

# Givaudan<sup>®</sup>

Safety and Environmental Report 2004



*Creating  
Sensory  
Advantage<sup>™</sup>*

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# Foreword

In 2004, Givaudan made further progress in health, safety and environmental protection. Almost all key figures show improvement, a trend which has been continuing for the last five years. This year's report is not only presented in a new layout, but also offers increased transparency in the level of data presented. Most of the key figures are now reported in relation to total production volumes. This shows more clearly our S&E performance, as our production volumes have steadily increased both organically and through acquisitions.

The enlargement of the compounding facilities in Vernier and the transformation of existing equipment to multipurpose plants have led to substantial S&E investments. Further S&E investments were made relating to the expansion of production equipment in Sant Celoni (Spain), Shanghai (China) and in the culinary centre in Kempththal (Switzerland). Specific investments were made in waste water treatment plants for our flavour production sites in East Hanover and New Milford, as well as in a bio-filtration installation in Dortmund to better control odour emissions.

Employee safety remains a key priority in the company's prevention policy. No major accidents or incidents have occurred at the work place in the reporting period. The occupational accident rate has increased slightly through a higher number of minor accidents, which as a consequence increased the numbers of work days lost. The number of non-occupational accidents continues to rise. Through employee awareness programmes, increased emphasis is being placed on promoting safe behaviour inside and outside the work environment.

In the area of hygiene, workplace risk assessment continued in all sites to control the level of exposure of employees to hazardous materials. A group wide medical surveillance programme has again this year shown that Givaudan's hygiene measures adhere to high standards. No case of occupational illness has occurred.

In environmental protection, our objectives aiming at reducing and minimising the impact of our activities to the environment have again been achieved in 2004. The continued efforts in this area have

led to very good results over the last years. Most of the key indicators (e.g. CO<sub>2</sub> emissions, waste generation and water consumption) show positive trends. These positive results are also reflected in the level of S&E expenses which has been remained almost stable, despite Givaudan's increase in production volumes.













S&E audits at Givaudan's sites are part of our continuous improvement process. In 2004, six sites were audited, partially in collaboration with outside insurance companies. All these audits have confirmed the high S&E standards being applied.

All the efforts made during the past years show our commitment to the environmentally responsible development of our activities, which will continue in line with our Group's objectives of minimising and reducing the impact on people's safety and health, and on the environment.

**Dr Jürg Witmer**

Chief Executive Officer

## Summary Comparison 2004 versus 2003

-  **Production**  
Overall production of fragrances and flavours decreased slightly by 1.3% due to discontinued fragrance ingredients. (see Givaudan Annual Report 2004).
-  **Water Consumption**  
Water consumption decreased strongly by 14.1% since production of sunscreen filters and some other commodity type ingredients ceased on the Vernier site.
-  **Safety (Accidents)**  
The number of workdays lost due to occupational accidents increased by 10.2%.
-  **Waste Water**  
Total Organic Carbon (TOC) decreased by 68.6% due to the reduction of waste water stemming from the discontinued fragrance ingredients.
-  **Energy**  
Total energy consumption, composed of electricity, light fuel and natural gas, decreased slightly. The importance of natural gas in the overall energy consumption is increasing.
-  **Hazardous Waste**  
Hazardous waste decreased by a further 7.8%. The landfill part remained constant and at very low level.
-  **CO<sub>2</sub> Emissions**  
Carbon Dioxide (CO<sub>2</sub>) emissions decreased by 4.6% as a consequence of reduced light fuel consumption.
-  **Non-Hazardous Waste**  
Non hazardous waste decreased by 6.5%. The non-recycled part decreased stronger (12%) leading to an increase of the recycling rate by 3%.
-  **Inorganic Gas Emissions**  
NO<sub>x</sub> gases decreased by 5% and SO<sub>2</sub> gas decreased by 12.8% in line with the reduction of light fuel consumption.
-  **VOC Emissions**  
Total VOC emissions decreased significantly by 32.3%.
-  **CFC Consumption**  
CFC consumption increased by 47%.
-  **CFC Inventory**  
CFC inventory decreased by 26.7%.

