



# SWISS ENVIRONMENTAL STATISTICS A BRIEF GUIDE 2009



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## REMARKS

### Index

Trends in totally different variables can be directly compared using indices, on condition that the same year is chosen as a basis (e.g. 1990=100).

### Rounded figures

Figures are rounded up or down, which may mean that their sum differs from the total given.

### Glossary

Terms in *italics* are explained in the glossary (page 37).

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# SWISS ENVIRONMENTAL STATISTICS

## A BRIEF GUIDE 2009

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# 1 Population and households

At the end of 2007, nearly 7.6 million people lived in Switzerland. This is 1% more than in the previous year and 20% more than in 1980.

Between 1980 and 2007, the percentage of single person households increased from 29% to 37% of all private households.

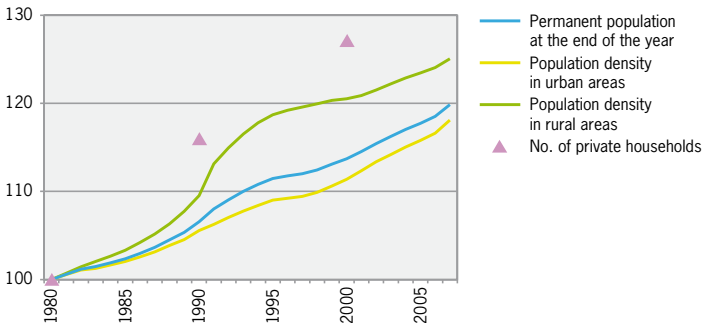
Between 1980 and 2000, the average area of living space per person increased by 29% or by half a square meter every year.

Today approximately three-quarters of the population of Switzerland live in urban areas. While more and more people work in towns and cities, they are tending to live farther away from their workplace. The consequence of this trend is increased building in rural areas and more commuting.

This changing pattern also affects the environment: the desire for more living space has led to the number of households increasing more than the population. At the same time the number of people per private household has fallen: while the average number of people per household was 2.5 in 1980, this figure had dropped to 2.2 by 2000.

## Population, population density and households

(Index 1980=100)



Source: Federal Statistical Office

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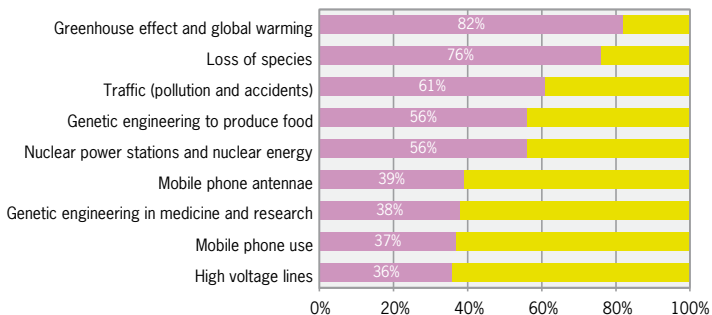
### More about this topic:

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[www.socio.ethz.ch/research/umweltsurvey](http://www.socio.ethz.ch/research/umweltsurvey)

## Opinion poll on dangers for people and environment

How high do you rate the danger for humans and the environment  
(1 'no danger' to 5 'very high danger')?

Percentage of persons interviewed in 2007 who rated the danger as 'high' (4) to 'very high' (5)

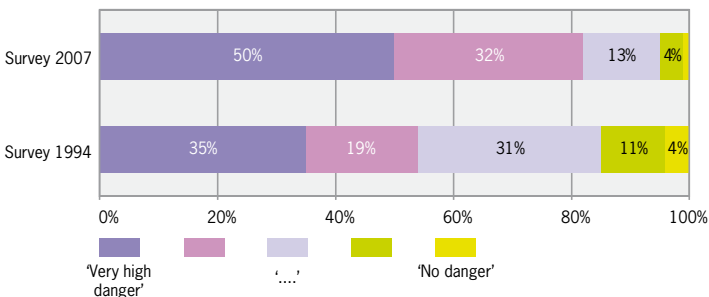


Source: 'Umweltsurvey 2007' (ETH Zurich)

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How high do you rate the danger of the greenhouse effect and global warming  
for humans and the environment (1 'no danger' to 5 'very high danger')?

Percentage of persons interviewed



Sources: 'Umweltsurvey 1994' (University of Bern); 'Umweltsurvey 2007' (ETH Zurich)

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## 2 Agriculture

In 2007, utilised agricultural area (without alpine farming) accounted for 25% of the total surface area. Another 13% of the surface area is used for alpine farming.

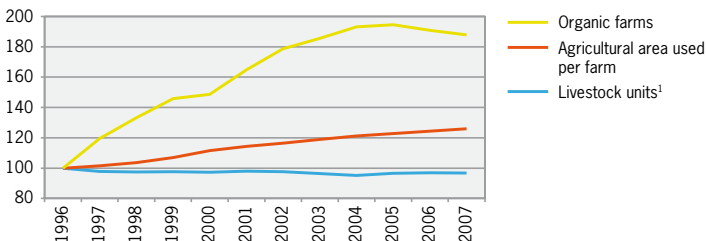
In 2007, 11% of utilised agricultural area was used for organic production. After major growth at the end of the 1990s the proportion of organic farmland has hardly increased since 2004.

In 2007, agriculture was responsible for 81% of methane and 78% of nitrous oxide emissions (collectively 12% of greenhouse gas emissions).

The basis for the implementation of environmental criteria in agriculture is proof of ecological performance (ÖLN), which is a prerequisite for federal payments. The conditions include the well-balanced use of fertilisers, a minimum of 7% ecological set-aside areas, crop rotation, appropriate protection of soils and livestock and the restrained and specific use of crop protection agents. Since 2001, the Ordinance on Ecological Quality (ÖQV) offers additional financial support for ecological compensation areas of particular biological quality and for the interconnection of such areas. These measures are intended to favour natural biodiversity, reduce the pollution of rivers and lakes and promote animal-friendly conditions for livestock.

### Changes in agriculture

(Index 1996=100)



<sup>1</sup> With livestock units (LU) different productive livestock can be compared to one another. 1 LU equals feed consumption, manure and slurry of a cow weighing 650 kg (a sheep older than one year e.g. equals 0.17 LU).

Source: Federal Statistical Office

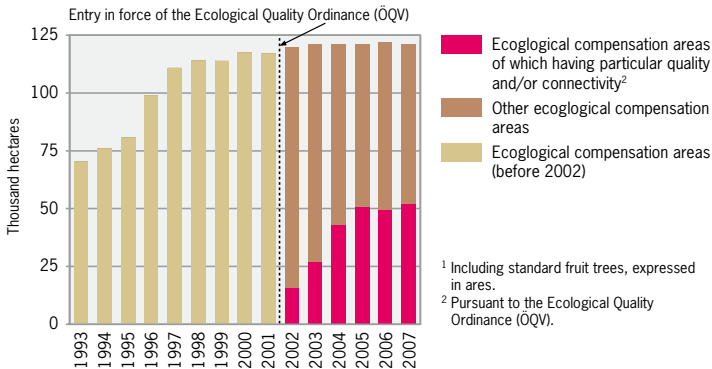
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#### More about this topic:

[www.statistics.admin.ch](http://www.statistics.admin.ch) → Topics → Agriculture, forestry  
[www.blw.admin.ch](http://www.blw.admin.ch)

## Ecological compensation areas

Areas qualifying for subsidies<sup>1</sup>

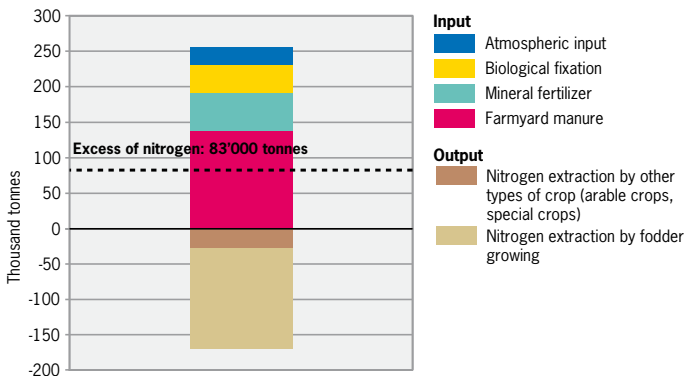


Source: Federal Agricultural Office

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## Nitrogen balance of agricultural areas, 2007

Amounts of nitrogen entering agricultural soils or extracted from them



Sources: Federal Statistical Office; OECD

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### 3 Consumption

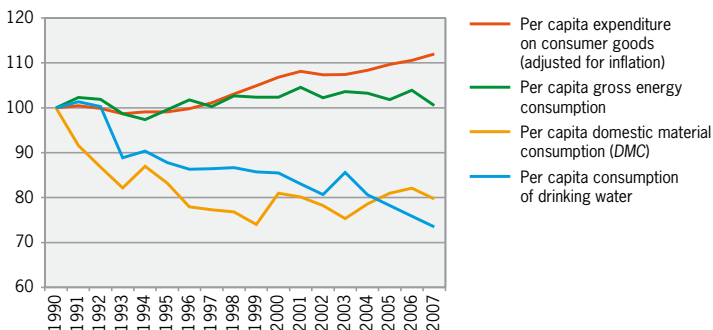
Between 1990 and 2007, average monthly consumer spending per person increased by 12% (inflation-adjusted).

