

# Givaudan<sup>®</sup>

Leading Sensory Innovation



Safety and Environmental Report 2006

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# Foreword

In 2006, Givaudan could record further improvements in its efforts to reduce the impact of its business activities on the environment – one of the important pillars when striving for a sustainable business model.

The favourable trend has been documented in the decrease or stabilisation of most of the Safety and Environmental, or S&E, key indicators shown in this report.

Most notably, we could achieve an almost 30% reduction of our accident rate – counted in working days lost per employee – over the twelve months in 2006. This reverses the increase in accident rates which we had seen over the past years. It is important to note that even though the frequency of accidents was only slightly reduced, their severity decreased greatly.

In 2006, Givaudan recorded neither fatal nor very severe accidents with long term consequences. This could be achieved thanks to the awareness-raising campaigns launched at the sites concerned at the beginning of last year. Healthy working conditions are also a primary concern at Givaudan to provide a safe working environment for all employees. Risks in the workplace are regularly assessed and exposure to danger is monitored. Any deviations are immediately reported and corrective actions are implemented. Similar to prior years, no occupational illness has been recorded in 2006. Providing a safe working environment remains a key objective of Givaudan and whenever necessary, working conditions are adapted or changed to avoid any accident.

No incident with major consequences for the employees, for the environment or for the business has occurred within Givaudan in 2006. These good results are due to the S&E policy which focuses on prevention and due to the ongoing efforts which have been applied extensively at Givaudan over the last years.

Givaudan continued to make important capital investments to further progress in the area of health, safety and environmental protection. In all these projects, S&E specialists have actively participated in implementing the best available technology to prevent accidents and incidents, and to guarantee a safe working environment.

The most significant investments include the new flavour creation, application and manufacturing site in Shanghai and the new powder mixing facility in Devon (USA). Specific S&E investments were made in the odour control unit in Cuernavaca (Mexico), Sao Paulo (Brazil), Duebendorf (Switzerland) and Devon (USA).

On the environmental side, indicators such as energy consumption, carbon dioxide emissions and water consumption have shown a stabilisation of the impact on the environment for the last four years. This stabilisation is mainly due to fact that after the important actions of optimisation and modernisation of the processes and installations during the past few years, there remains only a small upside for further improvement.

An important contribution to the good performance of Givaudan's efforts in the S&E area is the ongoing audit programme, aimed at identifying major risks at our locations around the globe at an early stage. Audits in Switzerland, the United States and South America have been conducted jointly with a major insurance company. No significant deviations could be identified as the result of a constant commitment of the employees at all levels to maintain high standards in S&E.

In 2007, Givaudan will remain committed to provide safe working conditions to our employees and will continue to make all the necessary efforts to guarantee a safe working environment. We will further strive to minimise the environmental impact of our business by applying best practices in all areas of activity and will expand our S&E activities to also cover the sites of former Quest.

**Gilles Andrier**

Chief Executive Officer



## Summary Comparison 2006 versus 2005 based on absolute value

- 
**Production**  
 The overall production taken into account in the report decreased by 12% due to the phase out of an important site in the United States. Only those sites which operated throughout the whole year are taken into account in the report.
- 
**Water Consumption**  
 Water consumption decreased by 5.3% as the production volume is decreasing.
- 
**Waste Water**  
 The Total Organic Carbon (TOC) has decreased by 6.0%.
- 
**Hazardous Waste**  
 Hazardous waste decreased by 13.0%. Landfill increased significantly by 37.4% but remained very low when compared to incineration.
- 
**Non-Hazardous Waste**  
 Non-hazardous waste decreased by 28.3%. The recycling rate decreased significantly to 61.1%
- 
**Safety (Accidents)**  
 The number of workdays lost by employee has decreased by 28.6%.
- 
**Energy**  
 Total energy consumption decreased by 10.5% due to the decline in production volume. The importance of natural gas continues to grow in the overall energy consumption.
- 
**CO<sub>2</sub> Emissions**  
 Carbon dioxide emissions (CO<sub>2</sub>) have significantly decreased by 9.3% as a consequence of the decreasing energy consumption and the ongoing replacement of light fuel by natural gas.
- 
**Inorganic Gas Emissions**  
 NO<sub>x</sub> gases decreased by 7.0% and SO<sub>2</sub> gas decreased by 40.4% as a consequence of the decreasing energy consumption and in line with the reduction of light fuel consumption.
- 
**VOC Emissions**  
 Total VOC emissions increased by 2.0% .
- 
**CFC Consumption**  
 CFC consumption remained constant.
- 
**CFC Inventory**  
 CFC Inventory decreased by 9.1%.

# Investments

Investments include expenses made for S&E specific equipment for fire detection, water/air treatment or water supply for fire-fighting, and an amount taken as a percentage of investments made in operating facilities.