# 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.

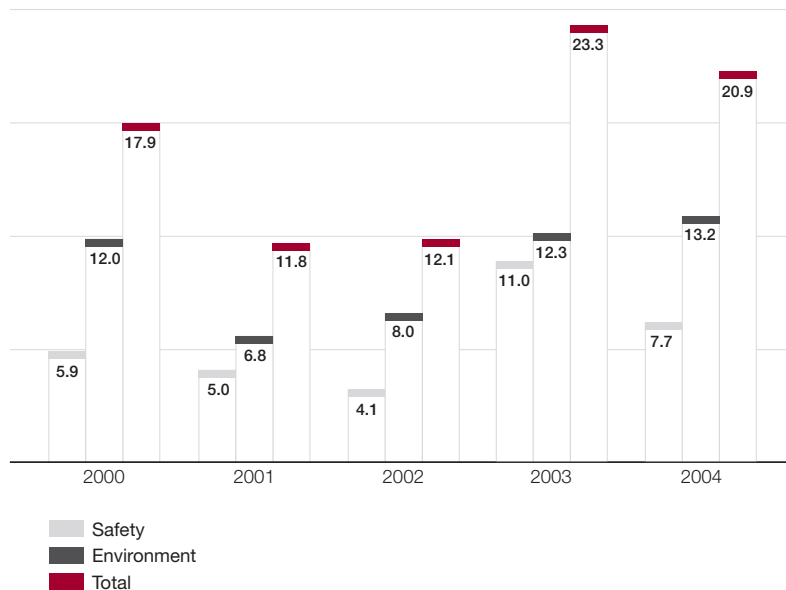
Overall investments for S&E have decreased in 2004, but remained high when compared to the years 2001 - 2002. S&E investments represent 14.1 % of the total capital expenditures.

The major part of the S&E investments related to projects concerning the production expansions in Vernier, Sant Celoni and Shanghai. Environmental specific investments were made in waste water treatment plants in East Hanover and New Milford and in odour emission control installations in Dortmund.

No important safety specific investments were made in 2004. All safety investments were in relation with new warehousing and production installations.

## S&E Investments

in millions of CHF



# Expenses

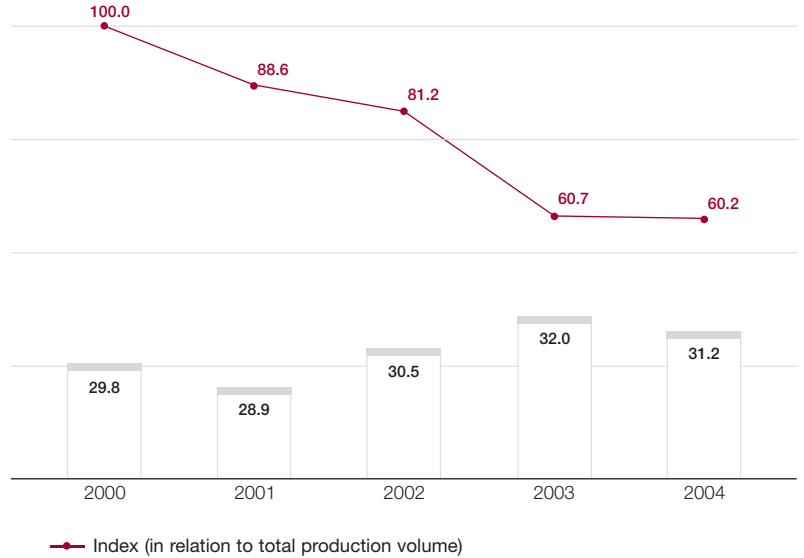
**S&E expenses mainly cover S&E services, maintenance of S&E equipment, site remediations, waste elimination costs and training of employees on S&E matters.**

The overall S&E expenses have decreased by 2.3%. The S&E expenses are primarily running costs and maintenance costs. The expense structure remained the same as last year where around 25% of the expenses were safety specific (fire brigade, medical services, fire fighting equipment), 50% environmental specific (waste water treatment, air treatment, waste management, etc) and the remainder were related to production and warehousing S&E equipment and training of employees.

S&E expenses in relation to the production volumes have decreased by about 40% since the year 2000. Such a performance was only possible thanks to strict management of the various cost drivers (see graphics of key figures).