In 2007, households accounted for 28% of final energy consumption (excluding transport).

In 2007, the average daily consumption of drinking water per person was almost 350 litres (including industry and business consumption).

Our life-style and consumption habits are closely linked to our consumption of energy, drinking water and materials as well as with the amount of waste we produce. Individual behaviour has only a minor influence on the environment while the strain on the environment caused by the population as a whole is considerable. In view of the continuing rise in population and an expanding economy in the long term, the responsible use of natural resources is of particular importance.

#### Consumer spending, drinking water, energy and material consumption (Index 1990=100)



Sources: Federal Statistical Office; Federal Office of Energy;  
Swiss Association of Gas and Water Suppliers

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#### More about this topic:

[www.monet.admin.ch](http://www.monet.admin.ch)  
[www.environment-switzerland.ch/products](http://www.environment-switzerland.ch/products)

# 4 Energy

In 2007, final energy consumption was (mainly because of the warm weather during the heating period and high oil prices) roughly 2.6% lower than in the previous year but 8% higher than in 1990.

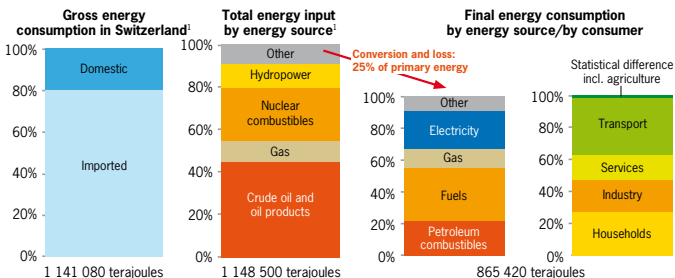
The percentage of final energy consumption from non-renewable sources has been fluctuating between 82% and 84% since 1990.

The percentage of the total final consumption in Switzerland from renewable energy, excluding hydropower and wood, has risen from 0.5% in 1990 to 1.2% in 2007.

Short term energy consumption is dictated by the economic situation and weather conditions. In the longer term, however, population and economic growth as well as technological and lifestyle changes are also determining factors. Since the 1990s the final energy consumption per person has remained more or less stable.

Around 80% of Switzerland's energy needs are supplied from abroad, particularly by importing oil, natural gas and nuclear combustibles. Fossil fuels such as oil, natural gas and coal account for around two-thirds of the energy consumed in Switzerland. Both the provision (exploitation and production) and the consumption of energy have an effect on the environment. Problems arise in connection with, among other things, the air pollutants and greenhouse gases that are released during burning processes.

## Gross energy consumption, total energy input and final energy consumption, 2007



<sup>1</sup> The difference between the gross energy consumption in Switzerland and the total energy input corresponds to the import/export balance for electricity.

Source: Federal Office of Energy

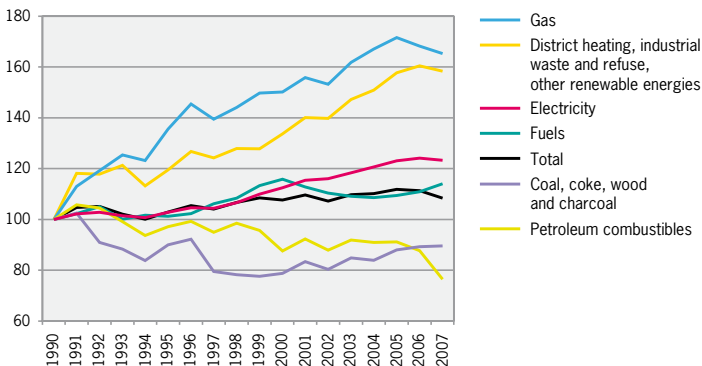
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[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Energy  
[www.sfoe.admin.ch](http://www.sfoe.admin.ch) → Topics

## Final energy consumption by energy source

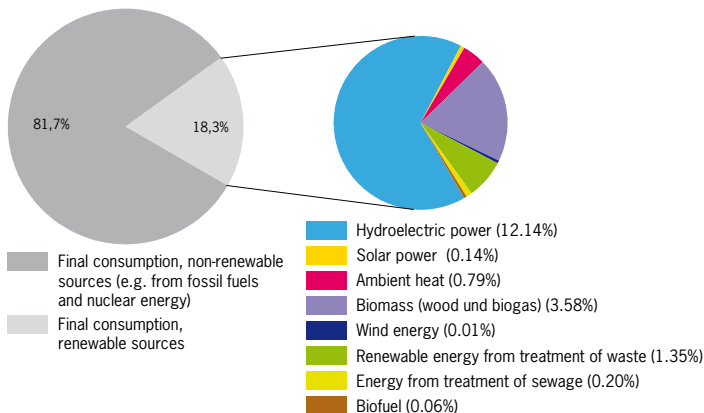
(Index 1990=100)



Source: Federal Office of Energy

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## Share of renewable energy in final energy consumption, 2007



Source: Federal Office of Energy

© FSO

## 5 Transport and mobility

Between 1990 and 2006, individual motorised transport increased by 18% while road freight transport increased by over 42%.

Transport is responsible for 35% of total final energy consumption.

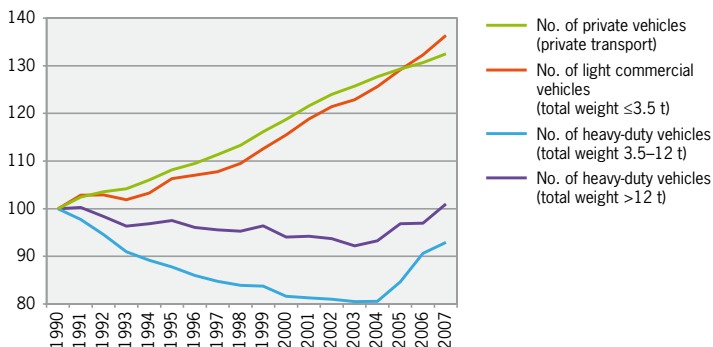
New cars sold in Switzerland in 2007 emit 183 grams of CO<sub>2</sub> per kilometre which is 16% above the EU average of 158 g/km.

There are many aspects to the downside of increased mobility: noise pollution, land-surface use and landscape fragmentation, the effects of the expansion of transport infrastructure, the *emission* of greenhouse gases and increasing air pollution: these are all a burden on the environment.

Although the implementation of regulations on air quality and technological improvements, have led to a marked reduction in the emission of air pollutants from means of transport, due to the massive increase in transport these successes can only be seen as relative.

### Pool of road motor vehicles

(Index 1990=100)



Source: Federal Statistical Office

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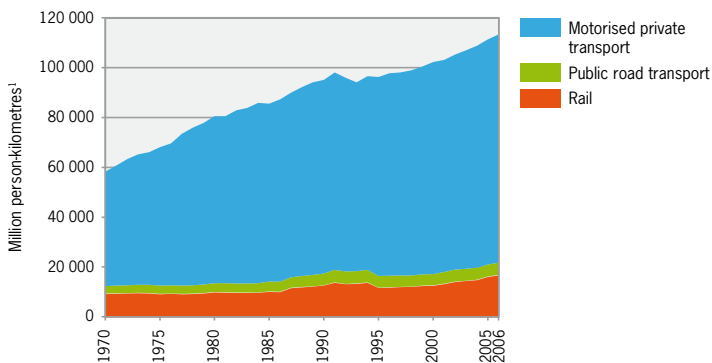
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[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Transports

[www.are.admin.ch](http://www.are.admin.ch)

## Passenger transport performance

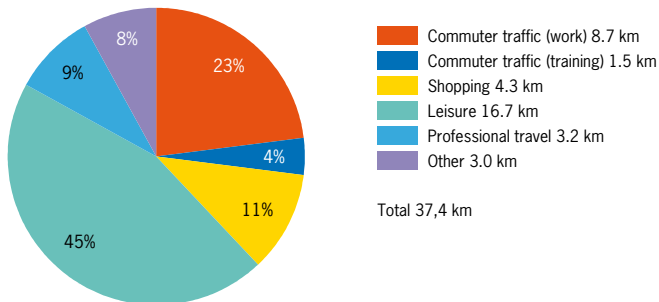


<sup>1</sup> Total of all kilometres travelled annually.

