Das Lebensministerium

Environmental Report of the Free State of Saxony 2007

Summary

Freistaat Sachsen

State Ministry for the Environment and Agriculture

Preface

Dear Sir, dear Madam,

This concise summary of the 2007 Environmental Report outlines the results of the environmental policy in Saxony between 2002 and 2006 on the basis of detailed values and concrete facts.

Now that the greater rehabilitation projects are largely complete, Saxon environmental policy is increasingly focused on the sustained control of the human environment, for example climate protection and sustained management of diminishing resources. There is limited scope for action due to the drastic changes in the world's energy markets, the increasing electricity, oil and gas prices, and the dependency on gas and oil supplies from just a few exporting countries. Our goal is to use energy even more efficiently and to find an energy mix with renewable energies for increased independence. Saxony's climate protection scheme set up in 2001 faces the political challenges of the changing climate and energy landscape. That scheme has been beneficial to the Saxony-based manufacturers of installations for energy production from renewable sources, as well as to their suppliers. The environmental industries in Saxony have high innovation and growth potentials. The achievements made in environmental protection and pollution control since 1991 are impressive: 87 % of the sewage treatment plants have been newly constructed or refurbished, involving investments of EUR 6.2 billion. EUR 400 million were invested in waste management infrastructures, EUR 250 million in the closure of landfills. Saxony had 1 500 landfill sites in 1991, of which just seven are in operation today. Much has been done and achieved also in terms of nature preservation; almost 16 % of Saxon territory is protected under EU standards. Last but not least, the return of the wolves to Saxony is a special development.

The full 2007 Environmental Report and a wealth of useful information can be downloaded from the web site of the Saxon State Ministry for the Environment and Agriculture: www.umwelt.sachsen.de.

Frank Kupfer
Saxon State Minister for
Environment and Agriculture

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View from Scheibenmountain towards the Erz Mountains

1. Introduction

The Free State of Saxony has achieved a great deal in the field of environmental protection since 1990. The air quality has radically improved. The greatest progress made has been in reducing sulphur dioxid: emissions, which dropped by 94 % between 1996 and 2004. The development of the water system and waste management systems has been similarly positive. The major rehabilitation tasks have largely been completed. This abridged version of the 2007 Environmental Report is an impressive record of what has been achieved. For more detailed and extensive information, please see the full version of the 2007 Environmental Report and the Saxon State Ministry for the Environment and Agriculture website at www.umwelt.sachsen.de.

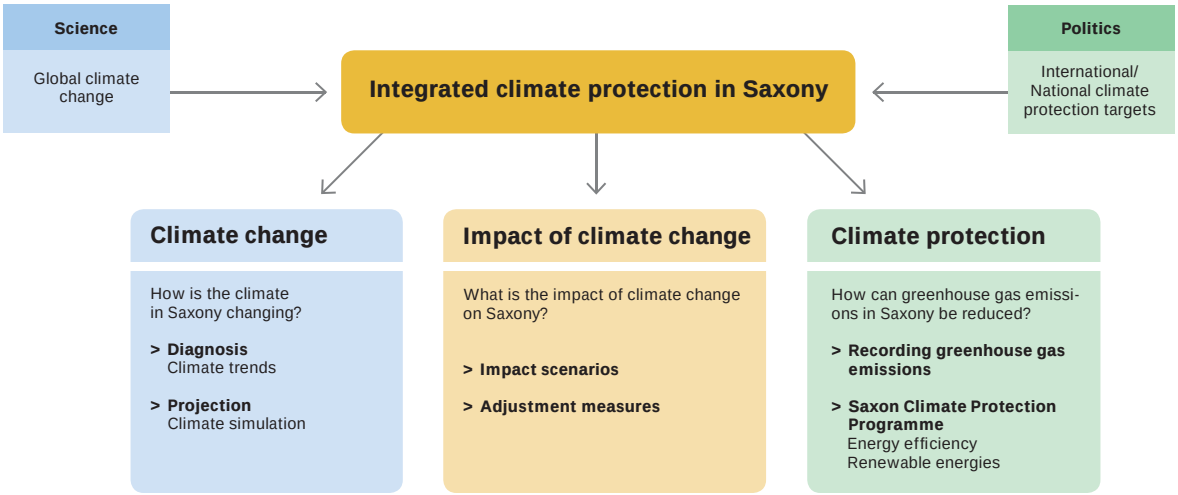
2. Climate

The speed and scale of global climate change at the end of the 20th and beginning of the 21st century are without precedent in the history of mankind. During the 20th century, the temperature rose by 0.6°C worldwide; in Germany this figure was as high as 0.9°C. The IPCC (Intergovernmental Panel on Climate Change) has predicted a further temperature increase in Europe of between 2.0° and 6.3°C by 2100.

Climate change will probably intensify many of humankind's problems, such as food availability, health, and water supply. Limiting climate change is therefore one of the major political and technological challenges of the 21st century.

Important climate parameters in Saxony have also undergone significant changes in recent decades. Observable trends reveal that adjustment measures based on climate projections and the estimated impact of climate change are necessary alongside strong and targeted climate protection measures. Together with climate protection, adjustment measures are therefore a key part of Saxony's "Integrated Climate Protection Plan".

Overview of Integrated Climate Protection in Saxony



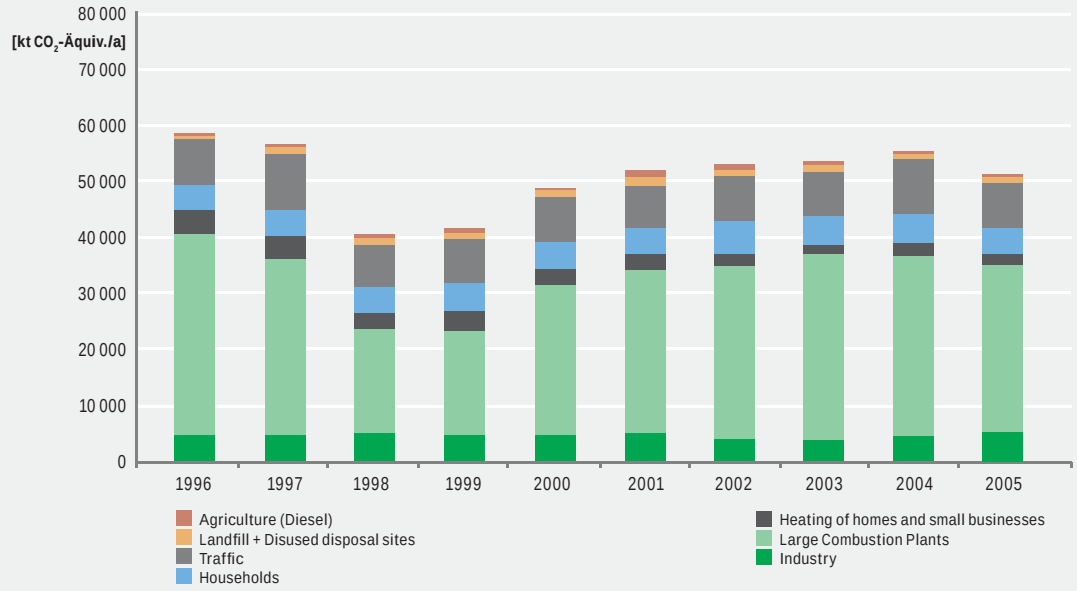
Greenhouse gas emissions in Saxony decreased 63 % between 1990 and 1999; this was due largely to the closure of outdated power stations and industrial plants, as well as to modernisation and the switch to other energy sources. Since then, the start-up of new power plants as replacements for those closed has caused emissions to rise again slightly. In 2004, the emissions reduction was 54 % relative to 1990 levels and 9 % relative to 1996 levels.