## S&E Expenses

in millions of CHF



# Safety

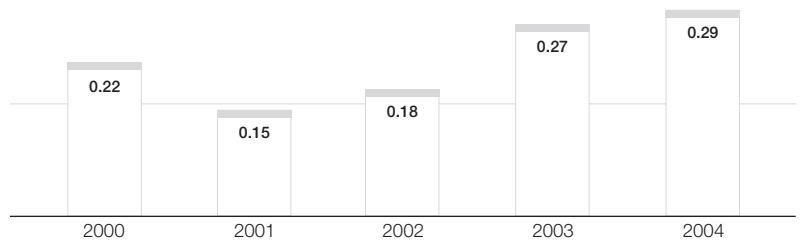
The Internal Accident Index (IAI) expresses the amount of workdays lost per employee and per year. The frequency is the amount of accidents per 1,000 employees.

The Internal Accident Index increased again in 2004, as a consequence of an increase in accidents which in turn led to an increase in the number of workdays lost. This rate is mainly driven by the accident rate in three major sites (Kempththal, New Milford and Vernier). On the positive side, six sites have recorded zero accidents in the period under review.

Accident frequency increased by 5.2%.

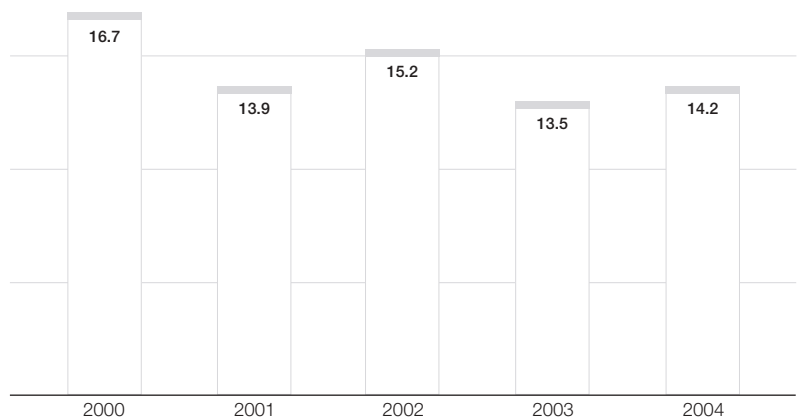
## Internal Accident Index

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.

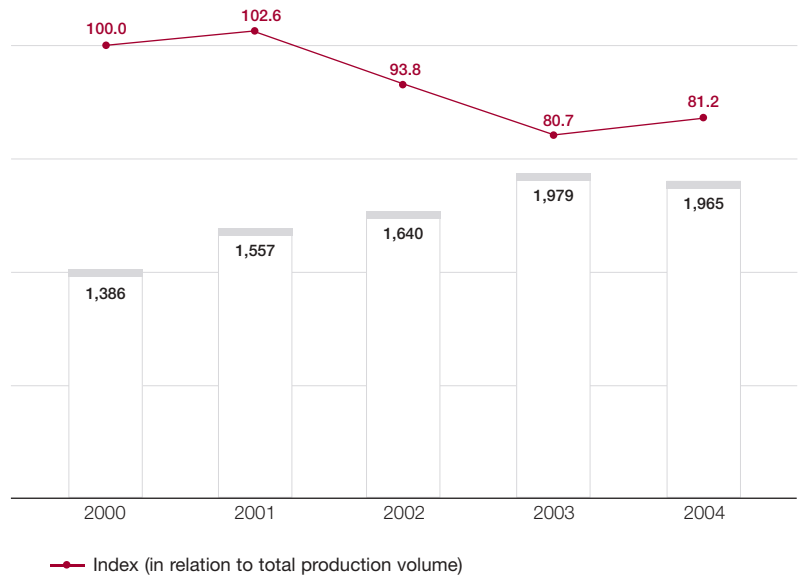
The energy consumption decreased slightly in line with the decrease in the volume produced. Production volume decreased in the chemical production in Vernier, where the production of sunscreen filters and some commodity type ingredients was discontinued.

Light fuel consumption decreased by 10.6% since this energy is the main combustible on the Vernier manufacturing site. Natural gas consumption continued to increase (3.7% in 2004).

