Environmental data

2021

LANDESAMT FÜR UMWELT,
LANDWIRTSCHAFT
UND GEOLOGIE

Freistaat
SACHSEN

Contents

Foreword

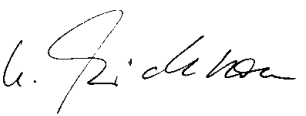
In "Environmental Data 2021", we provide information on the development of important environmental topics such as climate, air quality, soil and nature as well as the circular and environmental economy in Saxony.

This brochure focuses on the consequences of climate change, which is already clearly noticeable in Saxony through the more frequent occurrence of extreme weather conditions, among other things. For example, prolonged periods of heat or drought, as in 2018 and 2019, have a variety of consequences for land management and the use of natural resources, such as the deterioration of Saxony's forests due to pest infestation, but also the growing risk of yield losses in agriculture or changes in water supply for water management. Essential in the context of climate change and especially climate protection is the development of greenhouse gas emissions, especially CO_2. In Saxony, CO_2 emissions have been stagnating at a steady level since 2002, so that massive efforts will be necessary, especially against the background of the climate protection targets. An important building block will be the further expansion of energy production from renewable sources.

Our natural environment's situation has improved significantly since 1990, as shown by the marked improvement in air quality, for example. But there is still an urgent need for measures that protect the environment as well as human health, such as reducing nitrate levels in groundwater or reducing noise pollution.

As the development of the environmental economy shows, we as a society are on the right track. With the right political decisions and the commitment of each individual, the transformation towards more sustainability and the preservation of our natural resources will succeed.

Current and further information on the topic of the environment can be found online at:
www.umwelt.sachsen.de.

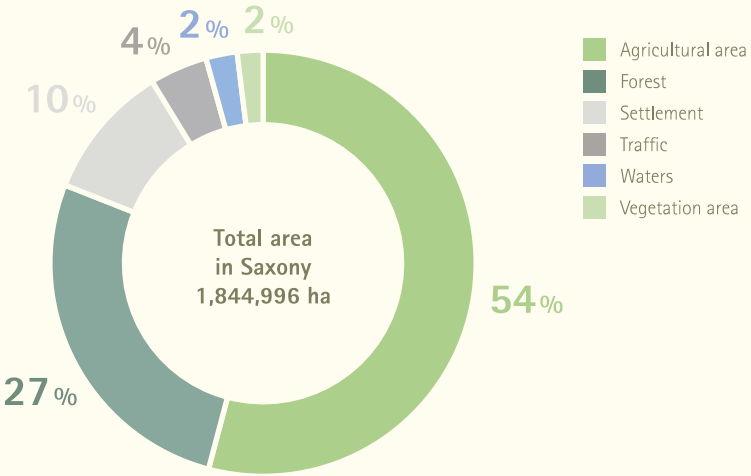


Norbert Eichkorn
President of the Saxon State Office
for Environment and Geology

Land use in Saxony

The graphic shows the main types of land use in 2020 by percentage. Land use in the Free State of Saxony is dynamic. Agricultural land has the highest proportion with an area share of 54 %, followed by forest land with a share of 27 % of the state's area. The amount of near-natural land in Saxony continues to decline in favour of the steadily growing use of land for settlement and traffic. Its share is currently about 14 %. The Free State of Saxony strives to reduce soil sealing through new land use.

Land use in Saxony

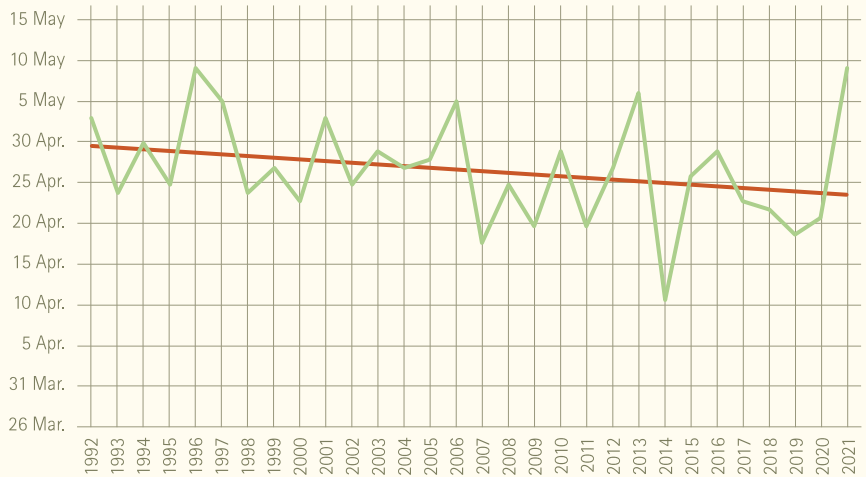


Source: State Statistical Office of the Free State of Saxony

Beginning of fruit tree blooming period

The beginning of the fruit tree blooming period is marked by the day when about 10 % of the blooms are open. The average is calculated from all the varieties considered for the representation chosen here. The beginning of the blooming period also marks the start of fruit development and thus the critical phase of vegetation for fruit growing. The beginning of blooming is an indication of climatic change. The LfULG data shown here indicate a slight trend towards earlier flowering and thus a longer growing season. This improves the overall cultivation possibilities for plants with high heat requirements, with a simultaneous risk of damage from late frost. Counter to the long-term trend, 2021 marked the latest start of blooming recorded in 25 years.