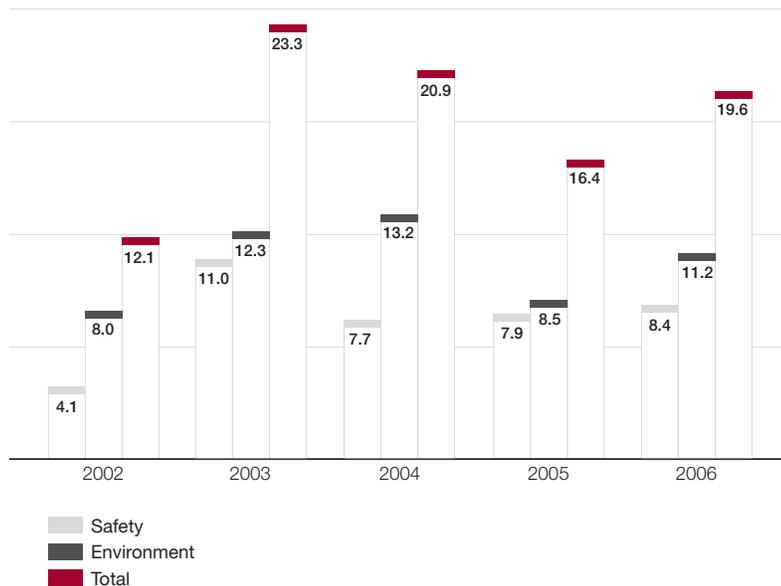
Overall investments in S&E have increased by 19.5% in 2006 to a total of CHF 19.6 million. These investments represented 13.5% of total capital expenditures in 2006.

Similar to last year, around 80% of the safety investments related to important production expansion projects in Devon, Dübendorf and Vernier. Safety specific investments to improve fire prevention and protection in Zurich, Sao Paulo, Cuernavaca and Sant Celoni represented the remaining 20%.

Around 50% of the environmental investments were made in relation to important production expansion and 50% specific to projects such as the improvement for odour control in the sites of Cuernavaca, Dübendorf, Sao Paulo and Cincinnati.

## S&E Investments

in millions of CHF



# Expenses

S&E expenses mainly cover S&E services, maintenance of S&E equipment, site remediations, waste elimination costs and training of employees on S&E matters.

Overall expenses have decreased by 10% in absolute value but have increased of 1% in relation to the production volume.

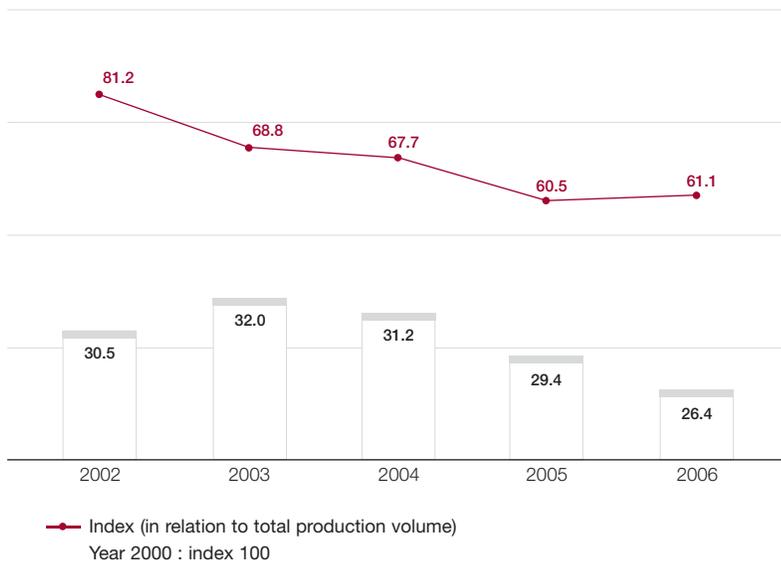
The split of the 2006 expenses was 52% for environment and 48% for safety.

Out of the environmental expenses, the majority is used to pay for the important running costs of installations like waste water treatment plants, odour control units and waste elimination.

S&E expenses have decreased by almost 40% since the year 2000 due to a good cost discipline and tend to stabilise.

## S&E Expenses

in millions of CHF



# Safety

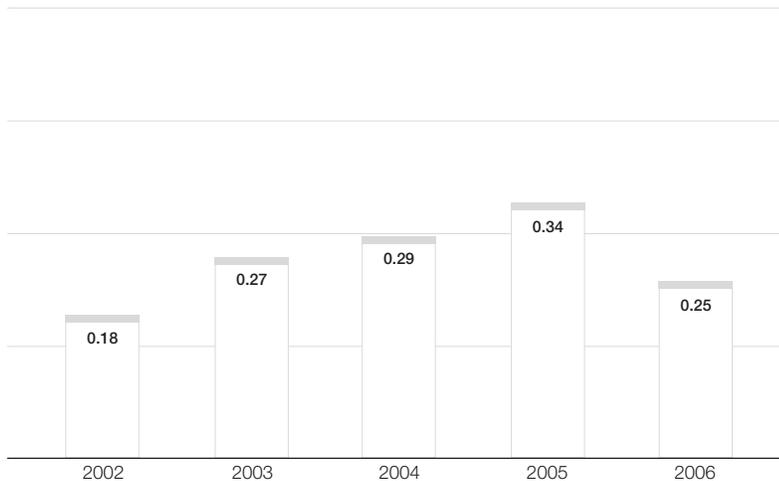
The Internal Accident Index (IAI) expresses the amount of workdays lost per employee and per year. The frequency is the amount of accidents per 1,000 employees.