Climate change research was carried out in Saxony at a very early stage and a regional climate change projection through 2100 was drawn up. The results show that the dynamics of atmospheric circulation in Central Europe will probably change fundamentally during the 21st century.

The heavy precipitation and flooding in August 2002 in Saxony or the drought in the summer of 2003 were once in a lifetime events. They were a result of a combination of various meteorological factors and in themselves cannot be considered a sign of climate change. However, the characteristics of these extreme events substantiate the results of the latest regional climate projections from now until 2100.

A considerable increase in periods of heat and drought is expected. The average annual precipitation in Saxony will drop, mainly as a result of the forecast increase in the number of summer droughts. North and East Saxony in particular should be prepared for far more frequent sustained periods of drought with significant water shortages during the growing season.

CO_2 emissions in Saxony in kt



Investigations into the possible impact of regional climate change on the water supply, vegetation development (phenology), forestry, agriculture and environmental protection will be coordinated in the Sächsische Staatsministerium für Umwelt und Landwirtschaft [Saxon State Ministry for the Environment and Agriculture] by the **"Climate Change Impact"** working group. The aim is to use regional climate projections to identify the impact of climate change in individual sectors and develop necessary adjustment strategies.

Current projects and investigations dealing with climate change in Saxony and its impact include

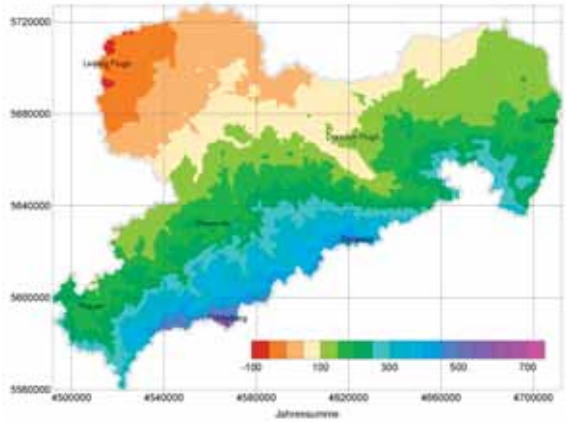
> The Saxon climate database,
> The Saxon climate model WETTREG,
> Various projects on the effects on agriculture and forestry, on dam management, on the water balance of various types of landscapes and on ecosystems and species.

Further information can be found at:
www.klima.sachsen.de

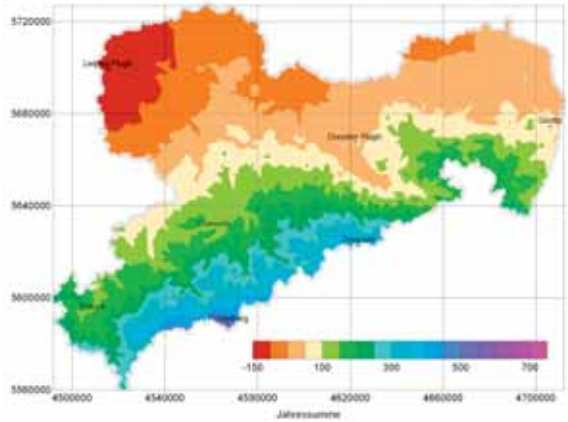
The following climatic water balance prognoses illustrate the effects of climate change.

Climatic Water Balance of Saxony, Comparison of Condition 1981–2000; Prognosis 2050

Climatic water balance, 1981–2000 (series of measurements)



Climatic water balance, 2050 prognosis



3. Energy efficiency and renewable energies

With its 2001 **Climate Protection Programme**, Saxony is taking account of the changing conditions governing climate and energy policy. Energy efficiency and the use of renewable energies will largely determine future energy policy.

The establishment in 2002 of the Energy Efficiency Centre and its transfer on 7 January, 2007 to the Sächsische Energieagentur [Saxon Energy Agency] created an organisational basis and brought together the necessary professional expertise.

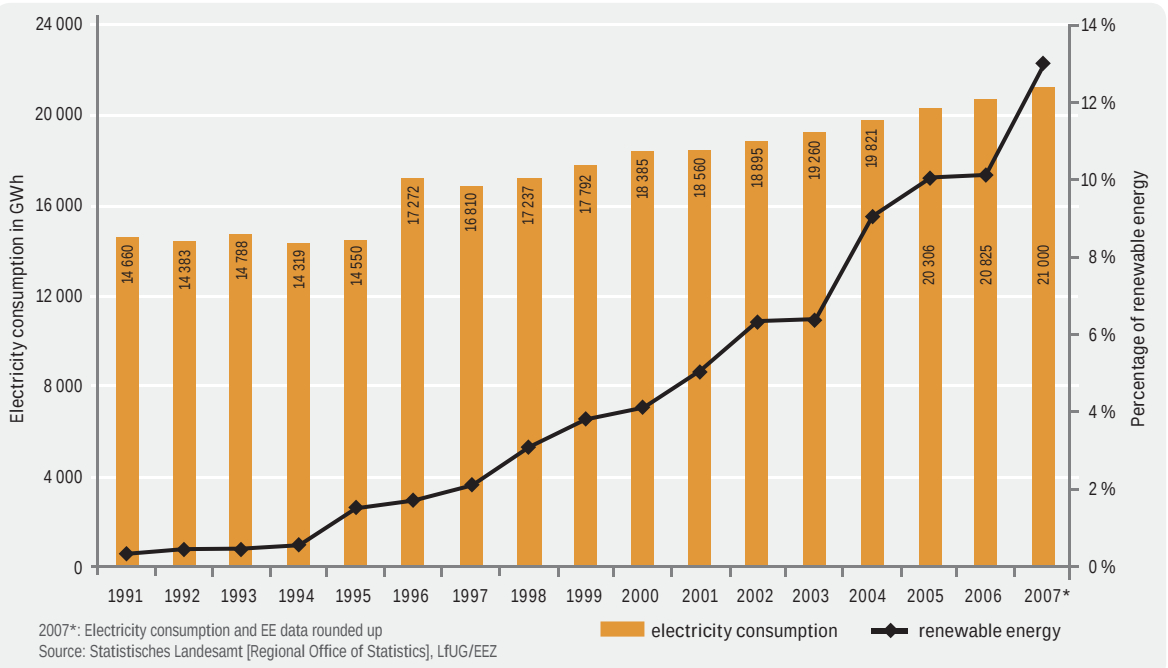
Various studies indicate that halving our energy consumption within a few decades is a realistic prospect. Renovation and redevelopment of buildings alone can currently reduce their energy consumption to a tenth of previous levels. Potential energy savings of up to 50 % are also seen in industry and business. The Saxon Regional Government aims to increase the percentage of renewable energy sources used in generating power.

The increase in energy efficiency and the use of renewable energies is not least an economic chance to promote the export of know-how and technological equipment.

As can be seen from the following diagram, electricity consumption in 2006 was around 20 825 GWh/year. 9.9 % of this was generated using renewable energy. In 2007, the percentage of electricity generated from renewable sources has once more risen considerably. Prognoses indicate there is a realistic prospect of increasing this share to as much as 25 % by the year 2020.

Wind Turbine

Electricity consumption and the percentage of renewable energy in Saxony (1991 – 2007)



2007*: Electricity consumption and EE data rounded up
Source: Statistisches Landesamt [Regional Office of Statistics], LfUG/EEZ

Renewable energies already accounted for 4.6 % of total energy consumption (electricity + heat) by the end of 2006. The Climate Protection Programme had already reached its target of increasing the percentage of renewable energy in final energy consumption to 5 % in 2007.

According to a 2006 study, 5 443 workers were employed directly and indirectly in this branch of industry in Saxony and generated a total revenue of around EUR 1.45 billion As many as 6 100 were already employed in this sector in 2007.