Average beginning of apple tree blooming period in Dresden–Pillnitz 1992 to 2021



Source: Saxon State Office for Environment, Agriculture and Geology

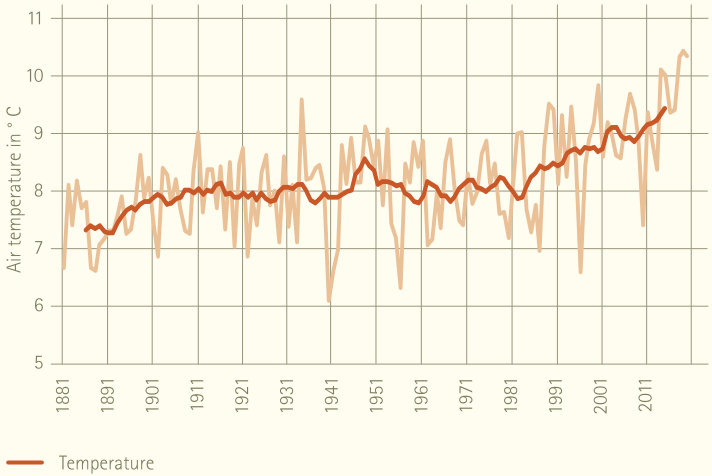
Development of climate conditions in Saxony

The graphs show the annual average values of air temperature and precipitation totals during growing season I (April - June) in the Free State of Saxony from 1881 to 2020. The 11-year moving average provides a better representation of long-term development because it is less dependent on individual years. A suitable representation of climate change can be seen in the temporal development of air temperature. Higher temperatures lead to a prolongation of the growing seasons, among other things, and are accompanied by weather-related extremes (e.g. heat, drought) and the associated risks. Since 1971, each decade has been warmer than the previous one, and since the end of the 1980s/beginning of the 1990s there has been a conspicuous accumulation of the warmest years in Saxony. 2020 is one of the warmest years since 1881 with an average air temperature of 10.3 degrees Celsius.

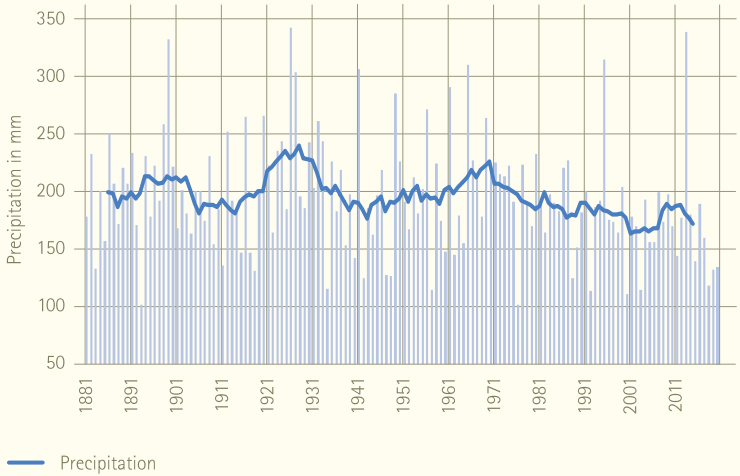
Precipitation is very heterogeneous in its spatio-temporal occurrence compared to temperature. A decrease in rainfall in growing season I slows down the growth process of plants and increases the risk of crop failure. Especially in combination with rising temperatures, this is increasingly affecting agriculture, among other things. Since 1971, each decade has been drier than the previous one. Saxon farmers can adapt to changing conditions by improving their water management.

Measures range from the choice of varieties and crop type to adapted methods of soil cultivation and fertilisation, to the irrigation of certain crops and crop rotations.

Annual average temperature in Saxony, 1881 – 2020
(eleven-year moving average)



Precipitation during growing season I (April to June) in Saxony, 1881 – 2020 (eleven-year moving average)

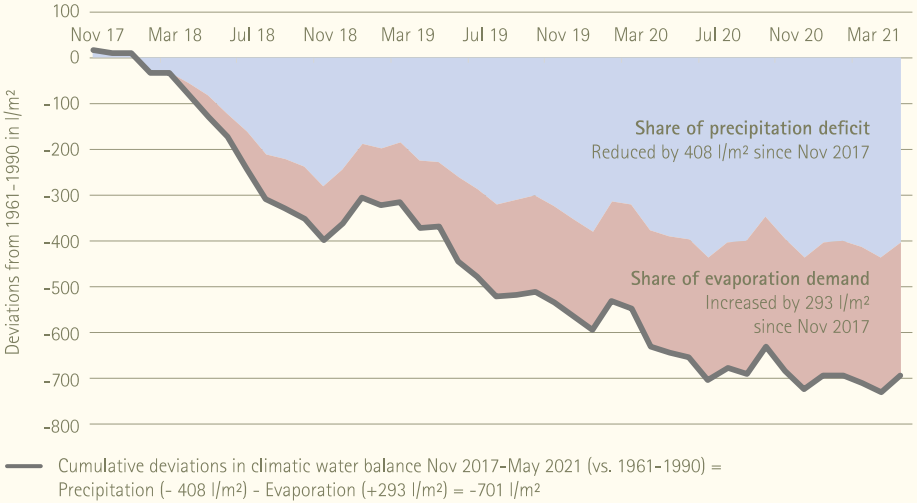


Source: Saxon State Office for Environment, Agriculture and Geology, German Weather Service (DWD), 2021

Climatic water balance

The climatic water balance (precipitation minus potential evaporation) balances atmospheric conditions and describes the potential water supply. As such, it is a drought characteristic and thus a measure of the susceptibility of different environmental systems to the development of drought. Since November 2017, a cumulative deficit in the climatic water balance of about 700 l/m² (-75 %) has arisen in the Free State of Saxony over three subsequent years. The reasons for this are below-average precipitation and above-average evaporation due to the temperature. The direct consequences of this can be seen, for example, in the area-wide below-average groundwater levels or in the increased susceptibility of drought-stressed forests to storms or pests.