The Internal Accident Index decreased significantly by 28.4% in 2006, falling to a low level of 0.25. This however is still higher than the low 2001 level of 0.15. The decrease in 2006 – after a four year long constant increase of the Internal Accident Index – is a result of the sensitisation campaigns performed at each Givaudan site throughout the year. Within our site network, four sites have again recorded zero accidents in 2006.

Accident frequency decreased slightly by 3.5%.

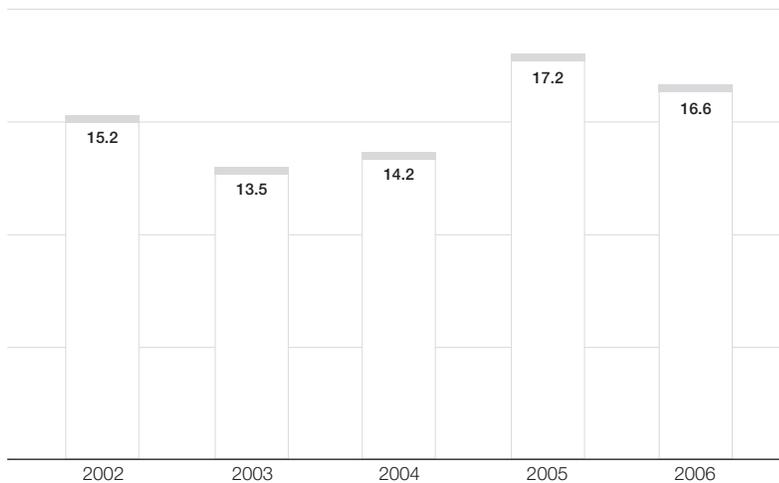
## Internal Accident Index

workdays lost per employee



## Accident Frequency

accidents per 1,000 employees



# Energy

Energy primarily covers the consumption of electricity, light fuel and natural gas to produce chemicals and to manufacture mixtures of liquids and powders.

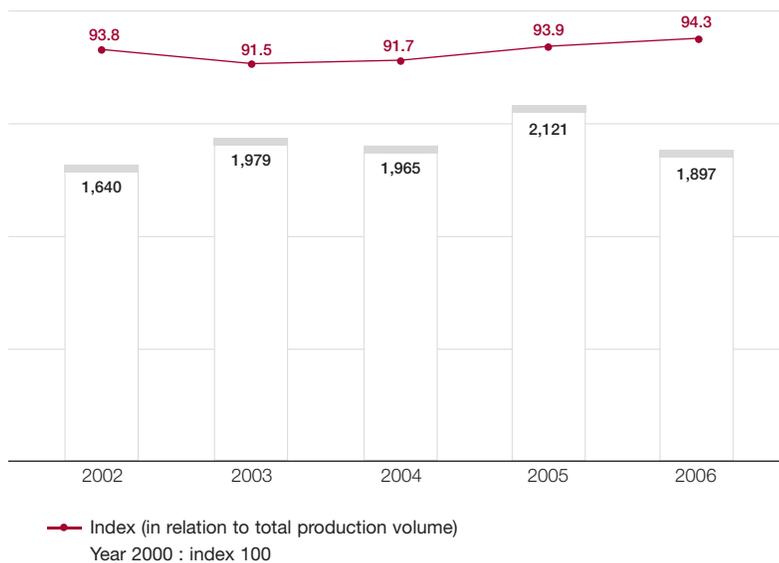
The total energy consumption decreased by 10.5%, but remained stable when put in relation with the total production volume.

Consumption of electricity increased in absolute value by 2.6%, but increased by 9.2% when compared to total production volume.

Since 2003, light fuel is decreasing constantly and represents now only 13.7% of the total fossil energies consumed. Almost all sites have turned to natural gas, which emits less carbon dioxide. The consumption of gas has remained stable.