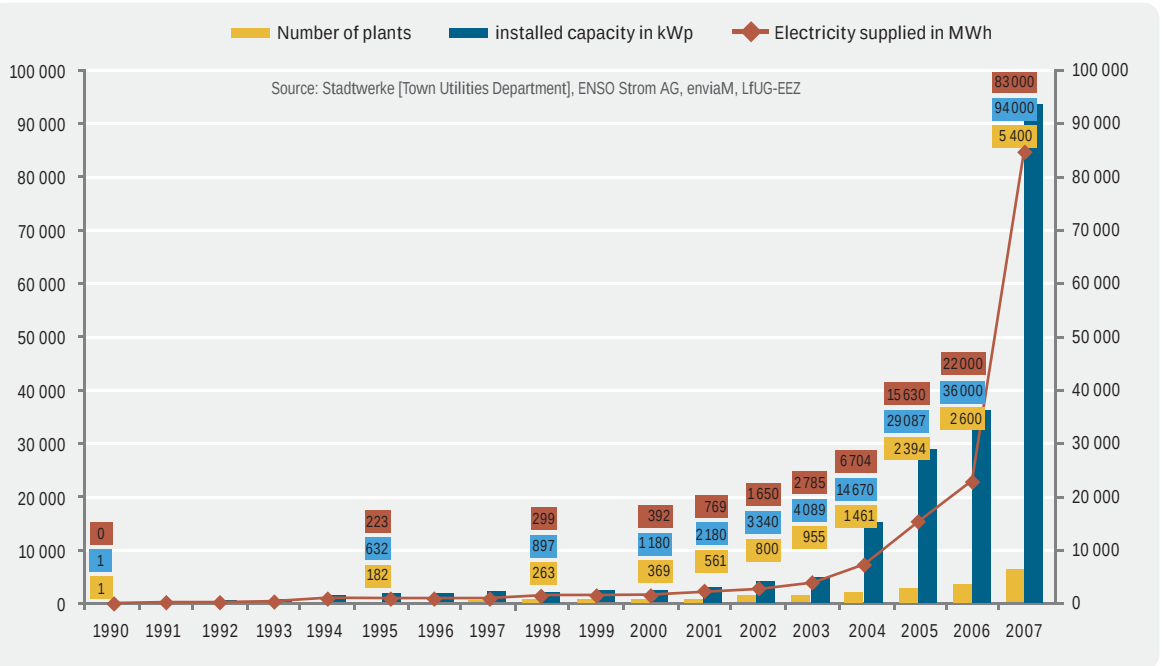
As before, the most important renewable source of energy for the generation of electricity in Saxony is **wind power** (6.7 %). At the end of December 2007, 770 wind power plants were running in Saxony with a combined electrical power output of 826 MW_{el}. There are both objective and subjective limitations on the expansion of wind power; however, the Saxon wind power plants could provide up to 20 % of electricity in the medium to long-term thanks to technological improvements and targeted repowering (replacing plants at existing sites).

308 **hydroelectric plants** were in operation at the end of 2006; these had a total installed electrical power capacity of 78.1 MW_{el} Expansion to a total output of 100 MW_{el} in Saxony would be ecologically acceptable. There is currently a sharp increase in the **use of biomass in energy production**. 276 biomass plants were in operation in Saxony in December 2007; these had a total electrical output of around 80.5 MW_{el} and a total thermal output of around 262 MW_{th}. 148 biogas plants combined heat and power units with an electrical power of around 59.6 MW_{el} also supply electricity to the grid. Their thermal power is around 71.9 MW_{th}. 55 more biogas plants were connected in 2007 alone. 925 GWh of electricity from biomass/biogas was supplied to the national grid. This is only a fraction of the potential amount. The same applies to the generation of heat from biomass.

Relatively high global radiation means that the conditions in Saxony are well suited to the **use of solar energy** (photovoltaic and solar thermal energy). Around 5 400 photovoltaic plants are currently operated in Saxony. These supplied the national grid with around 83 000 MWh in 2007. More photovoltaic power plants have already been approved. The largest power plant of this type is being constructed in Brandis-Waldpolenz and will have a peak output of 40 MW_p.

The start-up of new geothermal energy plants and the positive developments in near-surface **geothermal power** in the last few years is proof of its ever-growing

Developments in PV roof, facade and ground installations in Saxony 1990 – 2007



importance. Geothermal probes with heat pumps are increasingly being used to provide heat for detached houses. The number of geothermal facilities doubled in 2006 to 4 100 and thermal plant capacity doubled to around 56 MW_{th}. In the field of deep geothermal energy, on the other hand, there are still many issues to be dealt with before it can be used to any economic advantage. One such issue is the development of economic drilling techniques.

One focus of work in the field of **energy efficiency** is the buildings sector. An Energieausweis [energy certificate] has been legally required in Germany since 2008 when selling or letting buildings and flats. Saxony introduced the Sächsischer Energiepass [Saxon energy certificate] in 2001 and was thus at the forefront of developments in Germany. To date, over 14 000 Sächsische Energiepässe have been issued; most of these received a grant. Saxon has been helping fund model projects implementing measures recommended in the Energiepässe since 2006. These measures have since been implemented in around 120 projects, mainly during the renovation and redevelopment of detached and two family houses.

Since 2002, Saxony has been providing funding for new buildings to achieve the passive house standard as model projects. These buildings consume around 75 % less heat energy than buildings constructed in accordance with the current Energieeinsparverordnung [Energy Saving Ordinance]. The passive house standard can be used both for residential buildings and commercial properties. Events are organised for architects and planners during the construction phase

High Voltage Power Line

as part of the funded projects. The model scheme is aimed at demonstrating the efficiency of the passive house form and how it can work in practice. The passive house form can be constructed with a wide range of materials. It is suitable for detached and multiple dwellings, schools, nurseries and many commercial buildings. In 2005, the funding program was expanded to include building renovations. Existing buildings usually do not completely meet the passive house standard; however, using elements of the passive house such as regulated air conditioning and heat recovery can lead to a reduction in heat energy consumption of up to 90 %.

Solar Panels

4. Air

The Staatliche Umweltbetriebsgesellschaft [Saxon Environmental Association] runs a Saxony-wide monitoring network with 31 (status as of 2007) air sampling stations in continuous operation to monitor **atmospheric pollution** in Saxony. These stations are able to detect the following pollutents: sulphur dioxide (SO_2), carbon monoxide (CO), nitrogen monoxide (NO), nitrogen dioxide (NO_2), benzol, toluene and xylene (BTX), ozone (O_3), PM_{10} and $PM_{2,5}$[1] fine dust particles, as well as certain components of PM_{10}. The technical equipment in the local air sampling stations is suited to local conditions. Only the necessary parameters are measured.

The environmental departments of the various Regierungspräsidien [regional authorities] are responsible for monitoring the **emissions** from industrial plants in Saxony. Emissions from point sources and from diffuse sources (e.g. traffic, households) are all recorded in the Emissionskataster [emissions register] and regularly updated. Emissions from diffuse sources are established, calculated or estimated on the basis of samples.