Development of the climatic water balance in the Free State of Saxony

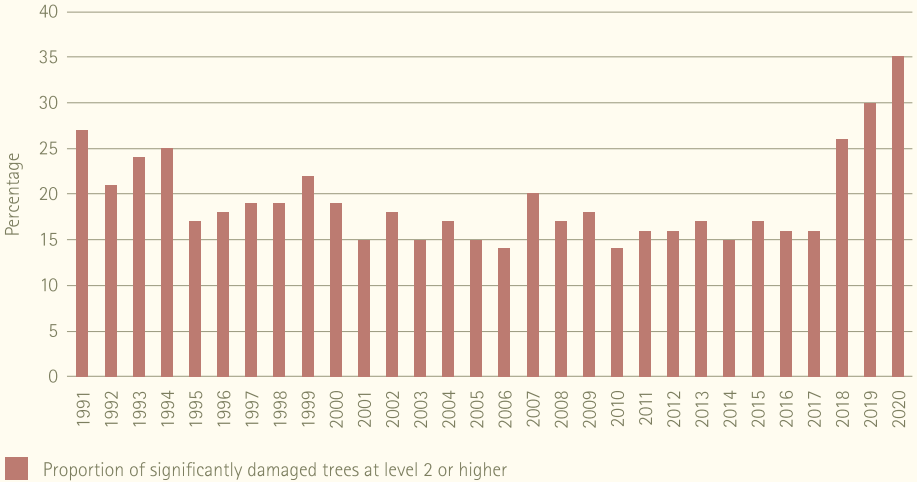


Source: Saxon State Office for Environment, Agriculture and Geology

Forest condition

The proportion of significantly damaged trees in relation to the sample trees assessed in the forest condition survey is an important indicator for assessing the vitality of forests. This indicator decreased from 1991 to 2003, mainly due to the decrease in sulphur dioxide emissions. Since then, the fluctuations in the values have been more strongly caused by weather and biotic damage factors. They continue to occur at too high a level. In the years 2018 to 2020, weather extremes such as storms, drought and heat as consequences of climate change, as well as the resulting mass proliferation of harmful organisms such as the box borer, led to a drastic increase in the proportion of significantly damaged trees from 16 % in 2017 to 35 % in 2020.

Forest condition



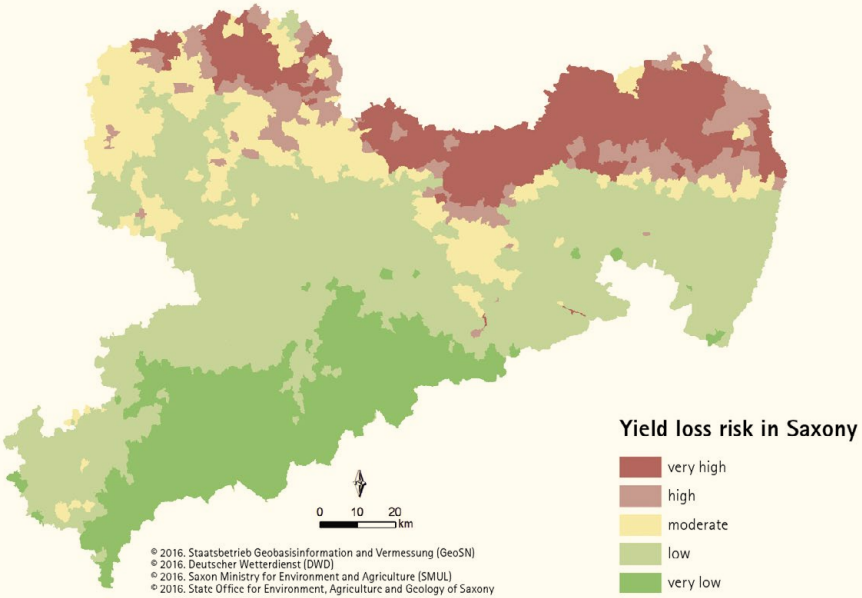
Source: Saxon State Ministry for Energy, Climate Protection, Environment and Agriculture, Saxony Forest State Enterprise - SBS

Yield loss risk for agriculture

Water is crucial to good yields in agriculture. Two of the most important fundamentals are sufficient precipitation and the ability of soils to store water. The weaker one of the two fundamentals is, the higher the risk of yield loss. This could be observed very well in the droughts of the past years. The map shows how high the risk of yield loss due to drought is in the different regions of Saxony. The north is particularly affected with relatively little rainfall and sandy soils. In the centre and south, there are good soils and currently sufficient rainfall. Forecasts by the LfULG assume that the risk of yield loss will continue to increase in the future.