Source: Federal Statistical Office

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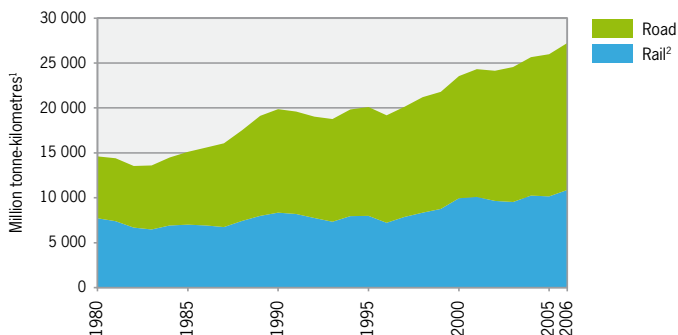
## Average daily travel distance by trip purpose, 2005



Sources: Federal Statistical Office; Federal Office for Spatial Development

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## Freight transport performance



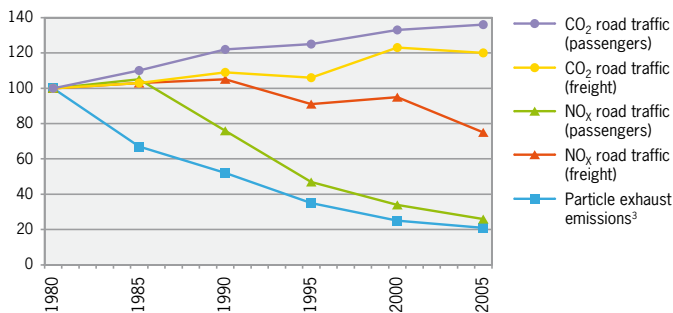
<sup>1</sup> Transport of one tonne for one kilometre.

<sup>2</sup> Net tonne-kilometres: not including weight of freight transport vehicles (and trailers), containers and mobile bodies in combined transport.

Source: Federal Statistical Office

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## CO<sub>2</sub>, nitrogen oxide and particle exhaust emissions caused by road traffic (Index 1980=100)



<sup>3</sup> Particle exhaust is only a part of fine dust emissions (PM<sub>10</sub>). Fine dust also includes those particles which enter the atmosphere through abrasion and resuspension.

Source: Federal Office for the Environment

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## 6 Noise

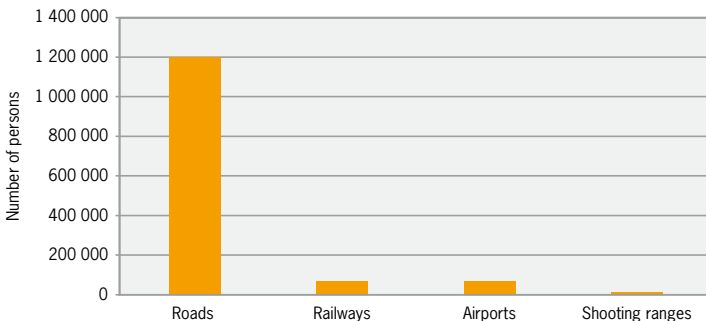
Today, some two-thirds of the population feel disturbed by noise in their homes.

The loss in value of a property can be calculated at about 1% per additional decibel.

Persistent noise and agitation are damaging to health and cause external costs of over CHF 1 million every year.

People are constantly subjected to noise in their surroundings, their job and their leisure time. Noise pollution consists of undesirable sounds whose effects of disturbance are highly subjective. The main source of noise pollution is traffic. Both the psychological effects (discomfort, stress, communication and sleeping problems) and the physical effects (damage to hearing, high blood pressure) of noise on health are often underestimated. At the same time, noise pollution can also have economic consequences such as the difficulty to let certain properties and rising spatial development costs, or indeed social consequences. In view of society's growing mobility, some of the successes achieved in noise reduction have been undermined.

### Number of persons exposed to noise immissions over the limit value during the day, 2009



Source: Federal Office for the Environment

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#### More about this topic:

[www.environment-switzerland.ch/noise](http://www.environment-switzerland.ch/noise)

# 7 Non-ionising radiation

At the end of 2008 almost 9 million mobile telephone contracts were registered.

In 2008, mobile telephony antennae were put into operation in 448 new locations.

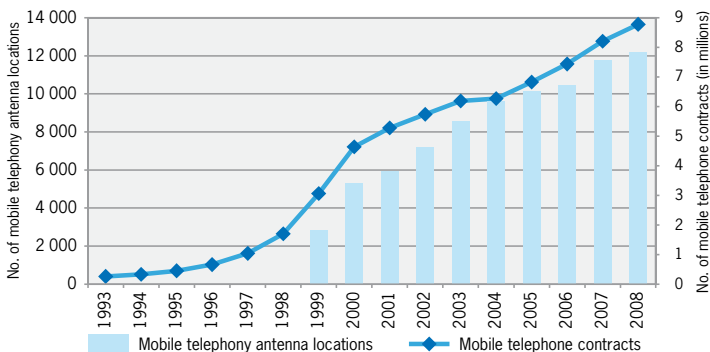
The threshold levels for *immissions* are generally respected.

Technologically produced non-ionising radiation (NIR) – commonly known as *electrosmog* – is the product of installations that supply electricity, electrical appliances and emitters for various telecommunication uses. Nowadays it is omnipresent.

Owing to the increasing demand for electricity, the growing number of electrical appliances and the rapid boom in mobile telephony, pollution in the form of non-ionising radiation is likely to increase in the future.

The effects of this type of radiation on humans and on the environment are not yet fully understood. It is suspected that long-term exposure to small doses could affect health or personal well-being but there is no definite proof. A principle of caution can be adopted by promoting low-radiation technologies and reducing radiation exposure.

## Mobile telephony antennae and mobile telephone contracts



Source: Federal Office of Communications

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### More about this topic:

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Electrosmog

## 8 Chemicals

Worldwide some 100,000 chemical substances are used for commercial purposes.

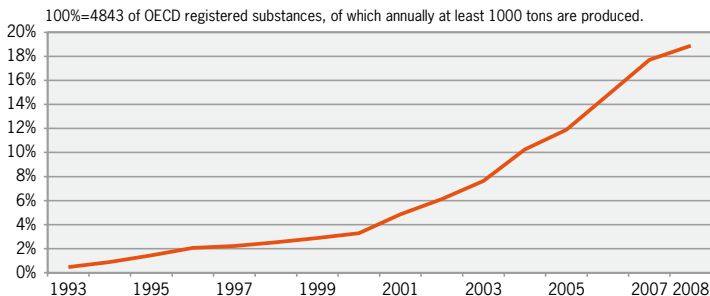
In 2008, 48 new substances were registered in Switzerland.

With a share of over 4% of worldwide chemical and pharmaceutical exports, Switzerland was the eighth largest exporting country in the world in 2007.

Substances are natural or manufactured chemical elements and compounds. Although much pollution has been reduced, countless chemicals whose origin, effects and behaviour are mainly unknown are still found in the environment. Against this background the testing of new substances on the market, but also of well-known ones, for their environmental compatibility plays a central role.

The same applies to new technologies such as nanotechnology. Their wide number of application possibilities could certainly prove to be positive for the environment. However the possible effects on human beings and the environment in this field are still for the most part unknown. Research findings should help to gather experience and to estimate possible dangers and thus ensure the safe use of these technologies.

### Share of hitherto assessed chemicals



Source: OECD

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#### More about this topic:

[www.environment-switzerland.ch/chemicals](http://www.environment-switzerland.ch/chemicals)  
[www.ta-swiss.ch](http://www.ta-swiss.ch)

## 9 Biotechnology

At the end of 2008, over 60% of activity in the field of biotechnology in closed systems dealt with genetically modified organisms and nearly 40% with pathogenic organisms.

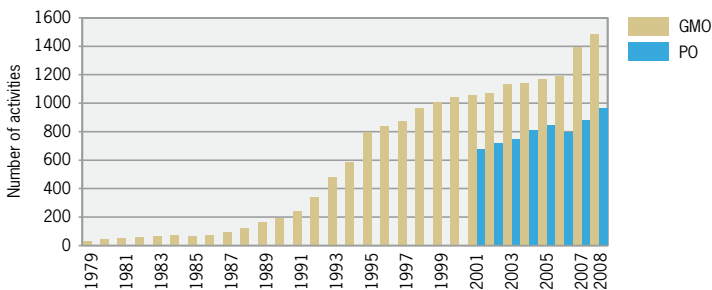
In 2008, permits were issued for 327 registrations and applications for work with genetically modified or pathogenic organisms in closed systems.

In 2008, no requests were made for the experimental release of genetically modified plants. Three already approved experiments involving the trial release of genetically modified plants were carried out.

Activity involving genetically modified or pathogenic organisms is strictly regulated in Switzerland. The principal aim of legislation in this respect is to protect human health and the environment. In addition, apart from ethical issues, freedom of choice for consumers has to be taken into account and preservation of biodiversity has to be guaranteed.

Biotechnological research in laboratories and production within closed systems are extremely important for Switzerland. Comparatively few permits have been issued for the release of genetically modified and pathogenic organisms, as is also the case for the introduction of such products on the open market.

### Activities with genetically modified organisms (GVO) and pathogenic organisms (PO) in closed systems



Source: Federal Office for the Environment

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#### More about this topic:

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Biotechnology

# 10 Waste and contaminated sites

In 2007, over 718 kg of municipal waste was produced per person. In 1990 this figure was 602 kg per person.