Since 2000, total energy consumption (light fuel, natural gas and electricity) has decreased in relation to the total production volume of about 20%. This good result is based on Givaudan's efforts to modernise major energy consuming equipment (boiler houses, air treatments, etc.) and to minimise energy losses through better insulation and the use of energy recovery systems.

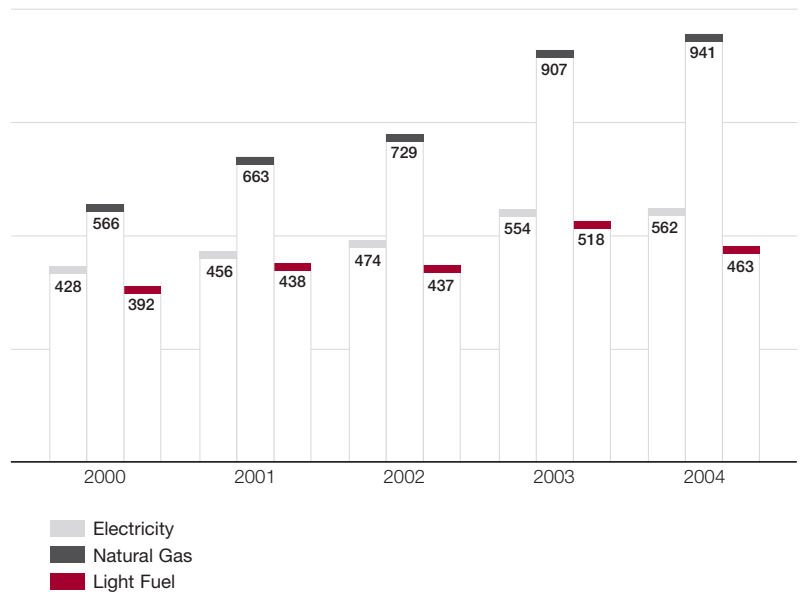
## Total Energy Consumption

in terajoules



## Consumption by Type of Energy

in terajoules





# CO<sub>2</sub> Emissions

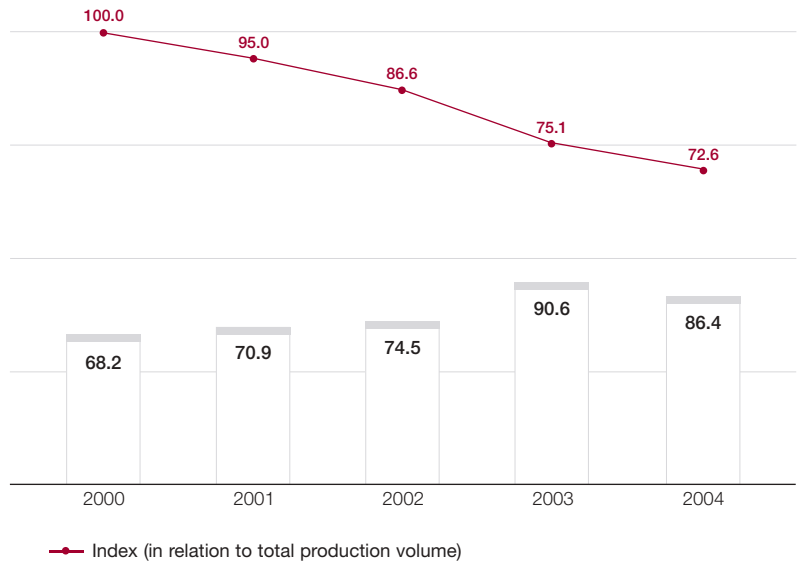
Carbon Dioxide (CO<sub>2</sub>) emissions result from the combustion of fossil fuels to generate steam necessary in the production of flavours and fragrances and to heat buildings.

The CO<sub>2</sub> emissions decreased by 4.6% due to the decrease of the overall production volume and the use of more natural gas compared to light fuel.

Since 2000, the CO<sub>2</sub> emissions per kilo produced have been reduced by almost 30%. This reduction is the result of our efforts to replace fuel oil by natural gas in many sites, since natural gas generates less CO<sub>2</sub> than fuel oil. The share of fuel oil in the total fossil energy consumption has gone down from 40% in 2000 to 33% in 2004.