Source: Saxon State Office for Environment, Agriculture and Geology

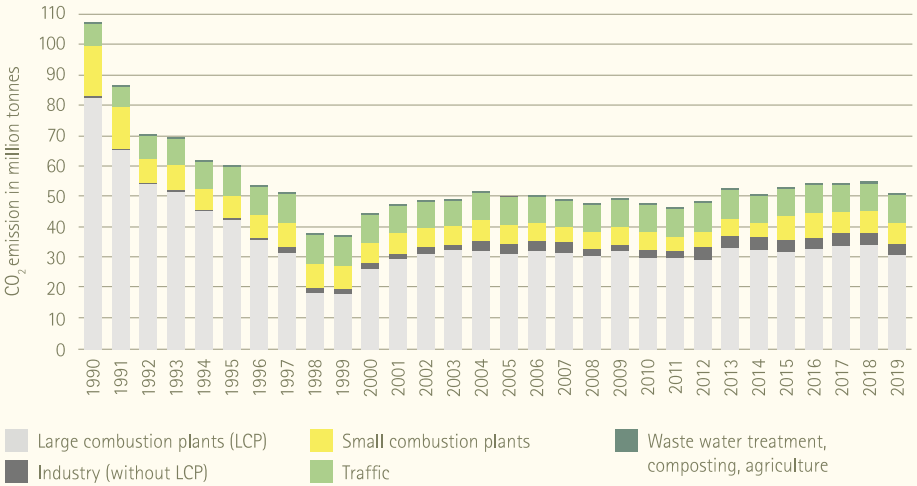
Yield loss risk for agriculture in Saxony



Greenhouse gases

Carbon dioxide emissions account for over 90 % of total greenhouse gases, which accelerate climate change by accumulating in the atmosphere. Large combustion plants (large industrial plants that generate electricity and heat) are still the main polluters. The decline in the 1990s was brought about by many plants closing. The increase at the beginning of the 2000s is due to new power plant units. Since 2002, carbon dioxide emissions have settled down at a stable level.

Development of CO_2 emissions in Saxony from 1990 to 2019



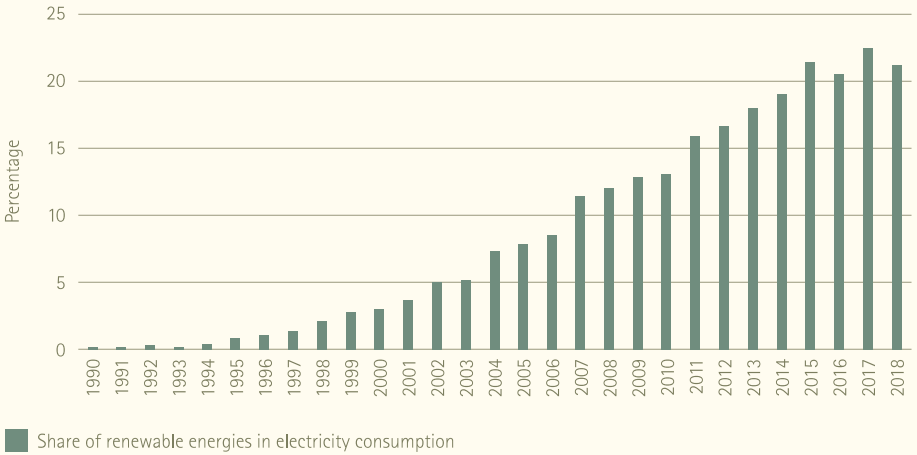
Source: Saxon State Office for Environment, Agriculture and Geology, Emissions Register

Renewable energies

To shape its future energy supply, Saxony is focusing on the expansion of renewable energies in addition to improving energy efficiency and saving energy. This will contribute to climate protection and resource conservation. The (gross) electricity consumption shown here is made up of net electricity generation, the exchange balance across national borders, the power plants' own consumption and grid losses.

Progress has been made since the mid-1990s. The existence and the expansion potential of individual energy sources in Saxony differ. Wind power has the largest share, followed by photovoltaics and biomass. Hydropower and other energy sources carry less weight.