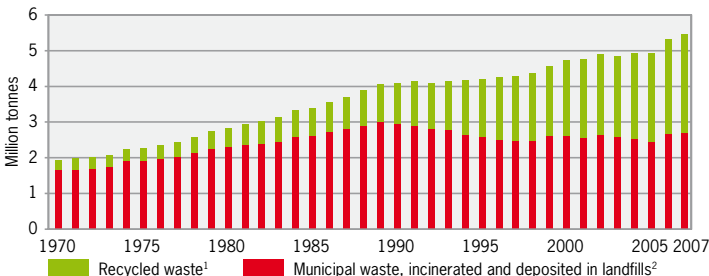
Between 1990 and 2007, the percentage of municipal waste coming from separate waste collection rose from 28% to 51%.

Construction waste, with 10 million tonnes, constitutes the largest amount of waste. 80% of it is recycled.

Sooner or later every product becomes waste. In the area of waste treatment Switzerland now has efficient infrastructure, high standards and clear legislative stipulations. Compared to the production and use of consumer goods, their disposal nowadays causes only minimal impact on the environment. However there is still room for improvement. One of the major aims will be, for example, to consider at the design stage, not only the manufacture and use of a product but also its disposal.

The picture is not so positive for contaminated sites. Careless handling of environmentally hazardous substances and wastes over many decades has left its mark on the substratum. Over the next 15 years we will be concerned with the sustainable remediation of the 3000 to 4000 contaminated sites.

## Municipal waste



<sup>1</sup> Total comprising compost, paper and cardboard, glass, tin foil, aluminium, PET, textiles (since 1993), electrical and electronic devices (since 2001). <sup>2</sup> The figures from 2004 include only domestic waste without imports.

Source: Federal Office for the Environment

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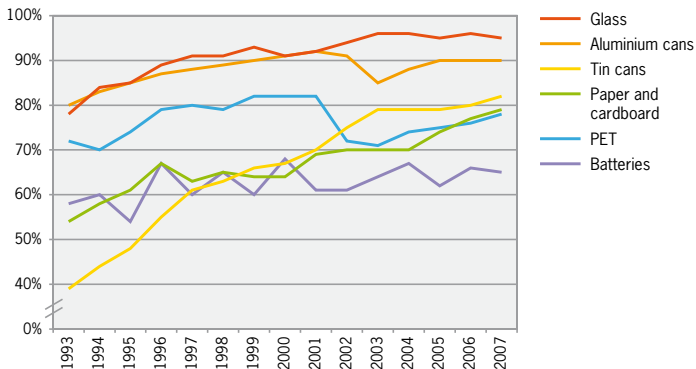
### More about this topic:

[www.environment-switzerland.ch/waste](http://www.environment-switzerland.ch/waste)

[www.environment-switzerland.ch/contaminatedsites](http://www.environment-switzerland.ch/contaminatedsites)

## Recycling domestic and industrial waste

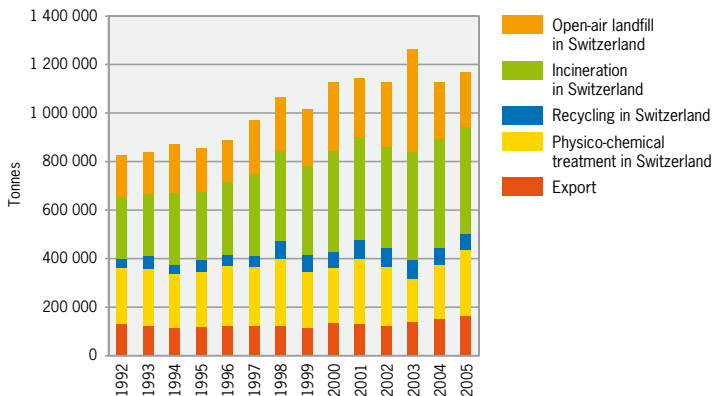
Percentage collected



Source: Federal Office for the Environment

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## Hazardous waste



Source: Federal Office for the Environment

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# 11 Landscape and spatial development

Between 1979 and 1992, 0.9 square meters of new settlement area was created per second.

Over the last 70 years the degree of landscape fragmentation has risen by 88%, the degree of urban sprawl by 155%.

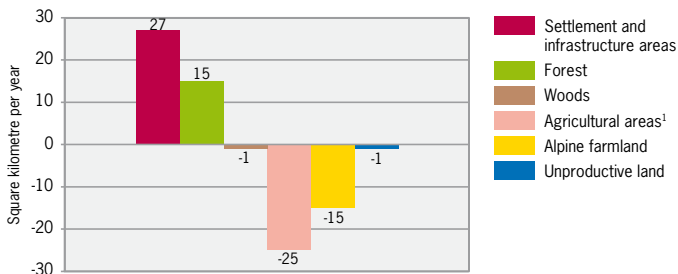
In 2008, nearly 3.5% of the total surface area of Switzerland was strictly protected. (e.g. national park, swamp and moorland).

Switzerland is rich in natural and rural landscapes, which play an important role in maintaining the standard of living and are a major resource for tourism.

The intensive use of the land exerts considerable strain on the landscape, however. The increase in the expansion of built-up areas and of transport infrastructure is often achieved at the expense of agricultural land. At the same time, the tendency to fragment the landscape more and more prevents wild animals from moving freely in their natural habitats. It is exactly this freedom of movement, however, which is an important prerequisite for reproduction and thus for maintaining the species.

## Annual change in land use in Switzerland

Between the periods 1979/85 and 1992/97



<sup>1</sup> Except alpine farmland.

Source: Federal Statistical Office

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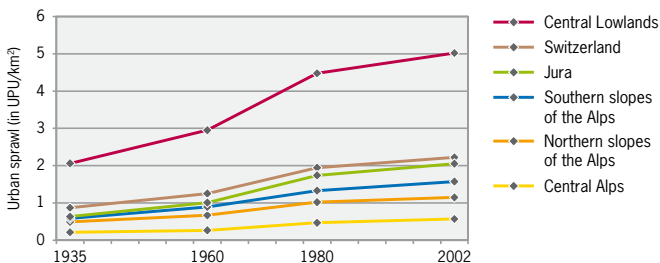
### More about this topic:

[www.environment-stat.admin.ch](http://www.environment-stat.admin.ch)

[www.landuse-stat.admin.ch](http://www.landuse-stat.admin.ch)

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Landscape

## Urban sprawl<sup>1</sup>

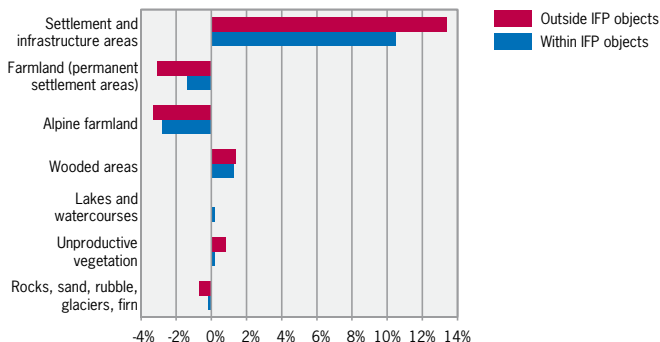


<sup>1</sup> The degree of urban sprawl, measured in 'urban permeation units (UPM) per km<sup>2</sup>' indicates the extent to which land is occupied by buildings. In addition to this, the utilisation density (number of inhabitants and jobs) of the built up areas is now taken into account. The more areas that are built upon, the further apart the buildings are and the lower their utilisation density, the higher the degree of urban sprawl.

Source: 'Landschaftszersiedelung Schweiz', NRP 54 (J. Jaeger, C. Schwick, R. Bertiller), 2008.

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## National protected areas: Changes in land use between 1983 and 1995, outside and within the IFP<sup>2</sup> objects (variation in %)



<sup>2</sup> Unlike biotopes and wetlands of national importance and the national park, IFP objects (Federal Inventory of Landscapes and Natural Monuments of National Importance) are not under strict protection.

Sources: Federal Statistical Office; Federal Office for the Environment

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# 12 Forest and timber

31% of Switzerland is covered by forest.

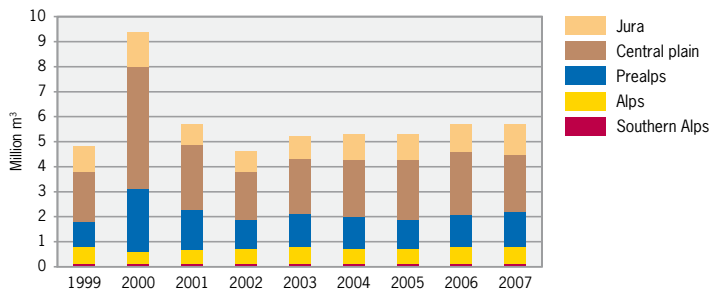
In 2007, 3.1% of the CO<sub>2</sub> emissions produced in Switzerland were absorbed by the increase in living and dead biomass in the forest.

23% of timber harvested is used to produce energy.