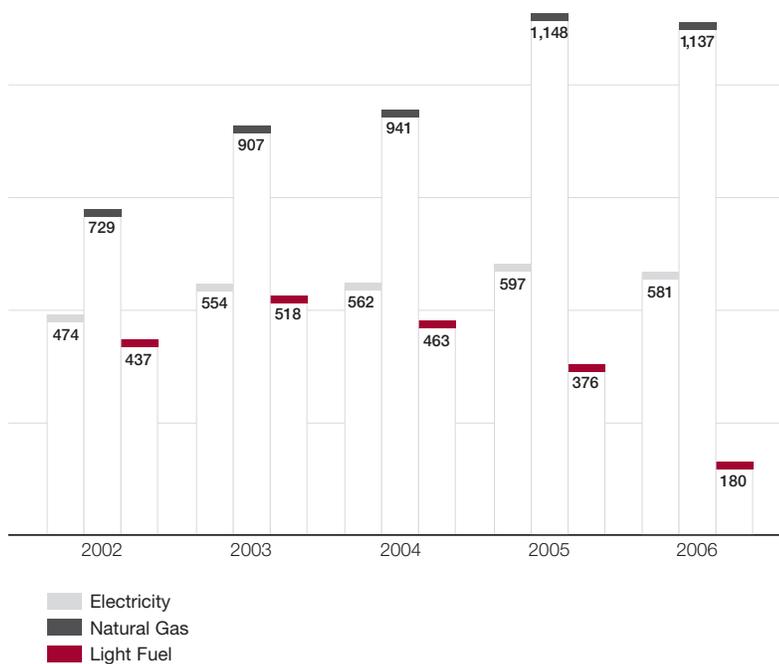
## Total Energy Consumption

in terajoules



## Consumption by Type of Energy

in terajoules



# CO<sub>2</sub> Emissions

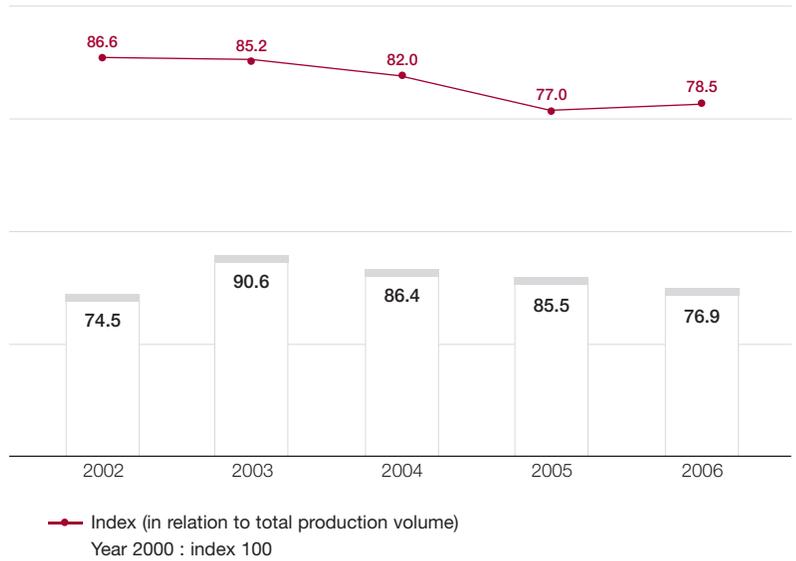
Carbon Dioxide (CO<sub>2</sub>) emissions result from the combustion of fossil fuels to generate steam necessary in the production of flavours and fragrances and to heat buildings.

CO<sub>2</sub> emissions have decreased by 9.7% in absolute value following the decrease of energy consumption but increased by 1.8% in relation with the production volume. Givaudan's ongoing efforts to give a preference to natural gas instead of light fuel have now been almost completed.

Since 2002, total CO<sub>2</sub> emissions in relation to production volume tend to slightly decrease.

## CO<sub>2</sub> Emissions

in thousand tons



# Inorganic Gas Emissions

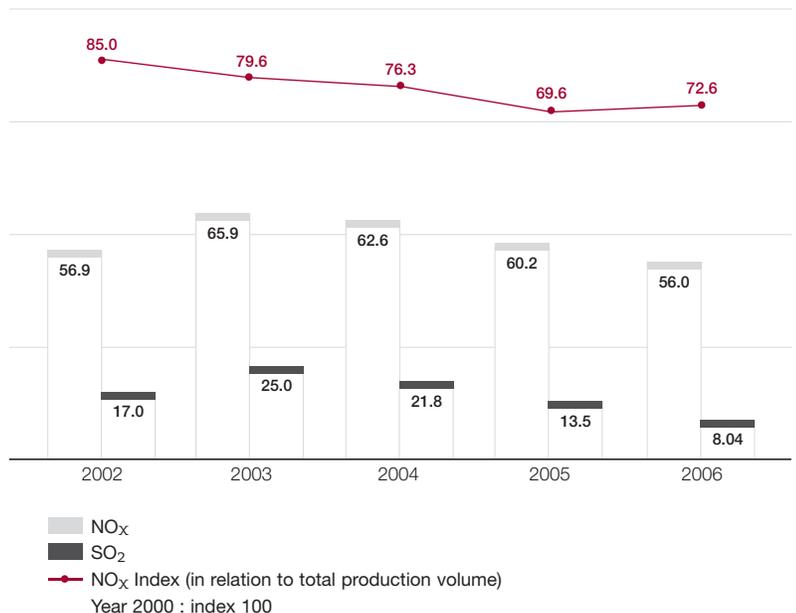
Inorganic gases are sulphur oxides (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) emitted by the combustion of fossil fuels.