Emission dropped by the following amounts between 1996 and 2004:

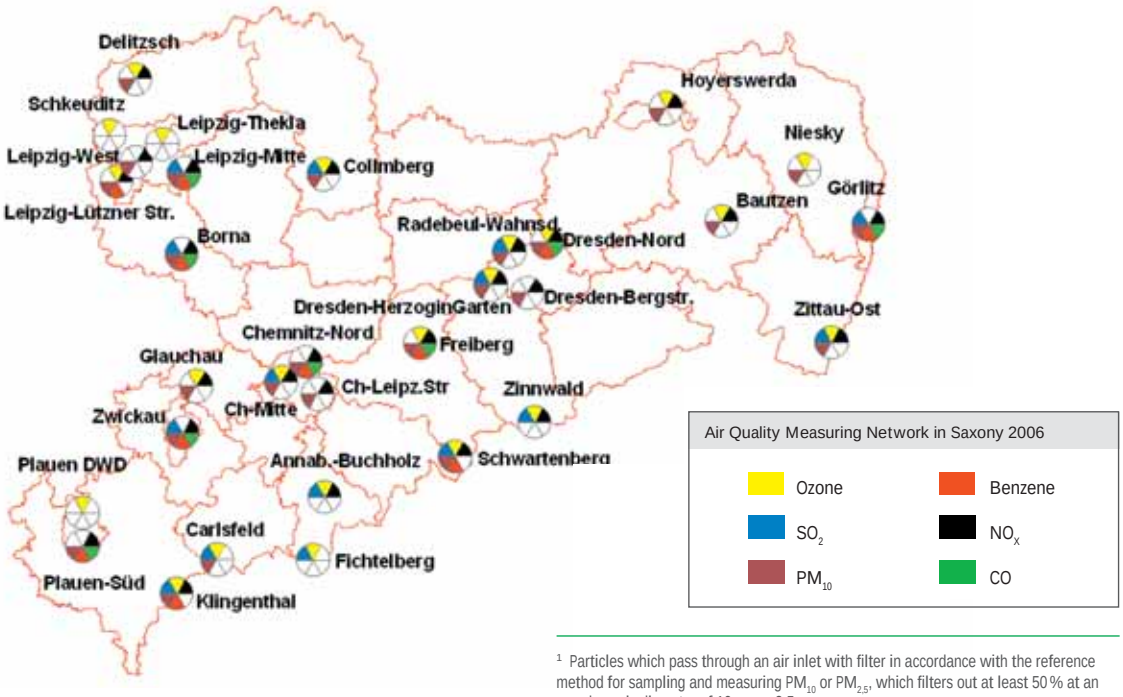
> Nitrogen oxide (NO_x) by 41 %
> Carbon monoxide (CO) by 51 %
> Non-methane volatile organic compounds (NMVOC) by 56 %
> Dust by 40 %
> Sulphur dioxide (SO_2) by 94 % and
> Ammonia (NH_3) by 7 %.

The reduction in emissions of SO_2, NO_x and dust is a result of the closure of and construction of new buildings for large combustion plants. The switch to different energy sources in industry, for domestic fuel and by small consumers contributed more or less in equal part to the reduction in CO emissions. The drop in NMVOC emissions was largely achieved through the withdrawal of motor vehicles with 2-stroke internal combustion engines and the introduction and development of catalytic converters. NMVOC emissions from private households, on the other hand, rose due to the use of solvent-based products such as cleaning agents, paint and cosmetics.

Traffic is a major emitter group. Traffic emissions in 2004 contributed as follows to total emissions:

> NO_x emissions 54 %
> CO emissions 74 %
> NMVOC emissions 46 %
> Dust emissions 26 %.

Further information can be found at www.luft.sachsen.de.



[1] Particles which pass through an air inlet with filter in accordance with the reference method for sampling and measuring PM_{10} or $PM_{2,5}$, which filters out at least 50 % at an aerodynamic diameter of 10 µm or 2,5 µm.

5. Water

Forellenbach in Vogtland, Saxony, Creek under near-natural Conditions

The protection of ground and surface waters is largely regulated by the **European Water Framework Directive** (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy). This directive requires the sustainable use of water resources without significant adverse effects on the waters' ecological function. "Good water status" should be achieved for all water resources by 2015.

The first step in the practical implementation of the directive was to record and report the water situation in 2004. 15 % of the 730 flowing and stagnant water bodies assessed in Saxony will probably achieve "good" status by 2015 without additional measures. For 54 % of the surface waters, however, it seems unlikely that the Water Framework Directive targets can be reached. A lack of data or insufficient data makes the situation for 31 % of the surface waters unclear.

An assessment of the bodies of ground water indicated that c. three fifths of the 64 bodies of ground water assessed will probably achieve "good" status.

A further milestone in the implementation of the Water Framework Directive was the establishment of monitoring programmes by the end of 2006. To this end, the sampling networks for ground and surface water were brought into line with the requirements of the Water Framework Directive in 2005 and 2006.

In 2003, the **Gewässergütekarten** [water quality cards] process was completed. Until then these cards had been drawn up and published in 3 year cycles by the Sächsisches Landesamt für Umwelt und Geologie [Saxon State Office for the Environment and Geology] (as of August 1, 2008 Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie [Saxon State Office for the Environment, Agriculture and Geology]). The 2003 Gewässergütekarte documents the biological quality of the flowing waters using the saprobic system and thus also progress in sewage treatment. Continuous improvements in water quality have been recorded since 1994. The table below shows the percentage of the classified water network in Saxony belonging to the various categories of water quality.

Surface Water Quality Classification (%)

Year	Percentage per quality category						
	I	I – II	II	II – III	III	III – IV	IV
1994	1.2	4.1	26.4	38.8	21.0	6.2	2.2
1997	1.7	5.2	38.8	40.3	9.8	1.4	2.8
2000	2.2	8.1	60.9	23.8	4.4	0.5	0.1
2003	2.6	9.3	61.8	23.9	1.8	0.4	0.2

Johanngeorgenstadt Water Gauge; photo: UBG

The Water Framework Directive changes the system for assessing waters. Since the directive came into effect, it requires that the ecological and chemical status of the waters be established as defined in the Water Framework Directive.

Since 1990 the percentage of Saxony's population connected to the **public water supply** has increased from 93.8 % to 99.1 %. Around 38 000 inhabitants are not yet connected to the public water supply. In 2005, 58 % of the public water supply came from ground-water (including bank filtration) and 42 % came from surface waters, mainly from reservoirs. The reduction in the proportion of ground water compared to 1990 (then 68 %) is a result of the closure of a large number of mostly small local waterworks. Since 1990, the per capita water consumption of Saxons has dropped from 160 l/In.·d (litre per inhabitant per day) to 86 l/In.·d. and is thus far below the national average.

Sewage in Saxony is currently dealt with in 768 municipal sewage treatment works with a capacity of at least 50 population equivalents. Plants built, redeveloped or expanded between 1990 and 2006 make up 85 % of the total treatment capacity. Around 83 % of the Saxon population was connected to public sewage treatment plants in 2006. In total, over EUR 6 billion have been invested in expanding the sewage systems since 1990.

As part of the implementation of the EU Directive on municipal sewage, proper public sewage disposal systems will be put in place for a total of 3.7 million inhabitants of Saxony by 2008. Sewage disposal for c.600 000 inhabitants living mostly in rural areas must be dealt with in the following years. In view of the projected decrease in population, small-scale solutions are also a possible economic alternative. Further information can be found at www.wasser.sachsen.de.

View of the Mulde River Valley

6. Flood protection

The period under review was marked above all by the **hundred year flood** in August 2002. This was sparked off by extreme and sustained precipitation in large areas of Central Europe. On 11 August, 2002 between 50 and 200 mm of precipitation were recorded across all of Saxony. On 12 August, 2002, the Zinnwald-Georgenfeld station recorded 312 mm, the highest level of precipitation in one day in Germany since records began.

On 17 August, 2002, the Elbe peaked in Dresden at 9.40 metres. At this point, the Elbe was flowing at 4 580 cubic metres per second, more than 20 times its normal flow rate of 200 to 250 cubic metres per second. This peak had been preceded by extreme flooding in large parts of the Erzgebirge Mountains and elsewhere, for example in the river catchment areas of the Freiberger and Zwickauer Mulde. The resulting damage was of unprecedented proportions.