The forest fulfils a multitude of functions and is expected to meet many demands. Forests offer protection from natural hazards such as avalanches, rock fall and landslides. They are an essential part of the Swiss landscape and are important for leisure and recreation activities. Forests provide an irreplaceable habitat for animals and plants. In addition the forest is extremely important for the climate (carbon absorbers) as well as for air and water quality.

The forest provides an economic service in the form of the resource timber: Timber is a renewable raw material and energy carrier with many advantages. Responsible forestry is an important part of sustainable raw material provision. A multi-functional forest management can ensure the compatibility of timber production with other products and services of the forest, thus enabling the forest to fulfil its protection, welfare and utility roles in the long term.

## Timber output by forestry zone



Year 2000: Peak in timber output was a consequence of the Lothar storm at the end of December 1999.

Source: Federal Statistical Office

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### More about this topic:

[www.statistics.admin.ch](http://www.statistics.admin.ch) → Topics → Agriculture, forestry  
[www.environment-switzerland.ch/forest](http://www.environment-switzerland.ch/forest)  
[www.lfi.ch](http://www.lfi.ch)

# 13 Soils

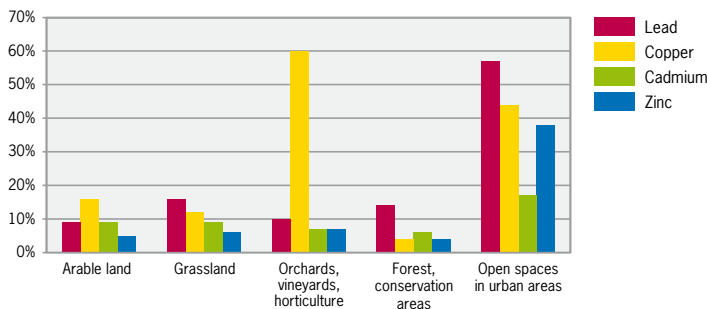
Between 1979 and 1992, 11 hectares of agricultural land disappeared every day. Latest results indicate that this trend is slowing down.

Between 1992 and 1996, over 15% of the analysed soils in Switzerland contained excessive levels of at least one heavy metal.

According to calculations based on models, 61% of all agricultural land is at risk of some degree of erosion and 17% is at serious risk of erosion.

The soil is a vital natural resource for mankind and for millions of organisms. Whereas air and waters are likely to recover in a matter of weeks or a few years upon removal of a pollution source, soils often need centuries to regain a healthy condition. Pollutants that enter the ecological cycle such as heavy metals and organic compounds which are difficult to break down accumulate in the soil where they may obstruct important functions of the soil and enter the food chain through plants. They may subsequently harm animal and human health through direct or indirect consumption. In addition to these chemical processes, the fertility of the soil may also be affected through physical processes such as erosion or compaction.

## Threshold value exceedences shown according to land use in about 14,000 cantonal and national measurement stations, 1990–1996



Source: Federal Office for the Environment

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### More about this topic:

[www.environment-switzerland.ch/soil](http://www.environment-switzerland.ch/soil)  
[www.soil.ch](http://www.soil.ch)

The threshold values for the *immissions* of ozone, nitrogen dioxide and fine dust particles (*PM10*) are still regularly and extensively exceeded.

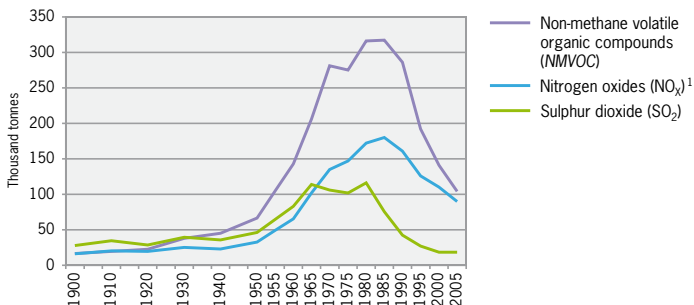
In 2005, 40% of the population was exposed to an above threshold value concentration of fine dust particles (*PM10*) at their place of residence.

The overall cost of air pollution in Switzerland amounts to several billion CHF per year (health care costs, damage to buildings etc.).

Since the mid-1980's the quality of the air in Switzerland has considerably improved thanks to the measures introduced to maintain clean air. This trend has flattened out in recent years. Today air pollution remains below most of the threshold values. This is not the case, however, with ozone ( $O_3$ ), nitrogen dioxide ( $NO_2$ ) and fine dust particles (*PM10*).

Air pollutants cause diseases of the respiratory tract and of the cardiovascular system in humans, as well as increasing the risk of cancer. Whole ecosystems are damaged through excess nitrogen and acidification. Air pollution *emissions* can be reduced by improving combustion processes (in particular for wood-burning heating systems), reducing ammonia emissions in agriculture and avoiding solvent leakage (*NM VOC*).

## Emissions of air pollutants



<sup>1</sup>  $NO_x$  comprises  $NO$  and  $NO_2$ . Emission values are given in  $NO_2$ .

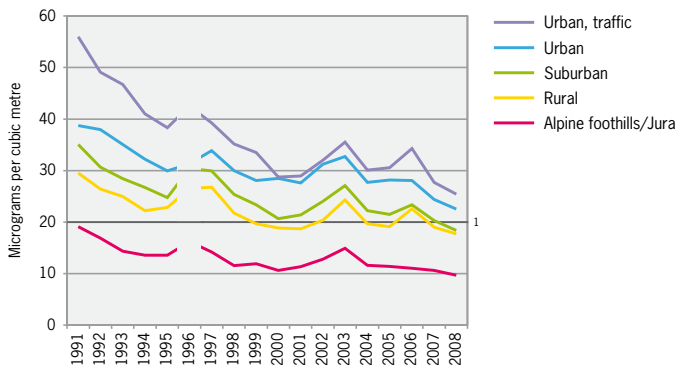
Source: Federal Office for the Environment

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### More about this topic:

[www.environment-switzerland.ch/air](http://www.environment-switzerland.ch/air)  
[www.cerclair.ch](http://www.cerclair.ch)

## Fine dust particles (PM<sub>10</sub>): Annual mean for various types of location



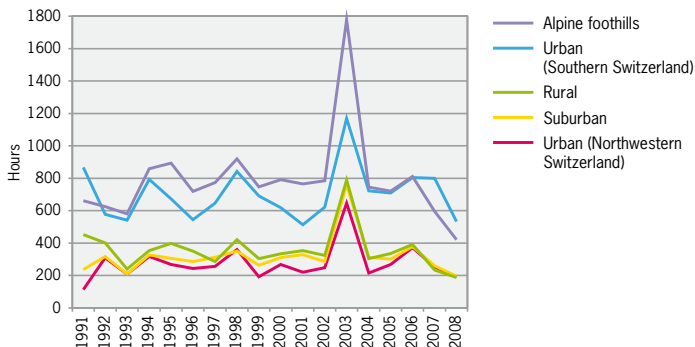
Data prior to 1997 was acquired by a different method.

<sup>1</sup> Threshold limit (annual mean): 20 micrograms per cubic metre.

Source: Federal Office for the Environment

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## Ozone concentration: exceeded threshold value<sup>2</sup>



In 2003 the ozone level was extremely high owing to the persistent high temperatures.

<sup>2</sup> Threshold value (hourly mean): 120 micrograms per cubic metre.

Source: Federal Office for the Environment

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# 15 Climate

Between 1970 and 2005, the mean temperature in Switzerland rose by 1.5 °C.

Emissions of greenhouse gases rose by 2.7% between 1990 and 2007 (the aim according to the Kyoto Protocol is to reduce greenhouse gases to a level of 8% below that of 1990 by 2008/12, incl. forest sinks and certificates).

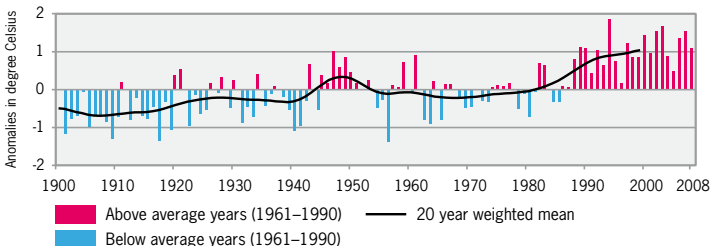
Between 1990 and 2007, the tongue of the Grosser Aletsch glacier receded by more than 700 metres.

With greenhouse gas emissions continuing to increase, man is visibly influencing the earth's climate system; this can be seen by rising temperatures which exceed the natural range. The emissions are mainly from transport (especially road transport), households (heating of homes and warm water) and industry.

As a result of higher temperatures, climate experts predict a change in rainfall patterns and a rise in sea-level in the future. The consequences for society and the economy are various; aspects such as water resources, tourism, agriculture, energy, health, insurance and infrastructure are likely to be particularly sensitive to such change.

A reduction in greenhouse gas emissions (e.g. by more efficient use of energy and greater use of renewable energy sources) can reduce human influence on the climate system. The negative consequences of climate change can be limited by taking measures to adapt to changing climatic conditions.