Total inorganic gas emissions of 64.0 tons in 2006 decreased by 13.1% compared to 2005. This reduction is a consequence of the lower volume of production. A decrease of almost 40% of the sulphur oxide emissions was achieved due to the ongoing replacement of light fuel by natural gas, which contains almost no sulphur.

NO<sub>x</sub> emissions in relation with the production volume increased by 4.3%

## Inorganic Gas Emissions

in tons



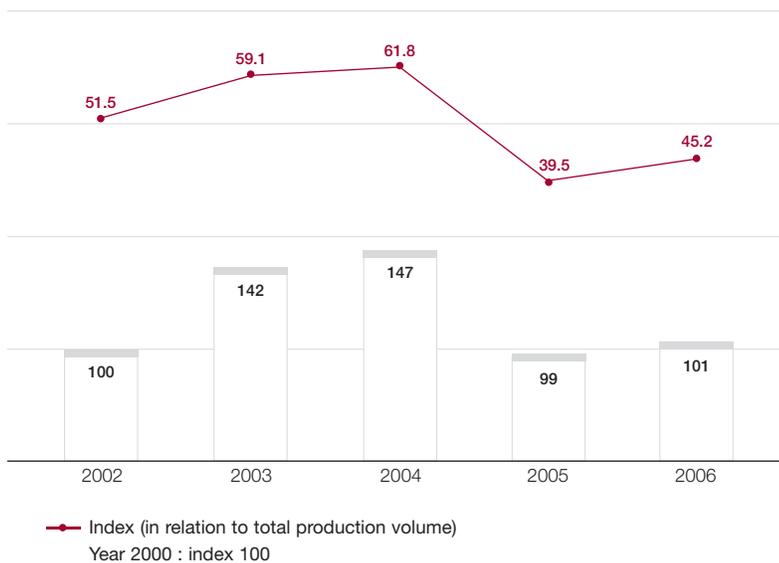
## VOC Emissions

Volatile Organic Compound (VOC) emissions are non-halogenated solvents such as aliphatic alcohols and toluene.

VOC emissions (mainly solvents) have increased by about 2.0% in 2006. The measuring of Volatile Organic Compounds emission is a challenge and in 2004, Givaudan introduced a more systematic and better identification of the possible emission sources at the sites. The efficiency improvement of the monitoring methodology led to better evaluation of the emissions in batch processes and the 2005 figure was restated. The 2006 emissions increased in relation with production volume by 14.4%.

### VOC Emissions

in tons



# CFC

CFC (Chlorofluorocarbon) is only used in cooling or fixed fire extinguishing systems.

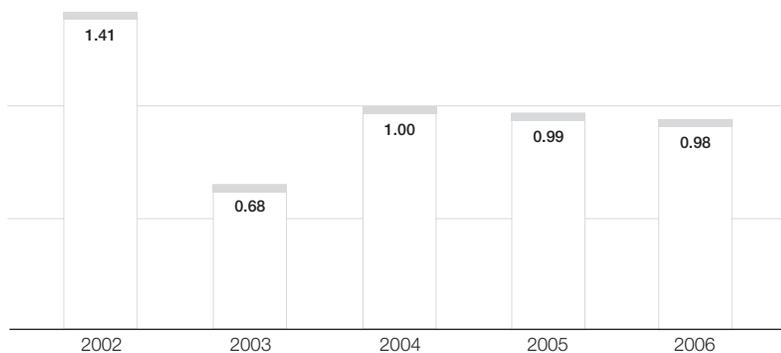
In 2006, CFC consumption remained constant compared to prior year.

CFC inventory decreased by 9.1% due to the dismantling of installations containing R22 CFC.

CFC inventory continued to decrease for the fourth consecutive year as a result of Givaudan's effort to reduce equipment containing CFC.

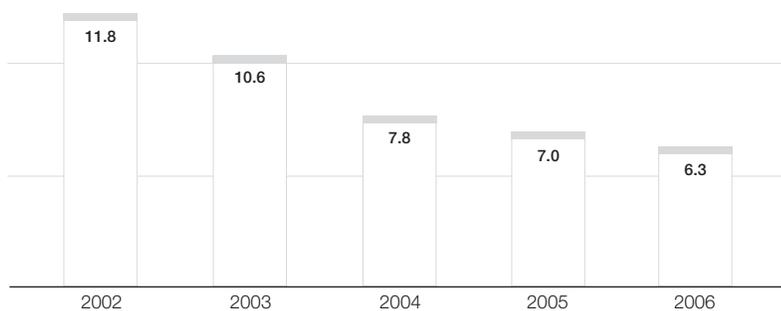
## CFC Consumption

in tons



## CFC Inventory

in tons



## Water Consumption

Water is used for cooling or in manufacturing processes. Consumption consists of industrial water (from rivers or wells) and drinking water (public utility).