The floods in August 2002 claimed 21 lives and two thirds of the region was affected. Material damages for Saxony alone are estimated at EUR 8.6 billion.

2002 Flood in Flöha

The amendment to the **Sächsisches Wassergesetz [Saxon Water Act]** of 2004 was the final stage in the legislative response to the 2002 floods, bringing together flood regulations in one section of the Act. New aspects include regulations establishing potential sources of flooding and flood plains and the creation of a regional flood protection action plan and flood contingency plans for river basins.

Ice Floes on the Elbe River at Dresden

New regulations entirely reorganised the **Hochwassernachrichten- und -alarmdienst [flood reporting and warning service]** Reporting procedures and times were significantly shortened, above all as a result of direct information at the community level.

One lesson of the August 2002 floods was that warnings and forecasts based on an overall assessment must be provided by the same body. **The Landeshochwasserzentrum [Regional Flood Centre]** in the Sächsisches Landesamt für Umwelt und Geologie (as of 01/08/2008 Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie) was formed from the four former regional flood centres. The new centre's main role is to constantly analyse the meteorological and hydrological situation, issuing flood warnings and flood forecasts as necessary.
More information can be found at:
www.hochwasserzentrum.sachsen.de

The Landeshochwasserzentrum is working in collaboration with the Deutscher Wetterdienst [German Meteorological Office], the Bundesanstalt für Gewässerkunde [Federal Institute of Hydrology], neighbouring countries and various research institutions to further improve forecasting. Advance warnings from Usti n. L./Aussig in the Czech Republic up to 60 hours earlier than before mean the forecast for the Elbe flow in Dresden can be made 48 hours earlier.

In Saxony 47 **flood protection plans** were drawn up for the Elbe and a further 3 000 km of Categroy I waters [waters of primary hydrological importance according to German water law]. These were developed over the course of 2003 and 2004. The Landestalsperrenverwaltung [State Dam Administration] is now planning and implementing flood protection and diversion measures on the basis of these plans.

On the basis of the flood protection plans, an atlas of flood risk in Saxony with a scale of 1:100 000 was drawn up for the Elbe and Category I waters. This sets out the risks posed in cases of extreme high water. Two separate maps (see illustration) show the areas flooded (left-hand map) and the potential damage (right-hand map) together with endangered and dangerous sites in the flooded area.

Portion of Flood Map and Damage Potential Map in the Saxon Flood Risk Atlas

Flood protection plans are also to be drawn up for Category II waters [waters of regional hydrological importance] should towns and cities deem them necessary for flood protection purposes. Since 2005, the Sächsische Staatsministerium für Umwelt und Landwirtschaft has been providing funding for the creation of **municipal flood protection plans** and the resulting flood protection measures. By 2006, this funding programme was supporting 14 municipal flood protection plans and 31 municipal flood protection measures.

7. Soil

Soil is a non-renewable resource. It is a basic necessity and source of life for humans, animals and plants as well as a natural element and as such must be preserved and protected.

The following issues must be considered in soil conservation:

- Land use,
- Soil sealing,
- Soil erosion, soil compaction,
- Continuous soil monitoring,
- Increases in wide-scale concentration of harmful substances,
- Pollution,
- Contaminated sites,
- Mining residue.

Extremely important aspects of soil conservation include reducing the area of land used for constructions and traffic routes. Construction work causes damage to the natural function of the soil through, amoung other things, sealing, digging, infilling, and fragmentation.

In 2006, the settlement and traffic area (SVF) in Saxony reached 217 568 ha, or 11.81 % of the land, an increase of 7 328 ha. from 2001. The traffic area alone grew to cover 4.03 % of the region.

The diagram below shows the average daily increase in areas used for settlement and traffic purposes in the period under review. This shows a drop in the growth of settlement and traffic land, particularly in rural areas of Saxony. Overall, land use has, however, once more risen considerably after a significant drop between 2001 and 2004.

This increasing use of land leads to a reduction in ground water regeneration, a change in the microclimate and regional climate, an increase in the flood risk and greater fragmentation of the land.

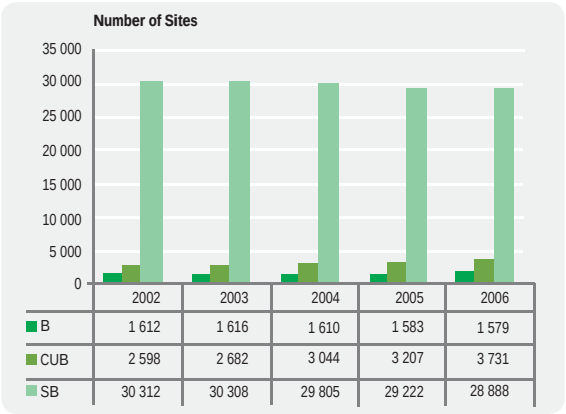
In ecological terms, and also from an economic and social perspective, sustainable land use and a reduction in land use are necessary. Inner city areas remain unused while suburbanisation and settlement dispersal consume valuable greenbelt areas.

The issue of **contamination** is closely connected with soil conservation.

In accordance with the Bundesbodenschutzgesetz [Federal Soil Conservation Act] and the Saxon Abfallwirtschaft- und Bodenschutzgesetz [Waste Management and Soil Conservation Act] all suspected and confirmed contaminated sites are listed in the "Sächsisches Altlastenkataster" (SALKA) [Saxon Register of Contaminated Sites]. The register contains the location and designation of sites, the reasons contamination is suspected and describes the dangers this poses. The process of documenting such sites in Saxony has largely been completed.
The diagram gives an overview of contaminated sites (AL), rehabilitated contaminated sites (san. AL) and suspected contaminated sites (ALVF) in the period of 2002 – 2006.

Increase in Settlement and Transportation Surfaces (hectares/day)

Ratio of Brownfields (B) and Cleaned Up Brownfields (CUB) to Suspected Brownfields (SB)



	2002	2003	2004	2005	2006
B	1 612	1 616	1 610	1 583	1 579
CUB	2 598	2 682	3 044	3 207	3 731
SB	30 312	30 308	29 805	29 222	28 888

The significant increase in completed risk assessments is clear proof of the progress made in dealing with contaminated sites. The number of completed clean-up operations is also increasing but appears stagnant as a result of of the small number of cases and the sometimes extremely long clean-up process. A large number of other areas are currently being cleaned up.

As part of site decontamination, companies who invest in these locations are granted funding for part or all of the clean-up costs. Most clean-ups in Saxony are done so that a company can set up business on the site. Over the period 2002 – 2006, the federal government and the government of Saxony invested c. EUR 185.5 million in Saxony for this purpose. At the same time, the companies invested c. EUR 15.3 million in cleaning up the contaminated sites. The rehabilitation of contaminated sites is important if investors are to be found for inner city areas and former industrial land. Further information can be found at www.boden.sachsen.de.

8. Nature and the landscape

The most important **protected areas** as defined in the Sächsisches Naturschutzgesetz [Saxon Conservation Law] are the Sächsische Schweiz National Park (9 350 ha = 0.51 % of the area of the region), the biosphere reserve Oberlausitzer Heide- und Teichlandschaft [Oberlausitz moor and ponds] (30 000 ha = 1.63 % of the area of the region), the two nature reserves Erzgebirge/Vogtland and Dübener Heide (in total 185 000 ha = 10.07 % of the area of the region) and a large number of nature reserves. The number of nature reserves rose from 209 in 2001 to 214 in 2006 and their combined area increased from 47 246 ha to 49 721 ha (2.7 % of the area of the region).

The European protected areas system, NATURA 2000, covers both the protected areas of local importance as set out in the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna) and the bird sanctuaries in accordance with the Birds Directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds). In Saxony, the ecological network of protected areas Natura 2000 covers has an area of 292 777 ha, or 15.9 % of the area of the region.