## Temperature changes in relation to the long-term mean (1961 to 1990)



Source: MeteoSwiss

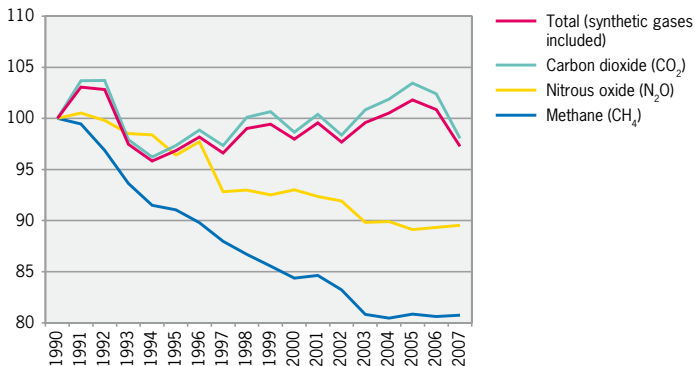
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### More about this topic:

[www.environment-switzerland.ch/climate](http://www.environment-switzerland.ch/climate)  
[www.meteoswiss.ch](http://www.meteoswiss.ch) → Climate  
[www.proclim.ch](http://www.proclim.ch)

## Greenhouse gas emissions

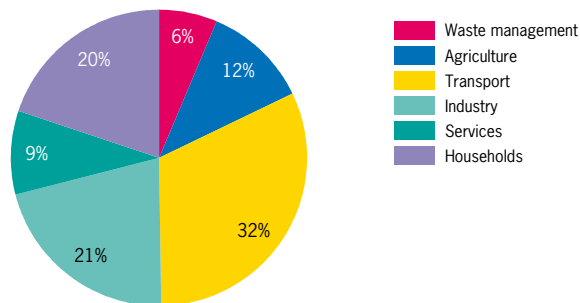
(Index 1990=100)



Source: Federal Office for the Environment

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## Greenhouse gas emissions by source, 2007



Source: Federal Office for the Environment

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# 16 Water

In agricultural and populated areas the concentration of crop protection agents in groundwater is too high in almost 20% of the monitoring stations.

In terms of phosphor pollution the water quality of surface waters has greatly improved since the 1970's.

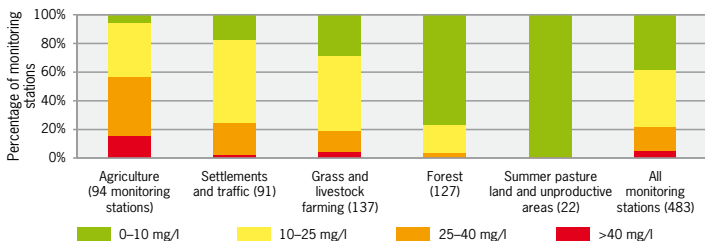
Some 25% of all watercourses in Switzerland (about 15,000 km) are severely obstructed, straightened or narrowed; over 90,000 artificial sills affect fish migration.

Human beings affect water in many ways and consequently great strain is placed on this resource. Although the quality of the water in our lakes and rivers has continually improved over the last few years, it is too early to sound the all-clear signal.

Around 80% of our drinking water comes from groundwater and some 20% from lakes. It is therefore essential that we treat groundwater in a careful and responsible way. In agricultural areas in particular the levels of nitrates and crop protection agents measured in the groundwater are often still too high. In addition the water contains other harmful substances, which are mainly the product of built-up areas, and hydrocarbons produced by transport, industry and manufacturing.

## Maximum nitrate concentration in ground water from 483 monitoring stations, 2007

According to land use in catchment areas



The Swiss Federal Ordinance on protection of lakes and rivers requires concentrations of nitrate in groundwater to be at the most 25 milligrammes per litre.

12 monitoring stations with a main soil use of fruit and wine growing or without classification are not listed separately but are included in the category 'all monitoring stations'.

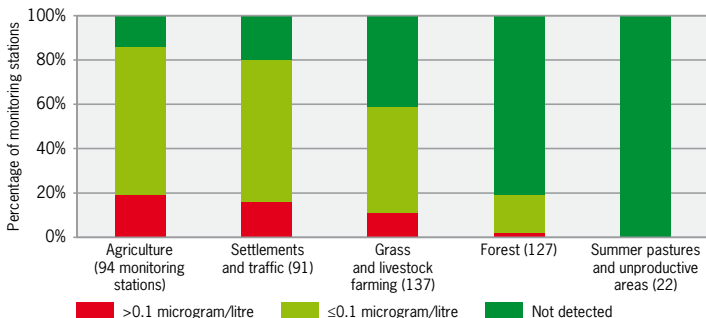
Source: Federal Office for the Environment

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### More about this topic:

[www.environment-switzerland.ch/water](http://www.environment-switzerland.ch/water)  
[www.svgw.ch](http://www.svgw.ch)

## Maximum concentration of crop protection agents in ground water from 471 monitoring stations, 2007 According to land use in catchment areas



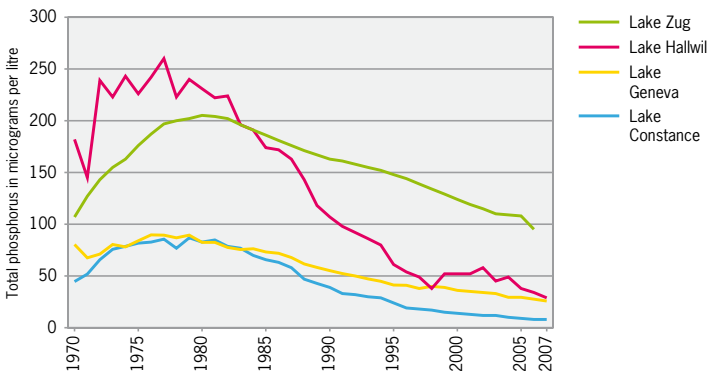
The Swiss Federal Ordinance on protection of lakes and rivers requires concentrations of crop protection agents in groundwater to be at the most 0.1 microgram per litre.

Source: Federal Office for the Environment

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## Phosphorus levels in selected lakes

Yearly average



Source: Federal Office for the Environment

© FSO

# 17 Biodiversity

Some 50,000 different species of plants, fungi and animals are known in Switzerland. However, the total number of living species in Switzerland is estimated to be as high as 75,000.

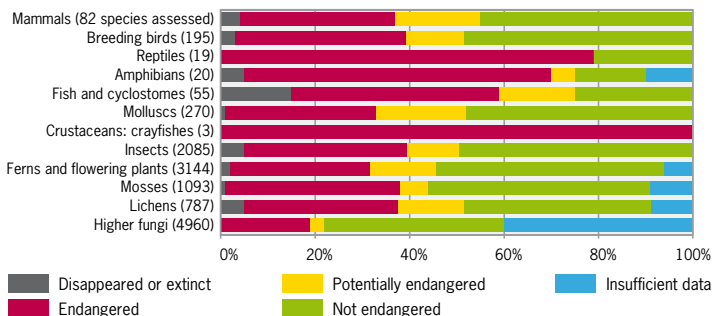
36% of approximately 12,700 plant, fungal and animal species which were the subject of research, are on the red list (missing, extinct or endangered).

The spread of around 100 invasive species is causing growing concern.

The variety of types of landscape found in Switzerland provides a multitude of different habitats for flora and fauna, thus creating favourable conditions for a rich biodiversity. Human activity puts considerable strain on the variety of species, however. While landscape modification by man can certainly create habitats for new species as well, the increasing standardisation and intensive use of the landscape is inevitably leading to a decline in populations and ultimately to the loss of some species.

Foreign organisms introduced by human hand can also cause radical ecological damage if they spread invasively at the expense of native flora and fauna.

## Species disappeared, endangered, possibly endangered or not endangered



Status 1994 to 2008, depending on the species groups.

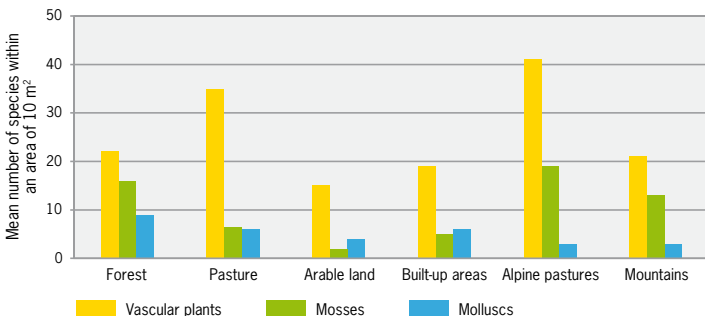
Source: Federal Office for the Environment

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### More about this topic:

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Biodiversity  
[www.biodiversitymonitoring.ch](http://www.biodiversitymonitoring.ch)  
[www.vogelwarte.ch](http://www.vogelwarte.ch)

## Number of species in different habitats (survey period 2004–2008<sup>1</sup>)



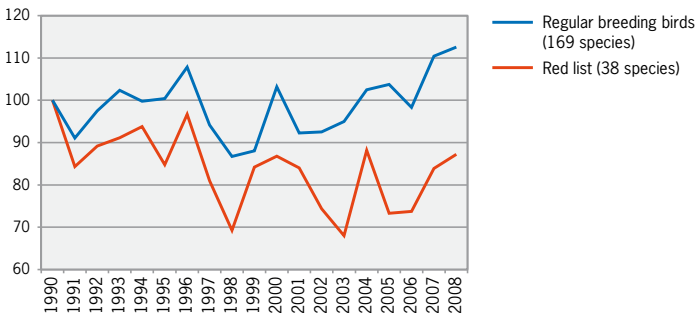
<sup>1</sup> Molluscs: 2003–2007

**Aid to understanding:** In Swiss forests an average of 22 species of vascular plants can be found within an area of 10 m².

