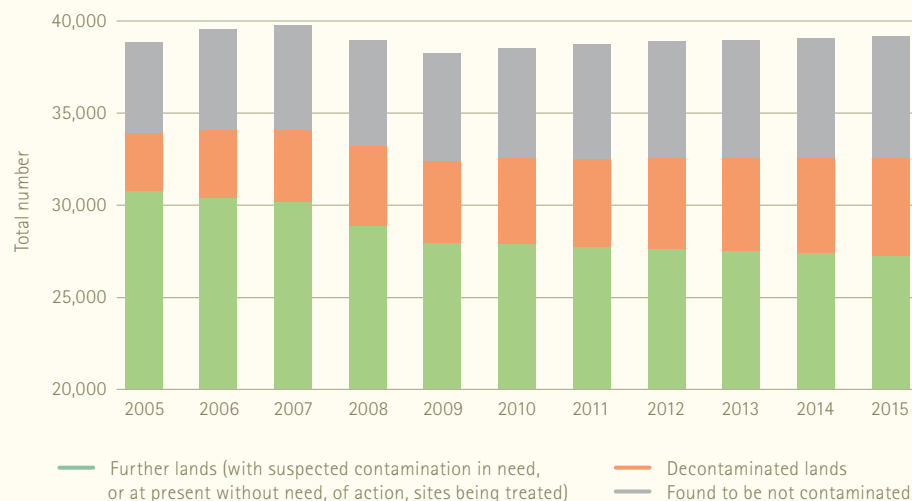
avoidance incentives for lower waste charges) contribute to reducing the waste stream.

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. But there is an upward trend in 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.

Source: LFULG

Lands recorded in the Saxon Registry of Contaminated Sites



Protection areas in Saxony

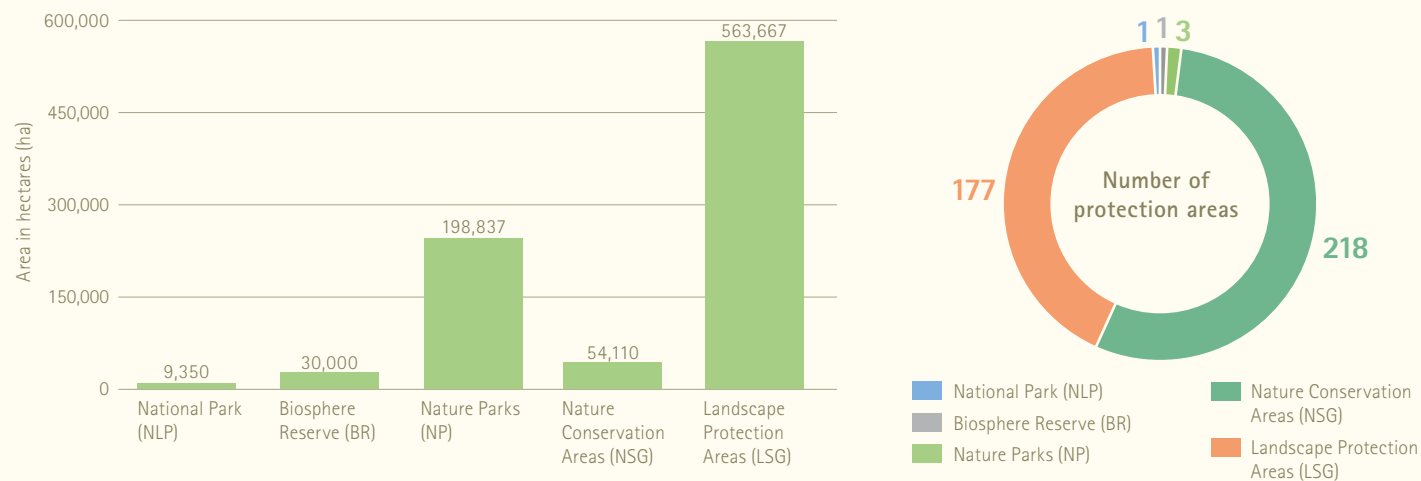
Examples of protection areas in Saxony include the National Park region of Saxon Switzerland and the Biosphere Reserve of the Upper Lusatian Heath & Pond Landscape. Whereas the general approach in the National Park is to leave nature more and more to itself, the heath landscape of the biosphere reserve is controlled by sustainable and exemplary resource-saving management procedures. The nature conservation areas together with the National Park and the Monuments of Nature form a "pool of natural assets" that are conserved and developed by the Free State of Saxony for their high biological diversity. The nature conservation area of Königsbrück Heath has a unique feature: it was nominated Germany's

first wilderness area within the National Nature Landscapes (NLL) in 2016 and enjoys also international renown for its development. Three large nature parks combine recreation and sustainable tourism with aspects of nature conservation: Erzgebirge/Vogtland mountains, Düben heath and Zittau mountains. The landscape protection areas can serve various purposes beyond recreation such as maintaining the performance, functionality and balance of the ecosystem, ensuring the usability of available natural resources, and enhancing the beauty of Saxon landscape.

As part of the areas of the different categories overlap, it does not make sense to add the values up.

A major step for a comprehensive nature conservation concept was already taken shortly after the end of the east German state. In September 1990, before re-unification of the two German states, the Council of Ministers of the GDR introduced a comprehensive National Park Programme. Since German re-unification 25 years ago, the share of nature conservation areas in the total surface area of Saxony has increased from 0.8% to 2.9%, but still is below the federal German average of 3.9%.

Area and number of Saxon protection areas in 2016



Source: LfULG, latest update: 01/01/2016

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