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

in thousand tons



# Inorganic Gas Emissions

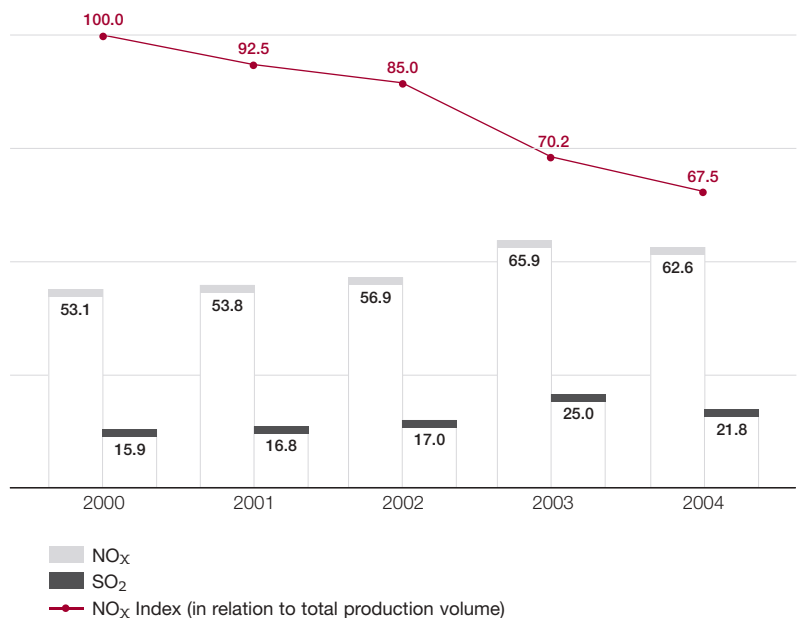
Inorganic gases are sulphur oxides (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) emitted by the combustion of fossil fuels.

Inorganic gas consumption decreased because the overall energy consumption has decreased.

Organic gas emissions are also depending on the type of fossil energy used. The increased use of natural gas compared to fuel oil has allowed the reduction of NO<sub>x</sub> emissions by more than 30% since 2000, when compared to the total production volume.

## Inorganic Gas Emissions

in tons



## VOC Emissions

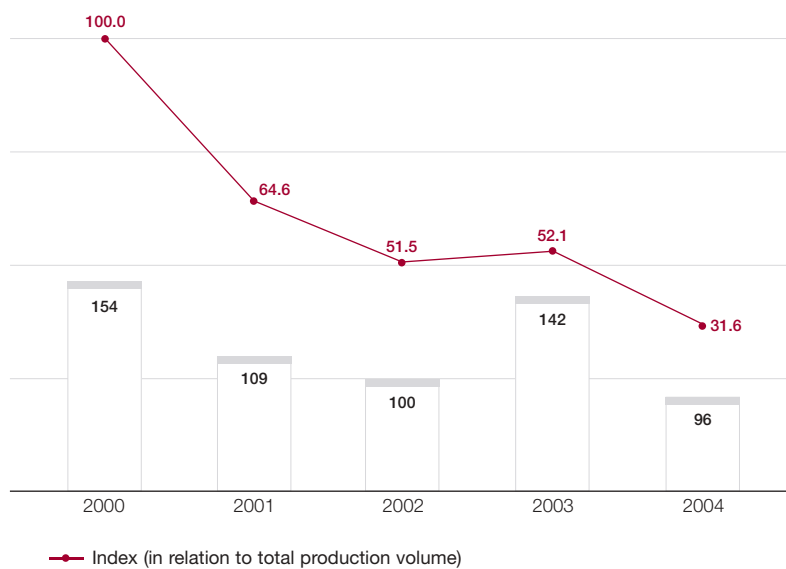
Volatile Organic Compound (VOC) emissions are non-halogenated solvents such as aliphatic alcohols and toluene.

VOC emissions have decreased by 32% in the year 2004. Continued improvement efforts on the emissions control systems and devices in our installations have led to this result.

Since 2000, VOC emissions have been reduced by almost 70% when compared to the total production volume. The main reason for this improvement lies in the fact that a large part of the additional production volume of these last years does not generate any VOC emissions.