Source: Federal Office for the Environment

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## Populations of breeding birds – Swiss Bird Index® (Index 1990=100)



**Aid to understanding:** a slightly positive trend can be detected for all of the 169 evaluated species of birds regularly breeding in Switzerland. This is due to the increase in numbers of more common species in recent years. As far as the endangered and rare species on the red list (2001) are concerned, large fluctuations within a low population level are observed.

Source: Swiss Ornithological Institute Sempach

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# 18 Natural hazards

On average 9 people die each year in no-fault accidents caused by natural disasters (6 in avalanches, 2 through floods and 1 through rock falls).

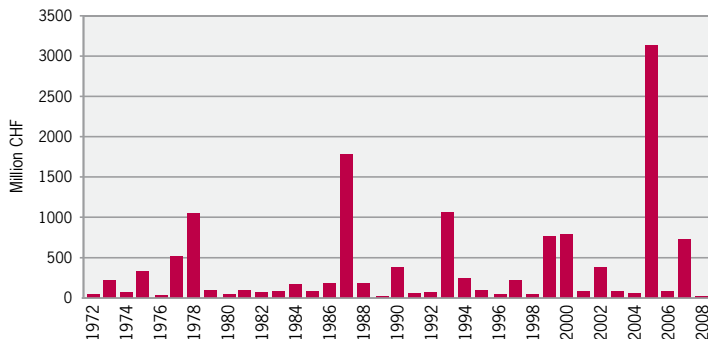
Each year natural disasters cause material damage costing an average of CHF 400 million.

Over 50% of the hazard maps required for the planning of preventative measures have been drawn up.

Natural hazards such as flooding, landslides, avalanches, rock falls and subsidence have always existed in Switzerland; however in recent decades they have caused greater damage than usual. This is partly due to extreme weather events which are likely to occur more often in the future as a consequence of climatic change and partly to increased vulnerability in areas at risk. The latter can be explained by increased housing development in these regions and the proliferation of goods and infrastructure brought about by a rise in the standard of living. Spatial planning together with technical and organisational measures can help to protect people, goods and property.

## Costs of storm damage in Switzerland (floods, mudflows, landslides<sup>1</sup>)

Data adjusted for inflation (base year 2008)



<sup>1</sup> Since 2002 including rock fall.

Source: Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

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### More about this topic:

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Natural hazards  
[www.wsl.ch](http://www.wsl.ch)

# 19 Eco-efficiency

CO<sub>2</sub> emissions into the atmosphere fell by 2% compared to 1990. In 2007 emissions amounted to almost 44 million tonnes.

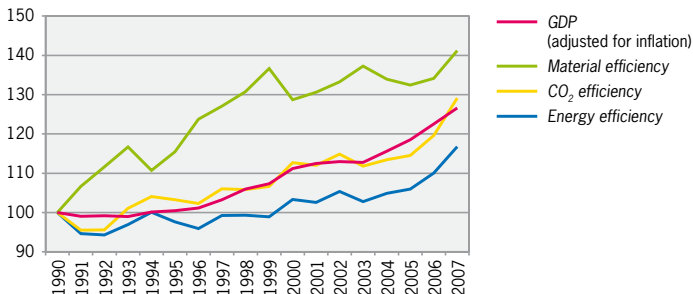
Economic performance (GDP) rose between 1990 and 2006 by over 22%.

CO<sub>2</sub> efficiency rose by 29% between 1990 and 2007.

The eco-efficiency of a national economy measures economic performance (e.g. using gross domestic product, *GDP*) against environmental pollution (e.g. use of energy, materials and CO<sub>2</sub> emissions): the larger the amount of money generated per unit of energy, materials or CO<sub>2</sub> emissions, the higher the efficiency. An increase in eco-efficiency can have several explanations: on the one hand the use of technologies that are more environmentally friendly, so that fewer resources are used or fewer emissions released for the same output. On the other hand structural changes e.g. the growing importance of the services sector or the relocation of environmentally harmful production methods abroad, can contribute to a rising efficiency in one's own country.

## Energy efficiency, CO<sub>2</sub> efficiency and material efficiency

(Index 1990=100)



Sources: Federal Statistical Office; Federal Office for the Environment; Federal Office of Energy

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### More about this topic:

[www.environment-stat.admin.ch](http://www.environment-stat.admin.ch)

[www.environment-switzerland.ch](http://www.environment-switzerland.ch) → Topics → Economy

## 20 Material flows

In 2007, the total material requirement (TMR) was approximately 44 tonnes per person.

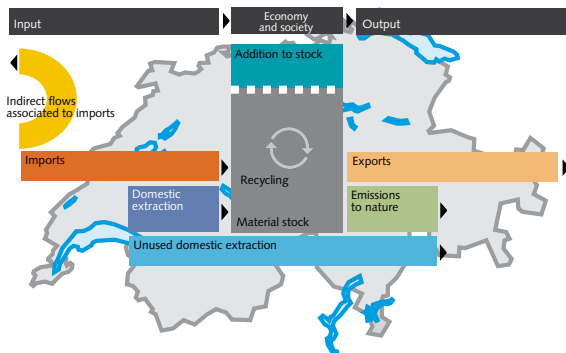
In 2007, 68% of the required natural resources come from abroad or are used abroad, in order to produce our imports.

In 2007, Switzerland's 'material stock' (goods, buildings, infrastructure) was enlarged by 63.5 million tonnes. This is equal to approximately 8.4 tonnes per person.

There exists a direct link between the volume of materials consumed and environmental pollution caused, since sooner or later these materials return to the environment in the form of *emissions* or waste.

The strain exerted by a country on the environment can be quantified through material flow analyses. This involves comparing the materials that enter the economic chain (domestic extraction and imports) with the materials that leave it (exports and emissions) – with the exception of water and air. The input side also includes domestic extracted materials which do not enter the economic chain (e.g. straw that remains lying on fields or excavated material). Finally, indirect flows associated to imports are also taken into account. This includes all materials needed in the originating country in order to manufacture and transport Swiss imports of raw materials and goods.

### Material flows



Source: Federal Statistical Office

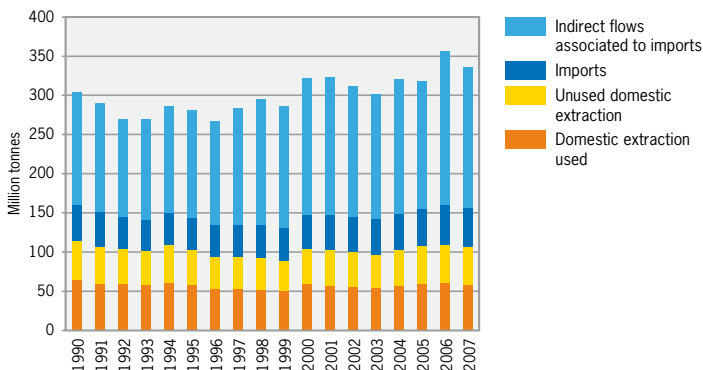
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#### More about this topic:

[www.environment-stat.admin.ch](http://www.environment-stat.admin.ch)

## Total material requirement (TMR) in Switzerland

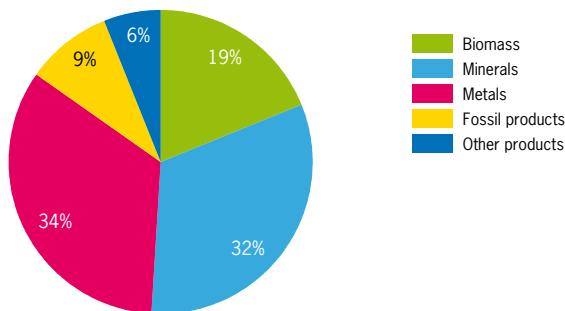
By type of material flow



Source: Federal Statistical Office

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## Total material requirement (TMR) by category of material<sup>1</sup>, 2007



<sup>1</sup> The categories also include material needed abroad for the production of imports (e.g. iron incl. iron ore).

Source: Federal Statistical Office

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# 21 Environmental protection expenditure

In 2006, public expenditure for the protection of the environment amounted to CHF 3.7 billion. Net expenditure (less revenue from sewerage and waste taxes) was approximately CHF 1 million.