The process of registering areas in Saxony under the Habitats Directive was completed in 2004. The 270 sites have specific conservation targets and a combined area of 168 661 ha (9.16 % of the area of the region).

The assisted areas as defined in the Birds Directive were expanded in 2005 and 2006. There are now 77 European bird areas in Saxony which cover 248 965 ha, 13.5 % of the area of the region.

Work has been underway since 2002 on management planning, implementation of protection measures, setting up a monitoring system and fulfilling the duty of reporting to the EU. 94 management plans have been completed and 75 of these have been approved.

Roughly 67 400 sites consisting of around 124 000 sections were recorded in the second round (1996 – 2002) of national **selective habitat mapping** of forestry and open land. The diagram below shows the percentages of the main habitat groups in the area mapped. Around 77 900 of the sections mapped are protected under Article 26 of the Sächsisches Naturschutzgesetz (Saxon Nature Protection Act). 7 470 sites with a total area of c. 9 600 ha (0.52 % of the area of the region) have been classified as potentially important.

During the period under review, a scientific basis was developed for the national **habitat corridor.** This was integrated into the “Gebietskulisse für die Ausweisung eines ökologischen Verbundsystems” [“Assisted areas

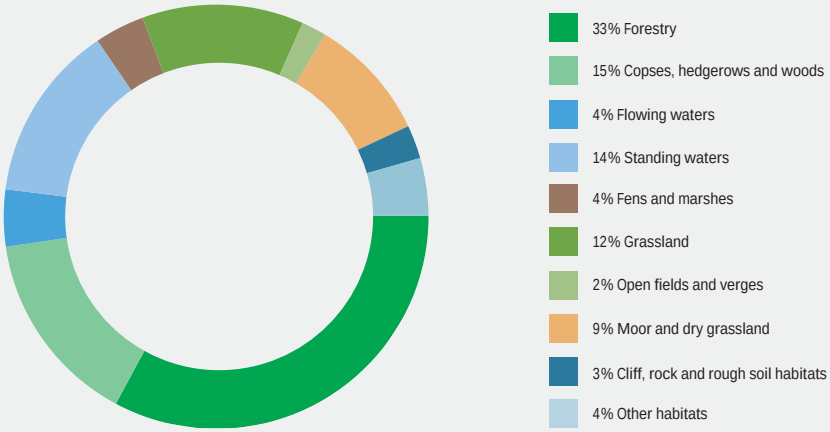
for the recognition of an ecological corridor"] which was added as a descriptive map to the 2003 regional development plan of the Free State of Saxony.

The **development of fauna and flora** is subject to constant change. However, it has been clear for some time now that adaptable and relatively insensitive species are increasingly benefiting whilst there is an overall drop in the number of species. Dry areas low in nutrients on the one hand and wet or damp habitats on the other are particularly endangered. The role of nature conservation is to implement suitable measures to preserve bio-diversity and to halt the decline of native species.

The wide range of efforts in species protection has contributed to positive developments in various populations, including White-tailed Eagles (Halieetus albicilla), Ospreys (Pandion halietus) and endangered bats. These positive developments are in large part thanks to the work of volunteers.

Much attention is being paid to the natural **return of wolves** in parts of Saxony. There have been confirmed reports of wolves from Poland coming into military training areas in Oberlausitz since 1996. Three wolf packs have formed in eastern Saxony since 2000 and these have already raised more than 30 cubs.

Main habitat groups in the area mapped in %



Between 2000 and 2006 **nature conservation measures in Saxony were largely funded** using the following three instruments:

The most important source of funding for nature conservation measures was the "Naturschutz und Erhalt der Kulturlandschaft" ["Nature conservation and preservation of the cultural landscape"] scheme, a part of the "Umweltgerechte Landwirtschaft Programm" ["Environmentally friendly agriculture programme"] and partly funded by the European Union. By the end of 2006, the scheme had funded environmentally responsible cultivation of 32 334 ha of grassland, arable land and ponds.

In addition, the Saxon administration financed the "Richtlinie zur Förderung von Maßnahmen des Naturschutzes (Naturschutzrichtlinie bzw. Landschaftspflegerichtlinie)" ["Funding guidelines for nature conservation measures (Nature Conservation Guidelines or Countryside Protection Guidelines)"], which concentrated on measures aimed at creating and maintaining habitats, public relations work, planning and management of conservation measures, and the care of protected areas. By 2006, this had made it possible to preserve around 6 000 ha of habitat. In 2006 alone, intensive conservation measures were implemented in 16 protected areas of European importance.

Finally, the "Richtlinie zur Förderung der Ökologischen Landschaftsgestaltung" [Directive on the Promotion of an Ecological Landscape], partly funded by the European Union, made it possible to replant c. 490 000 m² of hedges and regenerate and expand a further 1 200 000 m² between 2000 and 2006. Aproximately 2 700 fruit trees were also planted and 180 dry stone dykes and vineyards walls were renovated between 2002 and 2006. Further information can be found at www.natur.sachsen.de.

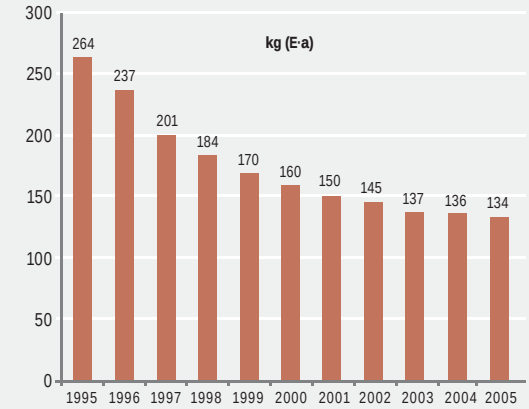
9. Waste management/Recycling

The districts and independent towns responsible for disposal have a legal obligation to draw up yearly breakdowns of the type, amount and residue of **municipal waste.** In 2005, these bodies received around 2.44 million tonnes of municipal waste. Around 23 % of this was non-recyclable waste from households and small commercial concerns. 77 % of the total waste was reprocessed. Only 23 % of the waste had to be disposed of directly.

Waste avoidance and waste separation between 1995 and 2005 resulted in the reduction of non-recyclable waste from 264 to 134 kg/inhabitant.

The Abfallablagerungsverordnung [Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste-Treatment Facilities] came into effect in June, 2005. Under this regulation, non-recyclable waste must be treated before being placed in landfills.

Development of Household Waste per Capita 1995 – 2005



Receiving Municipal Waste in a Mechanical-Biological Waste Treatment Plant

The 11 public waste disposal bodies are responsible for the **treatment of non-recyclable waste** in Saxony. (8 Abfallzweckverbände [refuse organizations], and the 3 verbandsfreie kommunale Gebietskörperschaften [independent municipal authorities] of Dresden, Hoyerswerda, and the district of Delitzsch). The waste disposal bodies were responsible for the construction of 4 treatment plants for non-recyclable and bulk waste which have an annual capacity of 870 000 tons.

The pre-treatment of waste required under the Abfallablagerungsverordnung means that now only the residue remaining after treatment is stored in **landfill sites.** Saxony currently has five landfill sites for the storage of waste from human settlements. Two of these landfills meet the requirements for a Class I landfill and three the stricter requirements for a Class II landfill. Only the latter are authorised for long-term operation after 2009. The landfills have an authorised capacity of c. 6 million cubic metres. 2 million cubic metres of landfill capacity have already been prepared for storage.

Hazardous waste is waste which, as a result of its nature, characteristics or quantity poses a particular risk to health, air or water, or of explosion or fire. Waste which carries or could cause infectious diseases is also classified as hazardous waste. Such waste may come from industrial of other commercial enterprises or public institutions. Hazardous waste must be treated separately in accordance with the nature of the risk.