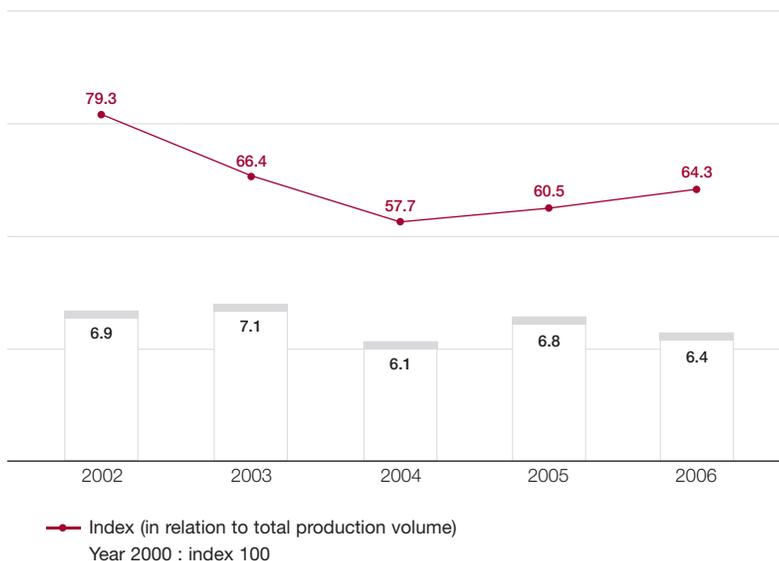
In 2006, total water consumption decreased by 5.2% compared to prior year's consumption. This is a direct result of the production decrease due to the closure of a major site in the United States during the course of the year.

The consumption index has increased slightly by 6.3%.

Since 2002, the overall water consumption is stabilising despite an overall increase in production output.

### Water Consumption

in million m<sup>3</sup>



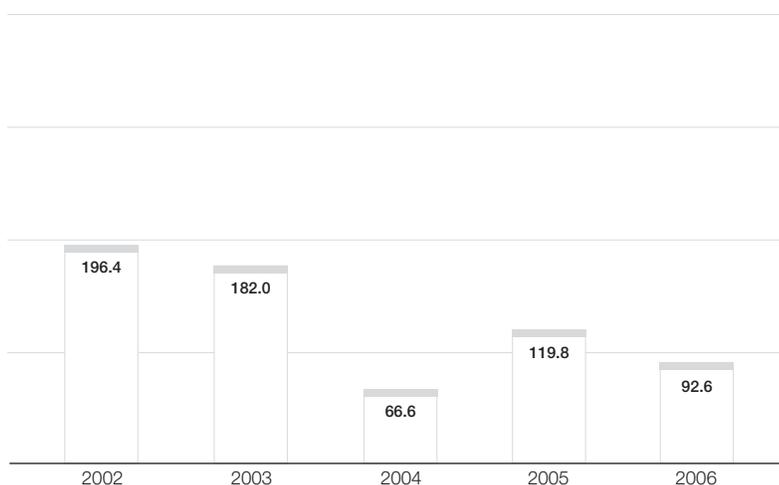
## Waste Water

Total Organic Carbon (TOC) expresses the amount of organic substances rejected back into the water after being treated in the waste water treatment plant.

Total organic carbon rejected in the environment has decreased in 2006 by 23% compared to prior year. Waste water releases of the Vernier, Switzerland plant represent almost 90% of the total TOC released in the environment. Vernier is one of the five waste water treatment plants of the Group. This year's decrease is mainly due to the good performances of Vernier's waste water treatment plant.

### Total Organic Carbon

in tons



# Hazardous Waste

Hazardous waste mainly covers flammable solvents, distillation residues and mineral sludge from waste water treatment plants.