Share of renewable energies in electricity consumption

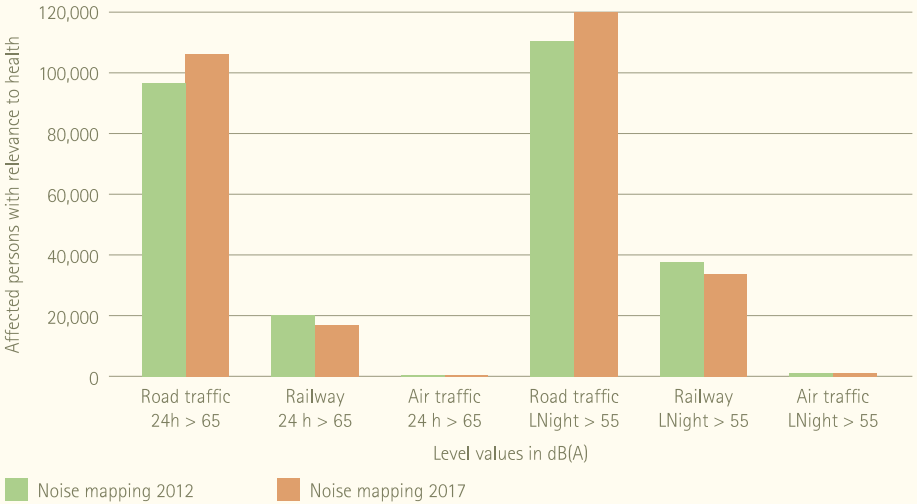


Source: Länderarbeitskreis (LAK) Energiebilanzen

Noise

For years, noise pollution in Saxony has been at a high level. Road traffic is the main cause of extensive noise pollution. However, there is also high pollution potential in the vicinity of airports and along the main railway lines with freight traffic. Noise levels are mapped according to the EU Environmental Noise Directive every 5 years by surveying the noise pollution in metropolitan areas, along major roads, main railway lines and at major airports. The figure shows the number of affected inhabitants above the health relevance level. With permanent exposure to more than 55 dB(A) at night or 65 dB(A) during the day, the risk of cardiovascular and psychological diseases increases. This is caused by stress responses and a decrease in the quality of sleep.

Noise pollution from traffic

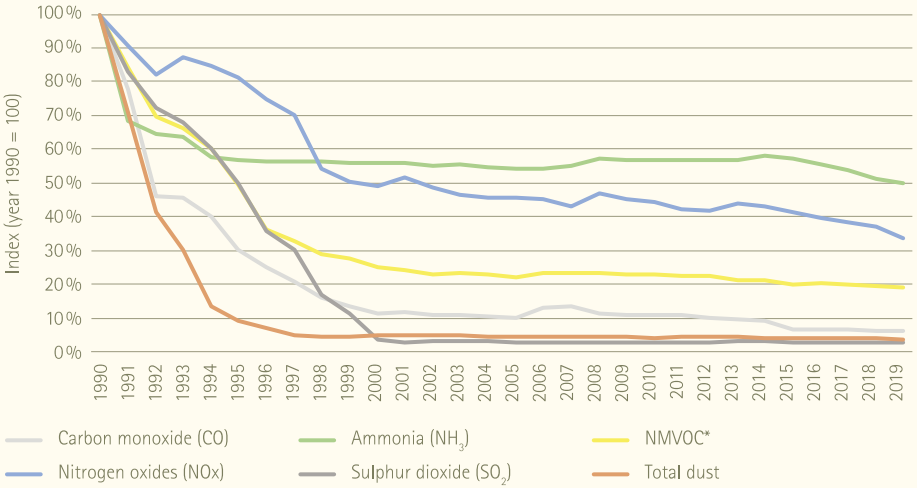


Source: Saxon State Office for Environment, Agriculture and Geology

Air pollutants – emissions

Air pollutants can trigger a variety of negative effects on humans and the environment. From 1990 to 2019, the emissions of air pollutants in the Free State of Saxony reduced considerably. This is mainly due to the economic restructuring in East Germany during the 1990s. In recent years, no relevant reduction effects can be detected any more. Emissions of ammonia and nitrogen oxides remain at a high level.

Emissions of air pollutants in Saxony



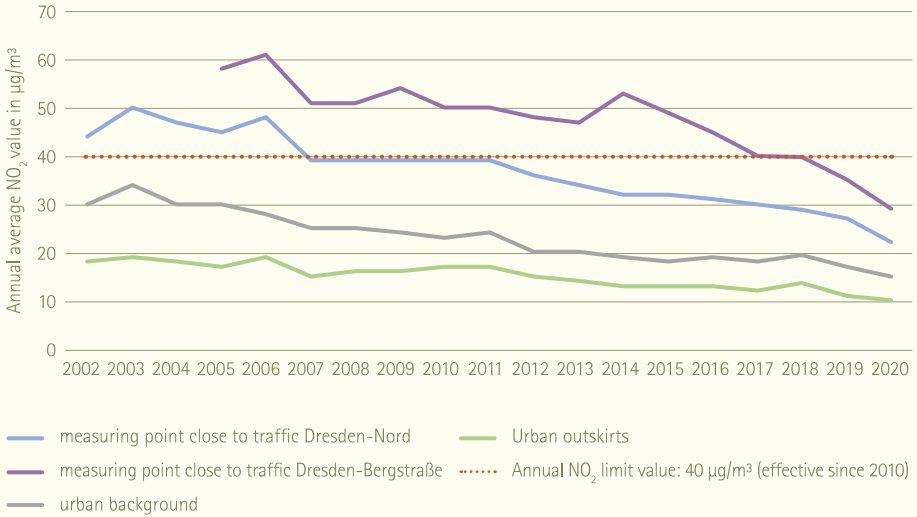
* Volatile organic compounds without methane

Source: Saxon State Office for Environment, Agriculture and Geology, Emissions Register

Air pollutants – immissions

To assess air quality, measurements are taken at locations with different pollution situations. The graph shows an example of nitrogen dioxide (NO_2) pollution in the Dresden metropolitan area. The highest concentrations occur - depending on traffic volume - at measuring points close to traffic. In the urban background - away from the main roads - NO_2 concentrations decrease. The lowest levels of pollution are found on the outskirts of cities and in rural areas. Overall, the pollution levels have steadily decreased over the last 15 years.