### VOC Emissions

in tons



# CFC

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

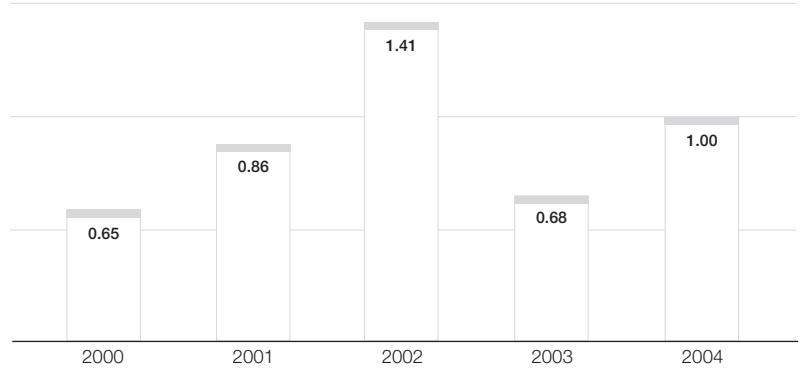
CFC consumption in 2004 increased as a result of losses in installations containing R22 CFC, which had to be compensated. Equipment incurring substantial losses will be replaced in the near future.

CFC Inventory decreased by 26.7% in 2004. This decrease is due to the dismantling of a cooling system containing R12 in Dübendorf.

Since 2002, the inventory of CFC has been decreasing by about 30%. Almost all installations containing R12 have now been dismantled, with the exception of some remaining laboratory equipment, representing 2.4% of the total CFC inventory.

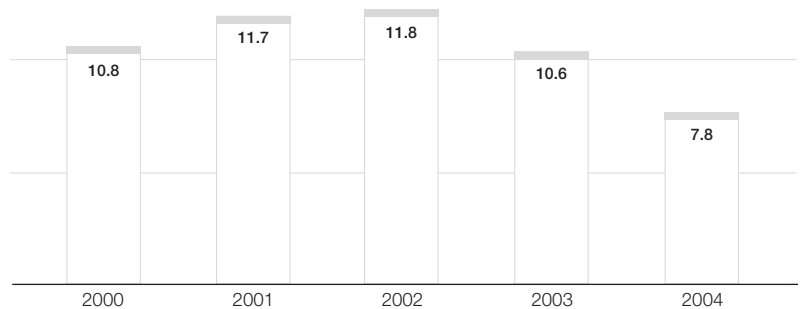
## CFC Consumption

in tons



## CFC Inventory

in tons



## Water Consumption

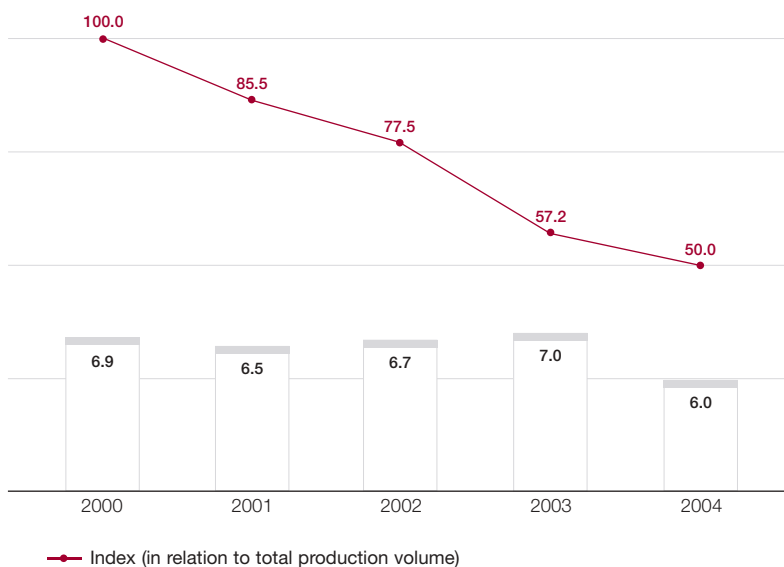
Water is used for cooling or in manufacturing processes. Consumption consists of industrial water (from rivers or wells) and drinking water (public utility).

Water consumption decreased strongly by 14.1% since the production of sunscreen filters and some other commodity type ingredients ceased on the Vernier site.

Since the year 2000, total water consumption has been reduced by half, when compared to the overall production volume. This strong decrease in consumption is mainly the result of major efforts undertaken on the Vernier site. This site's share of the total water consumption has gone down from 80.0% in the year 2000 to 61.7% in 2004.