The amount of such waste rose in recent years to 1.67 million tons in 2004. A slight decrease of 152 000 tons was recorded in 2005. Around 500 000 tons of hazardous waste was disposed of in other federal states in 2005.

Over 2 million tons of hazardous waste has been reprocessed or disposed of in Saxon treatment and disposal plants each year since 2004. Half of the hazardous waste came from other federal states or from abroad. Further information can be found at www.abfall.sachsen.de.

10. Other environmental issues

10.1 Noise protection

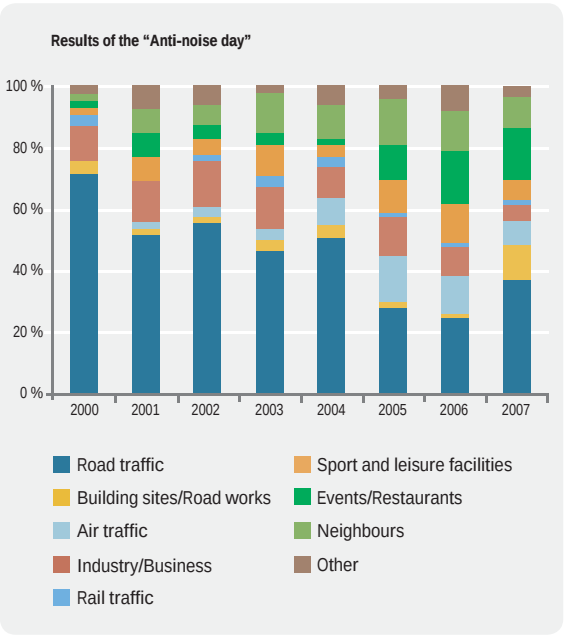
There has been a considerable increase in **noise pollution** in Saxony since the early 1990s, largely as a result of the sharp increase in traffic. In recent years, however, it has remained almost constant. The situation in Saxony is thus in line with the national trend.

Telephone forums for noise complaints have been being organised across Saxony since 2000 as part of the April campaign "Tag gegen Lärm" ["Anti-noise day"] (see illustration). These have revealed the following key issues and trends over recent years:

> The percentage of complaints about street noise has dropped slightly in recent years, but is still by far the greatest subject of complaints each year.
> Noise pollution from sport and leisure facilities, events, restaurants and air traffic is constantly increasing.
> Complaints concerning the industrial and commercial sector have remained relatively stable.

Thanks to targeted and successful work by the Immissionsschutzbehörden [pollution protection authorities] in noise prevention in **industrial and commercial plants,** a high level of protection has already been achieved in these sites in recent years. These plants no longer present a significant source of noise pollution.

Noise complaints by noise source



The percentage of the population exposed to an average sound level of over 65 dB(A) during the day or 55 dB(A) at night as a result of road traffic, on the other hand, amounts to c. 11 % and c. 14 % respectively.

10.2 Radiation protection

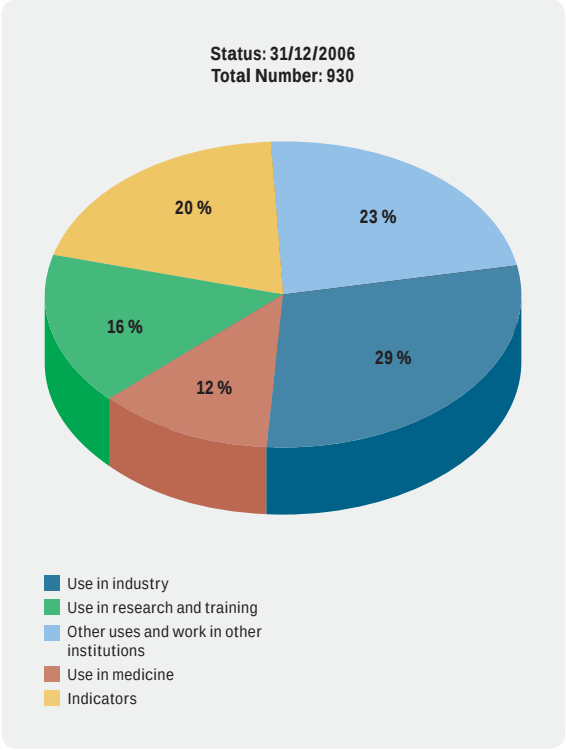
The radiation protection system is based on the following principles:

> Work with radioactive substances and the use of ionising radiation must be justified, i.e. the advantages of such applications must be weighed against the associated risks.
> All unavoidable exposure of people, objects or the environment to radiation is to be kept as low as possible and all unnecessary exposure to radiation is to be avoided.
> The set limits on radiation exposure must be adhered to.

Radiation protection in the field of machine-generated ionising radiation, in other words **plant radiation protection**, focuses on the medical and industrial sectors (nuclear medicine, radiotherapy, radioactive measuring, controlling and regulating techniques, mobile materials testing in chemical, biological or pharmacological research and in environmental analysis). 151 permits and alteration permits were issued in the 2006 calendar year.

There were 390 authorised or approved applications in Saxony at the end of December 2006 which involved the use of radioactive substances or the use of equipment for generating ionising radiation:

Use of Radioactivity according to the German Radioactivity Regulation Agency in Saxony



The total number remained more or less constant in the period under review.

Radioactive substances which are no longer in use must be handed in to a **Landessammelstelle** [regional collection point]. The Landessammelstelle operated by the Verein für Kernverfahrenstechnik und Analytik e. V. (VKTA) [organisation for decommissioning and dismantling disused nuclear sites] is responsible for collecting radioactive waste from Saxony, Thuringia and Saxony-Anhalt for intermediate storage. At the end of 2006, the site contained waste with a total activity of 68 terrabecquerel.

Regarding pollution by **natural radiation,** significant progress has been made in reducing exposure to radiation, largely progress in the rehabilitation of disused uranium mines. The federal government is providing EUR 6.2 billion for rehabilitation work in the Wismut mine area in Saxony and Thuringia. Half of this goes to Saxony, which had used about 75 % of the estimated funding at the end of 2006.
Over the period 2002 to 2005, 196 permits were issued for the rehabilitation of Wismut sites and disused uranium mining sites and around 220 official checks were carried out. 125 ha of spoil heaps and 34 ha of operating area were rehabilitated in this period from Wismut sites alone.

There was a reduction in **radon pollution** from residential and work premises thanks to funding for rehabilitation and public awareness measures. 374 individual consultancy sessions, 742 indoor air measurements, 278 soil air measurements and 491 measurements of gamma radiation were carried out in the period under review as part of the radon consultation programme. Further information can be found www.strahlenschutz.sachsen.de.

10.3 Electromagnetic fields

New technologies are exposing people to an increasing amount of low and high-frequency radiation from electromagnetic fields in their daily lives. Many people are worried as they cannot judge the effect of these fields on their health. The rapidly growing mobile phone network in particular is surrounded by such uncertainty.

We differentiate between low and high frequency fields, as they have different effects on the human body. Low-frequency fields occur around power lines, for example, while mobile phone facilities generate high-frequency fields. According to the most recent scientific findings, if legal exposure limits are adhered to, there is no risk of adverse health effects.

At the end of 2006, the environment departments of the Regierungspräsidien in Saxony recorded 6373 low-frequency and 5 361 high-frequency facilities. Over 1 000 facilities are currently being added to this list each year; most of these (c. 60 %) generate high-frequency fields.

All comprehensive measurement programmes carried out in recent years by the Bundesnetzagentur [Federal Network Agency] (in Saxony at around 130 sites each year) and other measurements by the environment departments of the Regierungspräsidien show that the applicable limits for high-frequency facilities are not being exceeded.