Immissions of air pollutants in Saxony

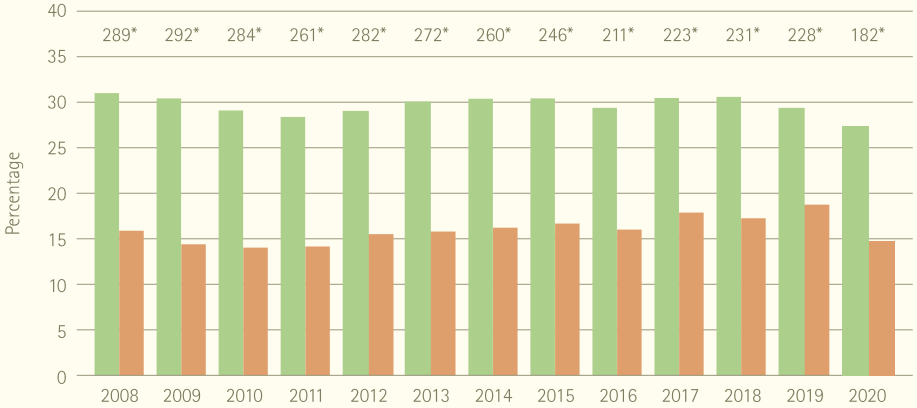


Source: Saxon State Office for Environment, Agriculture and Geology

Nitrate in groundwater

High nitrate levels in groundwater have negative effects. For example, ecosystems can become eutrophic or human health can be impacted.
The figure shows the proportions of monitoring sites in the overview groundwater quality monitoring network where the threshold is exceeded by more than 25 mg/l nitrate (value of concern under the EC Nitrate Directive) or more than 50 mg/l (threshold value under the Groundwater Ordinance and action value under the EC Nitrate Directive). From 2008 to 2019, the proportions of measuring points where the threshold is exceeded increase slightly. To what extent the difference from 2019 to 2020 may continue as a trend remains to be seen.

Nitrate in groundwater



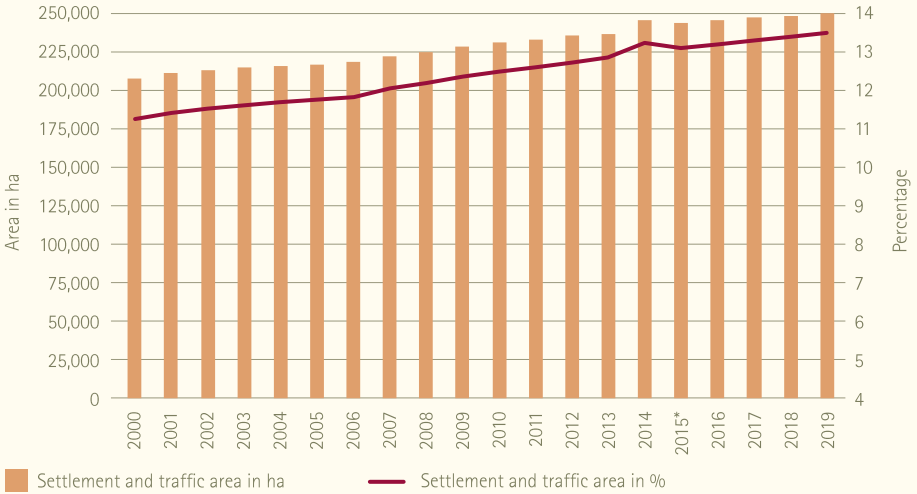
* Number of measuring points

Source: Saxon State Office for Environment, Agriculture and Geology

Settlement and traffic area

For years, the trend towards new use of near-natural soils for settlement and traffic areas has been unbroken in Saxony. The natural functions of the soils will be severely impaired by excavation and sealing. Soils can no longer absorb water or release it into the atmosphere. Large-scale soil sealing leads to local flooding and impacts the local climate. Increasing new land use is reducing the diversity of vegetation and animal species. The Free State has recognised the problem and wants to reduce new land use to an appreciable extent. The aim is to increase the revitalisation of settlement and traffic areas in order to direct demand to areas that have already been used for construction.

Development of settlement and traffic areas



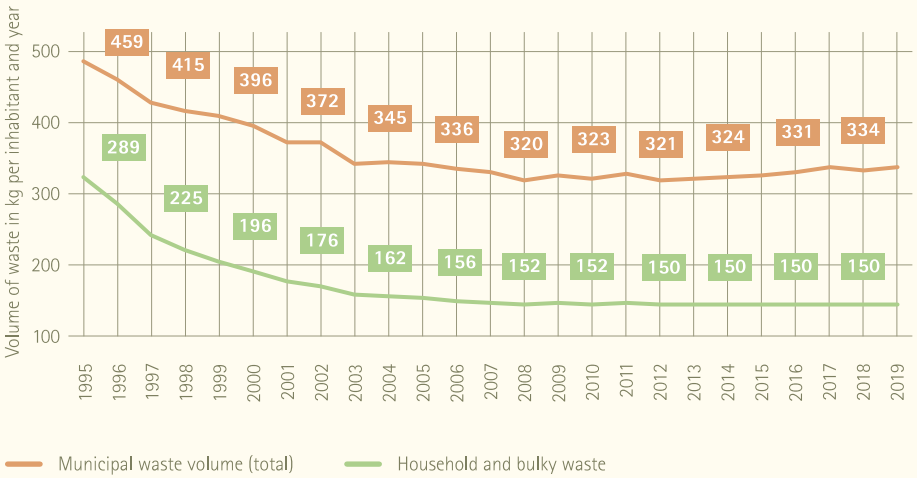
* Due to the conversion of the data basis to ALKIS (Official Real Estate Cadastre Information System) in the surveying administration, there were changes compared to previous years, which in most cases do not reflect the actual changes in use.