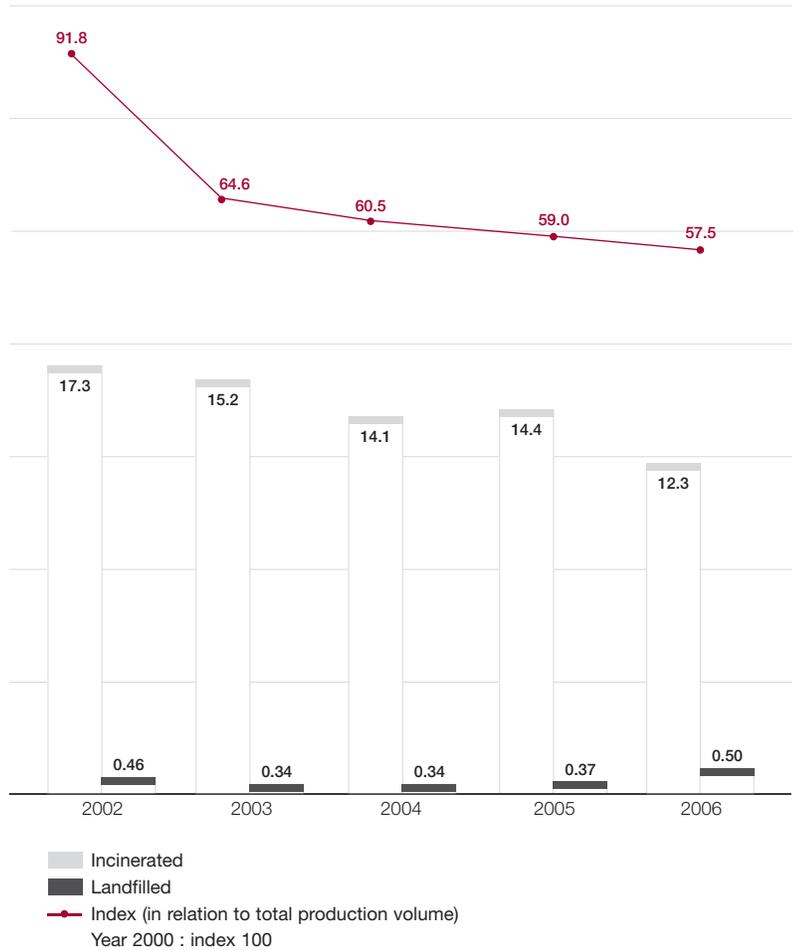
The total amount of hazardous waste produced decreased by 13.0% in 2006. The major part of the waste is incinerated and only a very small part, containing the sludge from a waste water treatment plant, is still landfilled.

The hazardous waste which was landfilled has increased by 37.4% but remains low compared to the incinerated part.

The hazardous waste index in relation with the production volume shows a slight decrease over the last four years. Givaudan will continue with its efforts to reduce, or at least to stabilise, the generation of waste.

## Hazardous Waste

in thousand tons



# Non-Hazardous Waste

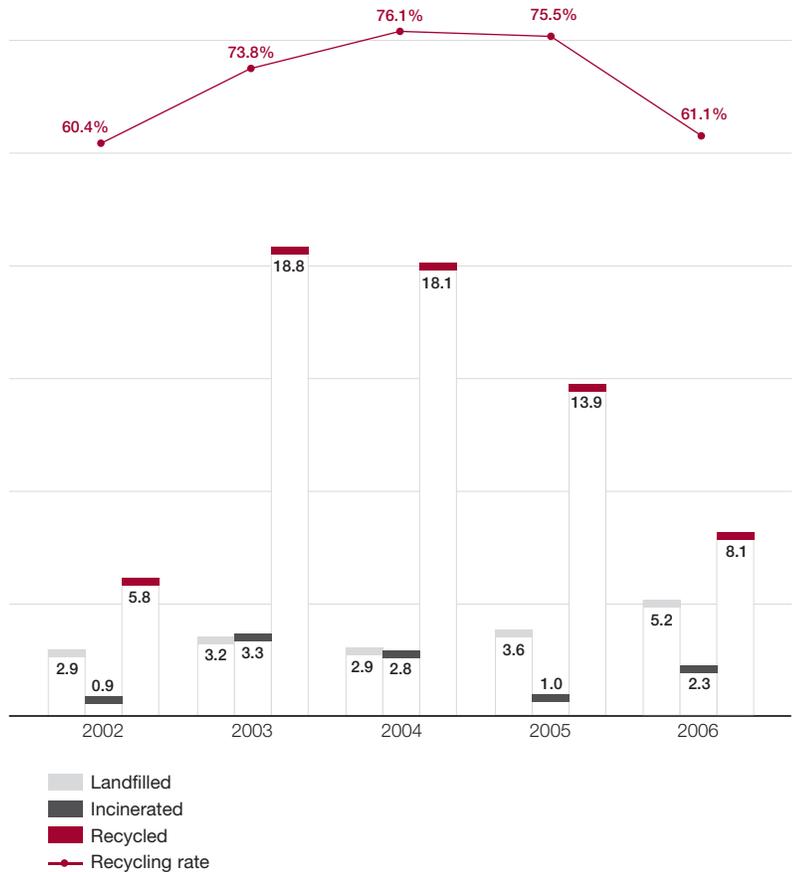
Non-hazardous waste is mainly packaging of all kinds, vegetable matter, etc.

The overall non hazardous waste generated decreased by 28.3% in 2006. The incinerated part has increased strongly. The part of landfilled waste increased by 44.6%.

The recycling rate in 2006 is significantly lower, declining by 19.1% in 2006, due to an increase of waste which is non combustible material but has to be landfilled. Givaudan will continue with its efforts to find new ways of recycling waste in order to improve the recycling rate.