Since 2004, the website of the Bundesnetzagentur has provided access to information on transmitters and to the results of the national measurement programme.

This database also records all transmitters in Saxony and the Bundesnetzagentur sampling/measurement sites.

10.4 Biotechnology and genetic engineering

There is a wide range of applications for biotechnology and genetic engineering, above all in medicine, agriculture and environmental protection. In order to take full account of the principle of protection set out in the Gentechnikgesetz [Genetic Engineering Act] (GenTG), **genetic engineering work and facilities** are regularly monitored. Particular attention is paid to the protection of workers dealing with genetically modified organisms (GMO) and the prevention of the unintentional release of GMOs into the environment.

156 facilities using genetic engineering in research were in operation in Saxony at the end of 2006. 115 of these were classified as security level 1 (no risk to man or the environment), 40 as security level 2 (slight risk) and one as security level 3 (moderately high risk). The number of genetic engineering facilities had thus risen by c. 30 % since 2002 (118 facilities).

Between 2002 and 2006, a total of 302 checks were carried out in genetic engineering facilities. Offences of the Gentechnikgesetz regulations were only discovered in one case. This concerned a laboratory in which security level 1 genetic engineering work (no risk to man or the environment) was being carried out but which was not registered in accordance with the Gentechnikgesetz.

Deliberate releases of genetically modified plants are monitored on site by the Sächsische Staatsministerium für Umwelt und Landwirtschaft. This usually concerns sowing, harvesting and/or the deactivation of the plants as well as subsequent checks after the trials are completed. The checks monitor adherence to the regulations on which authorisation is based and the operator's records. There were no objections as a result of any of the 45 checks between 2002 and 2006.

Examination of Seeds for Genetically Modified Seeds in Saxony

Year	Type of grain	Total No. of samples	Test results	
			negative	positive
2001	Corn	53	52	1
	Rapeseed	32	32	0
	Soybean	2	2	0
2002	Corn	35	33	2
	Rapeseed	29	29	0
2003	Corn	53	52	1
	Rapeseed	19	19	0
2004	Corn	40	40	0
	Rapeseed	37	33	4
2005	Corn	28	27	1
	Rapeseed	36	36	0
2006	Corn	37	35	2
	Rapeseed	1	1	0

In Saxony, conventional **seeds** have been checked for genetically modified organisms since 2001. The number and results of the analyses can be seen on the preceding page. Those values marked with a star were in the non-quantifiable traces range below the limit of quantification of 0.1 %. No measures were taken as the genetically modified organisms were approved for circulation and the results could not be reproduced.

10.5 Chemicals

The basic goals of the Chemikaliengesetz [Chemicals Act] which came into effect in 1982 are to protect human health, gaurentee a safe work environment, and ensure environmental protection. The monitoring carried out in Saxony during the period under review concerned tar oil, chlorofluorocarbons, classification and labelling regulations for hazardous preparations and biocides.

Tar-oil based wood treatments contain harmful substances such as the carcinogenic benzo(a)pyrene. Apart from a few exceptions, it has been illegal since 1992 to market or use products which are impregnated with such wood treatment agents. The regulations were tightened again in 2002. Monitoring procedures continue to uncover breaches of the ban on the use of sleepers and pylons impregnated with tar oil in the private sphere. The number of breaches discovered is, however, decreasing. For example, in 2005 the number of cases uncovered was still around 40; in 2006 this was down to 15.

Chlorofluorocarbons and **hydrochlorofluorocarbons** are significant contributors to the disintegration of the ozone layer in the stratosphere and to the greenhouse effect. Their use has thus been banned other than for a few exceptions. Existing refrigeration and air conditioning facilities with more than 3 kg of such refrigerants must be checked every year for leaks. A large number of facilities were checked for adherence to the regulations. In 2003, 74 % of facilities checked were adhering to regulations. In 2004, 95 % of all those checked were in compliance with the regulations.

10.6 Hazardous incident provisions and plant security

Plants in which hazardous substances are handled or could be produced may only be constructed and operated if sufficient measures for preventing harmful effects on the environment and avoiding other dangers are put in place. Areas where particularly large quantities of hazardous substances are handled are subject to the Störfallverordnung [Hazardous Incident Ordinance]. This sets out specific responsibilities. Operators must draw up a comprehensive safety report and an internal alarm and danger prevention plan.

The safe operation of a plant and the appropriate documentation are the responsibility of the plant operator. The responsible supervisory authorities monitor the implementation of the ordinance, for example by checking the records and documentation (e.g. the safety report) and regular site inspections.

In Saxony, the environment departments of the Regierungspräsidien are responsible for **monitoring** the 66 plant areas with basic obligations (status end of 2005) and the Sächsische Landesamt für Umwelt und Geologie is responsible for monitoring the 41 plant areas with more extensive obligation (status end of 2005). As part of its monitoring work, the Sächsische Landesamt für Umwelt und Geologie carried out a total of 69 site inspections between May 2005 and December 2006. 30 safety reports and alarm and risk prevention plans were also checked by experts.

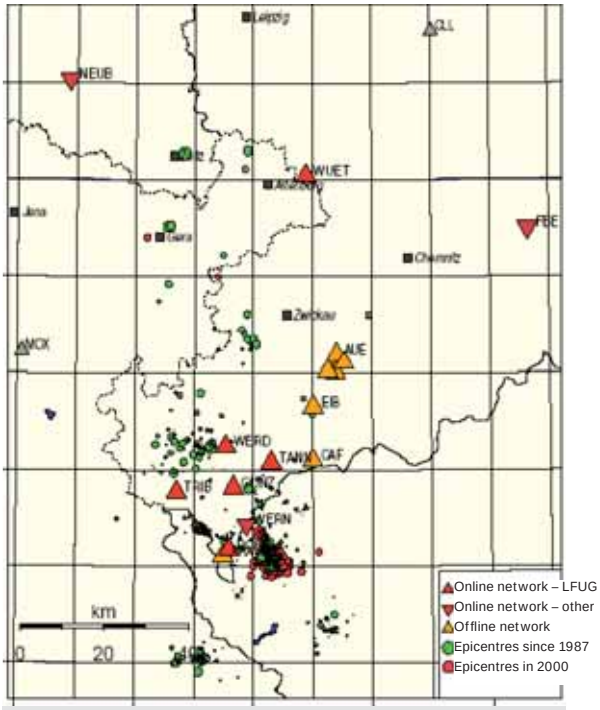
The relevant authorities must be notified immediately of all **incidents** affecting the legal operation of plants which are covered by the Störfallverordnung. Incidents are events involving hazardous substances which lead to significant damage to people, property or the environment. Cases of lesser proportions are referred to merely as “reportable events”.

A total of 23 incidents or reportable events occurred in the facilities covered by the Störfallverordnung between 2000 and 2006. In previous years, a disproportionate number of such events had occurred in chemical plants; in recent years, there have been a larger number of accidents in facilities which handle explosive substances and pyrotechnics and munitions disposal plants.

10.7 Earthquake risks

Saxony has a notable amount of seismic activity. Historically, seismic events measuring over 6.5 on the EMS scale (M>4 on the Richter scale) were observed in West Saxony on repeated occasions. An average of around one quake a month is recorded. The last significant quake occurred in the Vogtland in autumn 2000, when over 10 000 individual earthquakes were recorded (magnitude of up to 3.6 on the Richter scale).

A measurement network was set up to record seismic activity. This covers the entire area and is in continuous operation. The role of seismic monitoring is not to predict earthquakes but to demarcate and define seismically active areas and ensure the rapid provision of information when earthquakes occur. The figure opposite shows seismic activity in West Saxony since 1987 and the Seismologie-Verbund [Seismology Association] gauging stations.



Seismic Activity in West Saxony since 1987
and Seismic Measuring Stations

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