Source: State Statistical Office of the Free State of Saxony

Municipal waste

Goods are produced for the household using energy and raw materials, and disposed of as waste at the end of their use phase. The amount of municipal waste and the amount of household and bulky waste disposed of from households show a downward trend over the entire period under consideration; in the last ten years, both have been at a nearly consistent level. The following factors, among others, contribute to this: low-waste consumption, reuse of second-hand goods and waste collection and waste charging systems based on usage. The slight increase in the amount of municipal waste from households since 2015 is due in particular to the improved collection of biowaste.

Waste generation from households

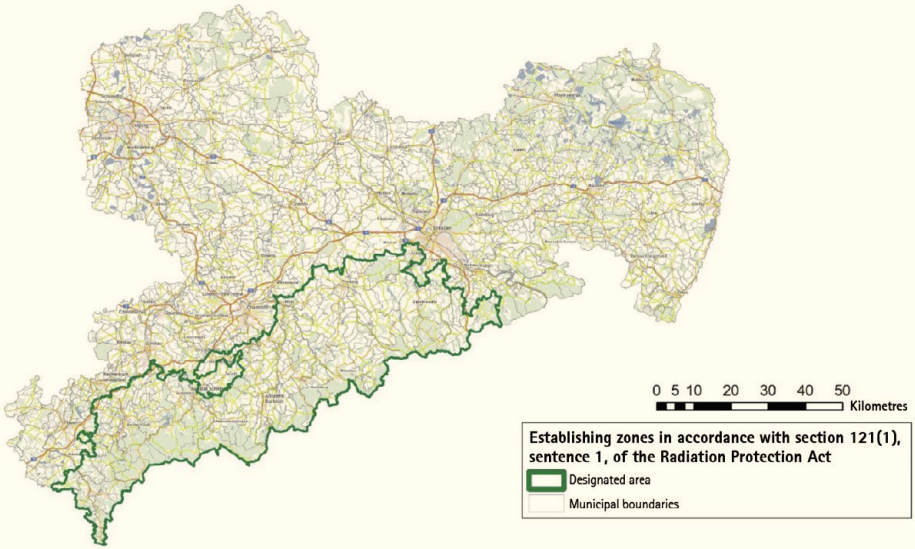


Source: Saxon State Office for Environment, Agriculture and Geology

Radon zones in Saxony

The radioactive noble gas radon is present everywhere in our environment, as it is constantly being formed by natural processes in the soil. Radon enters indoor spaces via different pathways and can accumulate there depending on the ventilation and usage conditions. Exposure to radon and its radioactive decay products in the air we breathe can cause lung cancer. Regulations were therefore anchored in the Radiation Protection Act to protect health. The LfULG defined radon zones on 31.12.2020, as areas in which the radon activity concentration is expected to exceed the reference value of 300 Bq/m³ on an annual average in a considerable number of buildings. Special obligations for radon protection must be observed in these zones. Information on this can be found at www.radon.sachsen.de.

Radon zones in Saxony

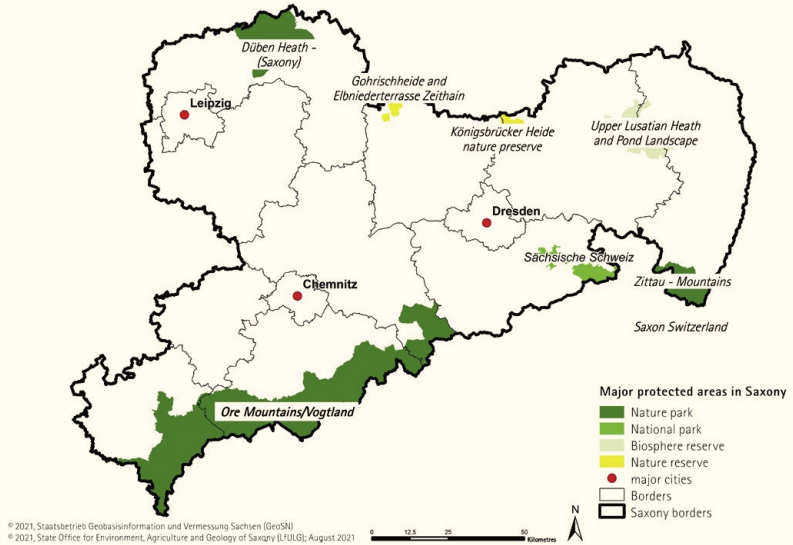


Source: State Operating Company for Environment and Agriculture

Location of major protected areas

The map shows Saxony's major protected areas (national parks, nature parks and biosphere reserves) and two large nature reserves with state-protected area management. These areas are characterised by the fact that they have the character of a nature reserve or landscape conservation area over a large area. Depending on the category, these areas can be used differently for tourism or commercial purposes. The major protected areas are intended to protect and develop near-natural landscapes or diverse cultural landscapes. This is linked to the preservation of species and biotope diversity.