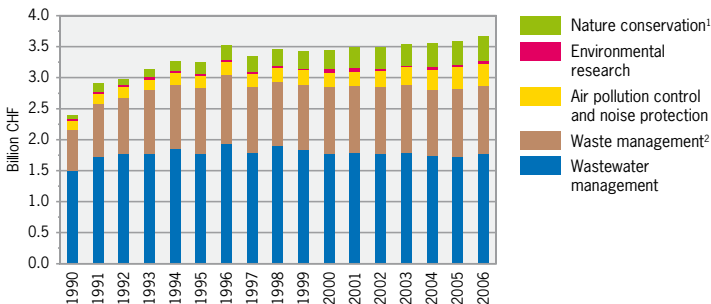
Total environmental protection expenditure in Switzerland (including businesses and households) was CHF 5.9 billion in 2003. This is 1.3% more than in 1993 (adjusted for inflation).

According to estimations, in 1998 the eco-industry sector employed some 50,000 people and achieved a turnover of CHF 9.5 billion.

Environmental protection is a major issue, driven by our desire to maintain an intact environment and growing awareness of the effects of our actions upon it. Although environmental protection also has its price, it helps, in particular in the public health sector, to avoid costs which would arise through a high level of environmental pollution.

Moreover, efforts aimed at protecting the environment help to achieve economic growth and technological progress. The eco-industry sector, which has expanded dramatically over the past few years, is proof of this: this sector covers all activities linked with the provision of goods and services that help to reduce environmental pollution.

## Public environmental protection expenditure at current prices



<sup>1</sup> Since 1993: Incl. governmental agri-environment subsidies.

<sup>2</sup> Excl. domestic waste incinerators.

Source: Federal Statistical Office

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### More about this topic:

[www.environment-stat.admin.ch](http://www.environment-stat.admin.ch)

# 22 Environmental taxes and fees

The proportion of revenues from environmental taxes of all taxes and social security contributions in 2007 was almost 7%.

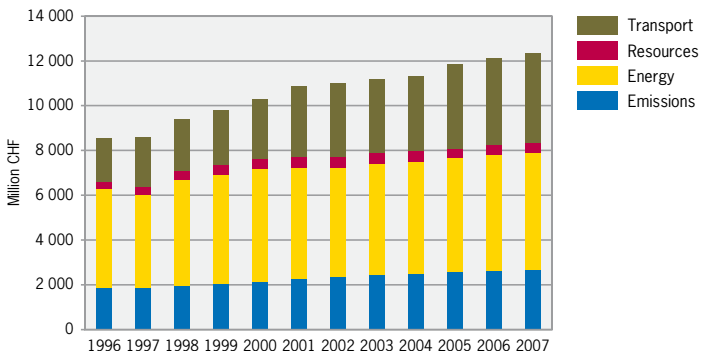
In 2007, approximately 24% of revenue from environmental taxes and fees was 'environmental in the narrower sense', i.e. arising from an environmental matter.

Cost coverage of public expenditure on waste water treatment rose from 43% to almost 75% between 1990 and 2006 (increasing application of 'polluter pays' principle).

Environmental taxes and fees include various kinds of taxes and fees on items which have an impact on the environment such as waste (e.g. rubbish bag tax), energy (e.g. mineral oil tax) or traffic (e.g. performance-related heavy vehicle fee, LSV). A tax is considered as 'environmental in the narrower sense' if its introduction or application arises from an environmental issue. Revenue from environmental charges comes mainly from taxes and fees.

Environmental taxes and fees make environmentally hazardous goods and services more expensive, therefore encouraging consumers and manufacturers to consider the ecological dimension when making consumer and production decisions. They also favour the increasing application of the 'polluter pays' principle.

## Revenues from environmental taxes according to domain



Source: Federal Statistical Office

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### More about this topic:

[www.environment-stat.admin.ch](http://www.environment-stat.admin.ch)

# 23 The environment in European comparison

|                                                                                                     | CH  | FR  | DE   | IT   | AT   | BE   | NL   | DK   | EU15 |
|-----------------------------------------------------------------------------------------------------|-----|-----|------|------|------|------|------|------|------|
| <b>Population density, 2007</b><br>(inhabitants per km <sup>2</sup> )                               | 188 | 100 | 231  | 200  | 100  | 349  | 485  | 126  | 121  |
| <b>Gross energy consumption per person, 2005</b> (tonnes oil equivalent per person)                 | 3,6 | 4,4 | 4,2  | 3,2  | 4,2  | 5,9  | 5,1  | 3,6  | 4,0  |
| <b>No. of cars per 1000 inhabitants, 2006</b>                                                       | 523 | 492 | 550* | 592* | 509  | 473  | 443  | 372  | 507* |
| <b>Household waste, 2006</b><br>(kg per person)                                                     | 715 | 553 | 566  | 548  | 617  | 475  | 625  | 737  | 563  |
| <b>Recycling rate for waste paper and cardboard measured by consumption, 2005</b>                   | 74% | 55% | 73%  | 50%  | 70%  | 60%  | 72%  | 60%  | 64%  |
| <b>Proportion of total agricultural land farmed organically, 2005</b>                               | 11% | 2%  | 5%   | 8%   | 11%  | 2%   | 3%   | 5%   | 4%   |
| <b>Emissions of greenhouse gases, 2006</b> (tonnes per person)                                      | 7,1 | 8,6 | 12,2 | 9,7  | 11,0 | 13,0 | 12,7 | 13,0 | 10,7 |
| <b>Proportion of total number of known avian species that is endangered</b> (latest available data) | 36% | 19% | 27%  | 18%  | 28%  | 25%  | 22%  | 16%  | –    |
| <b>Proportion of total number of mammalian species that is endangered</b> (latest available data)   | 33% | 19% | 38%  | 41%  | 22%  | 36%  | 19%  | 22%  | –    |
| <b>Use of forest resources in relation to annual growth</b> (latest available data)                 | 80% | 55% | 50%  | 26%  | 60%  | 85%  | 70%  | 35%  | 67%  |
| <b>Environmental tax revenue in total taxes and social contributions revenues, 2006</b>             | 7%  | 5%  | 6%   | 7%   | 6%   | 5%   | 10%  | 12%  | 6%   |

\* older data: DE, IT: 2005; EU15: 2004–2006

Sources: Federal Statistical Office; OECD; Eurostat

## More about this topic:

[www.atlasofeurope.bfs.admin.ch](http://www.atlasofeurope.bfs.admin.ch) (interactive statistical atlas of European regions)

## GLOSSARY

### **CO<sub>2</sub>-efficiency**

=  $GDP \div CO_2 \text{ emissions}$

### **DMC (Domestic Material Consumption)**

A country's domestic consumption of materials, i.e. the extraction of materials domestically used plus imports minus exports.

### **Emissions**

The release of pollutants, noise or radiation from natural sources or by man into the environment.

### **Energy efficiency**

=  $GDP \div \text{final energy consumption}$

### **GDP (Gross Domestic Product)**

GDP is used for measuring a country's economic performance over a period of one year.

### **Hazardous waste**

Waste which due to its composition and its physiochemical or biological characteristics requires special technical and organisational measures for its environmentally acceptable disposal.

### **Immissions**

Levels of air pollutants, noise, vibration or radiation at their point of impact.

### **Material efficiency**

=  $GDP \div DMC$

### **NM VOC (Non Methane Volatile Organic Compounds)**

These exclude methane and FCKW and are precursors for the formation of ozone, summer smog and PM<sub>10</sub>.

### **PM<sub>10</sub> (Particulate Matter <10 µm)**

Dust particles with a diameter of less than 10 microns.

### **TMR (Total Material Requirement)**

The total material requirement of a country measures the total volume of materials obtained from natural sources (with the exception of water and air).

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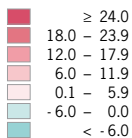
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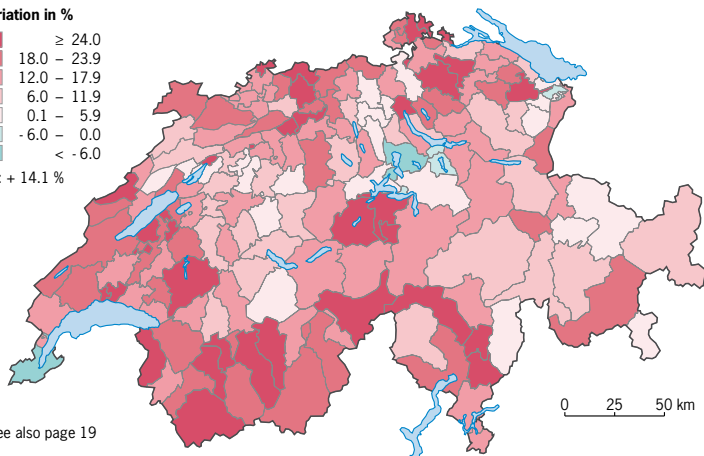
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## Urban sprawl\* 1980–2002, by district

Variation in %



CH: + 14.1 %



\* See also page 19

Source: «Landschaftszersiedelung Schweiz», NFP 54 (J. Jaeger, C. Schwick, R. Bertiller), 2008

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