## Non-Hazardous Waste

in thousand tons



# Audits

**Safety and environmental audits are performed on a regular basis in Givaudan's 24 production facilities.**

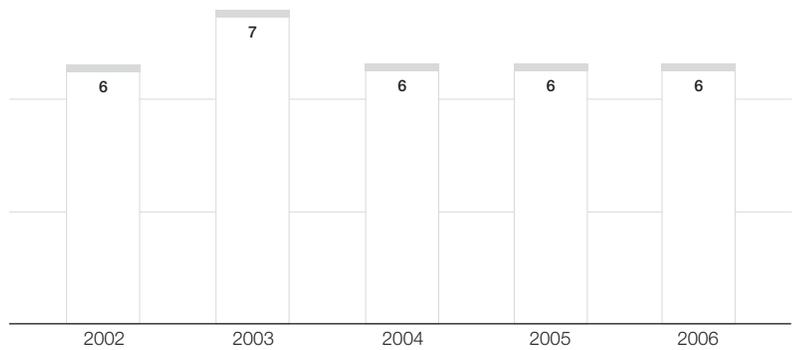
In 2006, six audits have been performed in Europe, South America and the United States. During these audits no significant issues have been identified, showing the high level of safety, hygiene and environmental protection in all Givaudan activities.

In all Givaudan sites, risk management has become an important tool to conduct the business in a safer and more environment friendly manner.

Audits in co-operation with an insurance company have again been pursued in 2006 and confirmed the high level of Givaudan in S&E.

## Audits

number of audits



# Sites

Sites participating in the 2006 S&E Report

## Sites

### United States

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Cincinnati	(Ohio)
Devon	(Kentucky)
East Hanover	(New Jersey)
Lakeland	(Florida)
Mount Olive	(New Jersey)
Saint Louis	(Missouri)

### Latin America

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Cuernavaca	(Mexico)
Munro	(Argentina)
Sao Paulo	(Brazil)

### Europe

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Argenteuil	(France)
Barneveld	(Netherlands)
Dortmund	(Germany)
Dübendorf	(Switzerland)
Kemptthal	(Switzerland)
Lyon	(France)
Sant Celoni	(Spain)
Vernier	(Switzerland)

### Asia

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Bangalore	(India)
Fukuroi	(Japan)
Shanghai	(China)
Singapore	(Singapore)

### Oceania

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Sydney	(Australia)
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# Givaudan's Ecotoxicological Laboratory

Testing the impact of fragrance ingredients on the environment has always been a high priority at Givaudan. Already at an early stage of development, new molecules are subjected to different tests to evaluate their impact on the environment. These evaluations can be made only through a better understanding of the integration mechanisms of the fragrance ingredients in the environment. Appropriate physical as well as biological properties, such as biodegradability and ecotoxicity need to be determined to calculate the impact.

Already in the early 1990's, in the in-process control laboratory of the waste water treatment plant, specific equipment was acquired to perform biodegradability tests. Test protocols were at that time not yet standardised, but nevertheless, interesting results of biodegradation of fragrance ingredients could be demonstrated.

These first encouraging results initiated great enthusiasm to further investigate all the ingredients produced by Givaudan and then those purchased outside the company. In 1992, a new laboratory called the Ecotoxicological Laboratory was launched to perform a battery of tests for evaluating the impact of the ingredients. Interesting findings on the bio-resistance of structure and functions of molecules could be revealed.

In 1993, to improve the quality and recognition of the tests performed in the Givaudan Ecotoxicological Laboratory, the installation was certified for "Good Laboratory Practice" (GLP) by the Environmental Agency of the Swiss Federal Authorities. In 2005, the laboratory had already been certified successfully for the 5th time. Until now, nearly 200 molecules have been tested. These investigations first of all help our research activities to avoid the creation of excessively bio-resistant molecules and also show that a large majority of the existing fragrance ingredients have a very low impact on the environment.

This very useful work of the Ecotoxicological Laboratory will continue, not only to test existing molecules according to EU regulatory framework for chemicals, REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) but also to investigate new methods of testing to better understand the mechanism of degradation in the environment. This will help to find new ways of developing even more environmentally-friendly molecules.

The Swiss GLP Monitoring Authorities



Swiss Federal  
Office of  
Public Health



Swiss Agency for the  
Environment, Forests  
and Landscape



Intercantonal Office  
for the Control of  
Medicines

## Statement of GLP Compliance

It is hereby confirmed that

during the period of

March 31 – April 1, 2005

the following Test Facility of

**Givaudan SA**  
**CH-1214 Vernier**  
**Switzerland**

was inspected by the Swiss Agency for the Environment, Forests and Landscape with respect to the compliance with the Swiss legislation on Good Laboratory Practice.

**Test Facility**

**Areas of expertise**

**Givaudan SA**  
**Laboratoire d'Ecotoxicologie**

**Environmental Toxicity Studies**

**Physical-chemical Testing**

The inspection was performed in agreement with the OECD Guidelines for National GLP Inspections and Audits. It was found that the aforementioned test facility was operating in compliance with the Swiss Ordinance on Good Laboratory Practice [SR 813.016.5] at the time it was inspected.

Swiss Agency for the Environment,  
Forests and Landscape  
The Director

Philippe Roch

Bern, June 2005

# Contact

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