Location of major protected areas

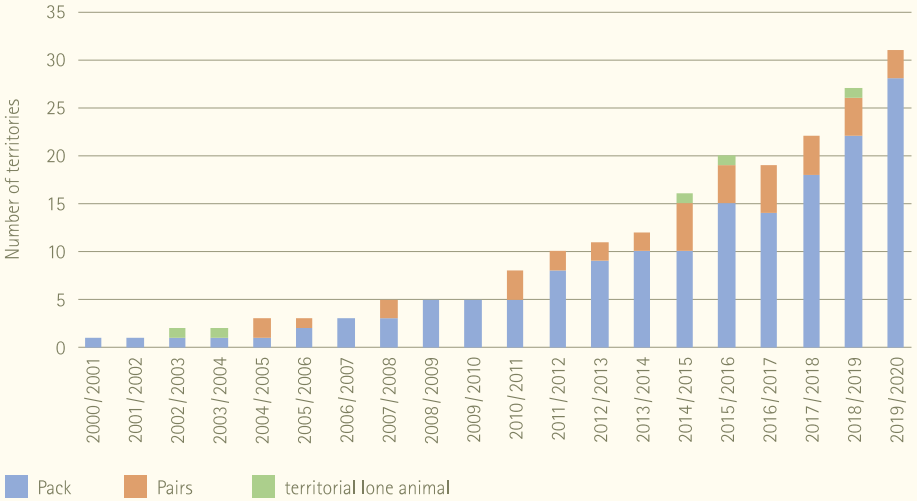


Source: Staatsbetrieb Geobasisinformation und Vermessung Sachsen (GeoSN), Saxon State Office for Environment, Agriculture and Geology (LfULG)

Wolves

When a wolf pack was discovered in the Saxon military training area, Oberlausitz, in 2000, it was the first time that free-roaming wolves were born and raised in Germany in 150 years. In the following years, wolves migrating from Poland or born in Germany colonised new territories and established more packs. In the monitoring year 2019/2020, a total of 28 packs and three pairs were found in the Free State. In addition to wolf monitoring, kill assessment, herd protection advice and environmental education on the subject of wolves are all available from the Wolf Unit of the LfULG. For citizens, livestock keepers and media representatives, the unit is thus the point of contact for all questions concerning wolves throughout Saxony.

Development of confirmed wolf territories in Saxony since 2000

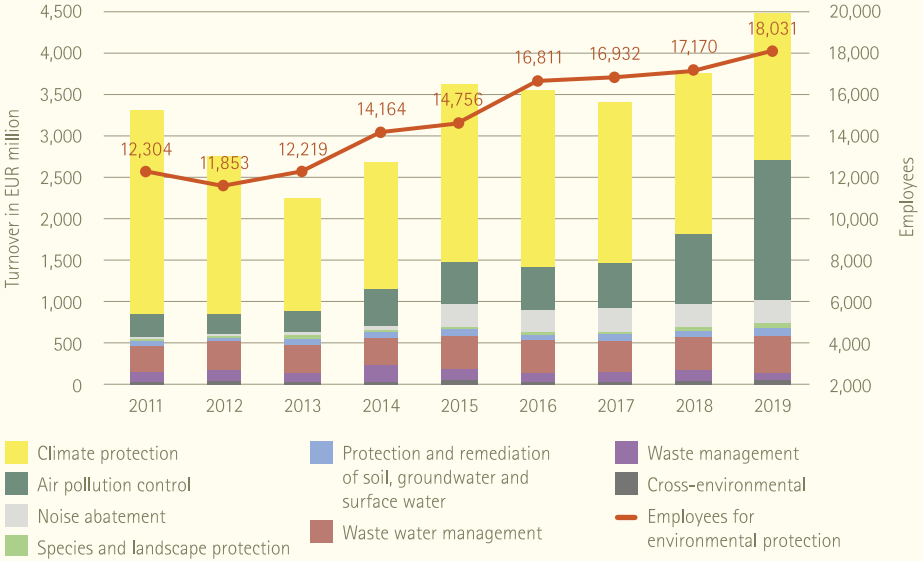


Source: Saxon State Office for Environment, Agriculture and Geology, Wolf Unit

Environmental economy

The environmental economy has become an integral part of the general economy in Saxony in recent years. More than 18,000 people are now employed there. A continued positive development in turnover and employment can be observed in most environmental economic sectors. The years 2012, 2013 and 2017 were exceptions. During these years, there were declines in the area of climate protection. In recent years, revenues have increased, especially for noise abatement and air pollution control. Since the 2019 reporting year, sales of storage technologies for electromobility are no longer allocated to the area of climate protection, but to air pollution control. As a result, significant portions of turnover are shifting between environmental sectors compared to the previous year.

Turnover and employees for environmental protection in Saxony



Source: State Statistical Office of the Free State of Saxony

Topics from the brochure online:

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Publisher:
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Agriculture and Geology (LfULG)
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The LfULG is a subordinate authority of the Saxon State Ministry for Energy, Climate Protection, Environment and Agriculture (SMEKUL).
This publication is financed by taxpayers' money based on the budget passed by the members of the Saxon Parliament.
Editor:
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Design and composition:
genese Werbeagentur GmbH/Serviceplan Solutions 1 GmbH & Co. KG
Printed by:
Lößnitz Druck GmbH
Photo:
Pawel Sosnowski (foreword), Laura Pashkevich - stock.adobe.com (title)
Editorial deadline:
23 October 2021

Circulation:
200 copies
Paper:
Printed on 100% recycled paper
Reference:
This publication can be obtained free of charge from:
Central Brochure Dispatch of the Saxon State Government
Hammerweg 30, 01127 Dresden
Telephone: +49 351 2103-671 | Fax: +49 351 2103-681
E-mail: publikationen@sachsen.de | www.publikationen.sachsen.de

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