### 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.

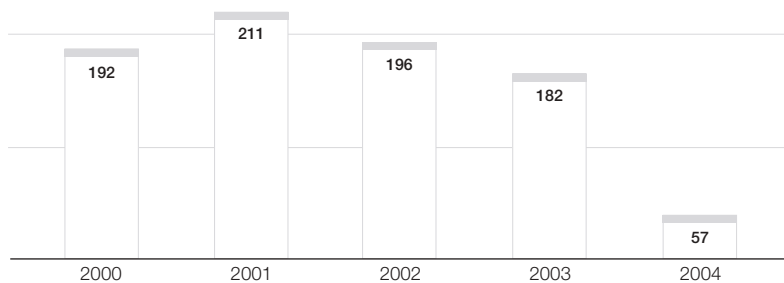
The total organic carbon discharged by our installations has decreased by almost 70% as a direct consequence of the discontinuation of sunscreen filters and some other commodity type ingredients on the Vernier site. This site contributes more than 80% to the total TOC emission.

Since the year 2000, TOC emission has decreased significantly in Vernier, Sant Celoni, East Hanover, New Milford and Kempththal, when we put the emission in relationship with the production volumes.

This improvement is a result of Givaudan's efforts to increase efficiency of the waste water treatment plants. All other sites, without waste water treatment plant, are directly connected to public sewer systems. The waste water is, after neutralisation, directly discharged to the sewer.

### Total Organic Carbon

in tons



# Hazardous Waste

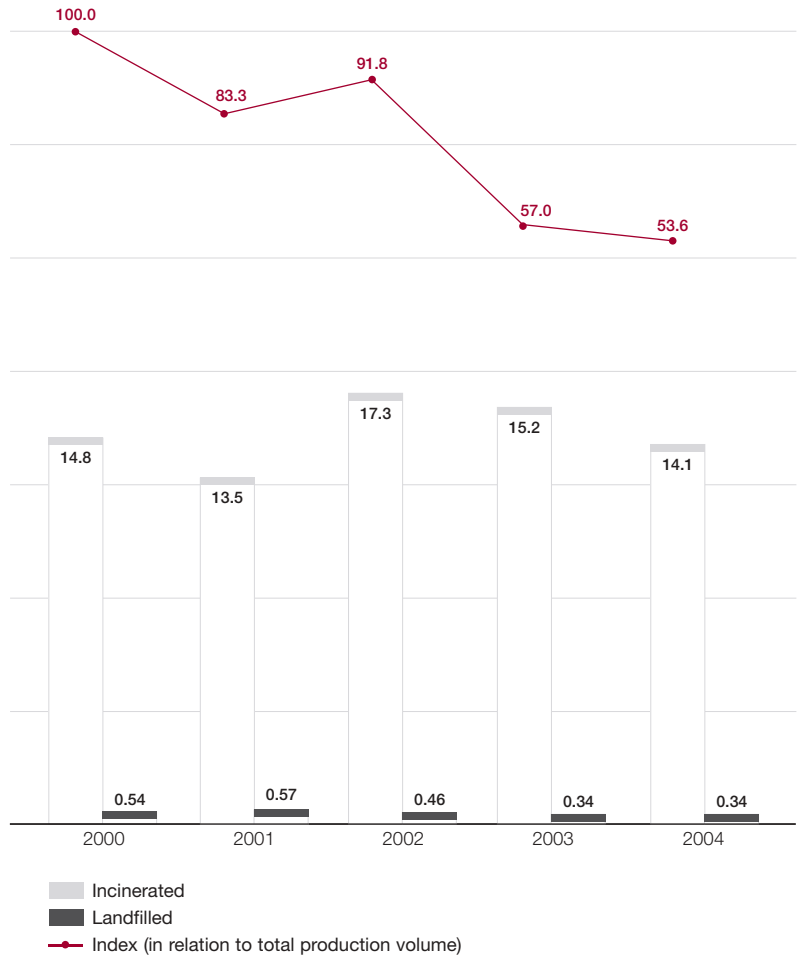
Hazardous waste mainly covers flammable solvents, distillation residues and mineral sludge from waste water treatment plants.

The total amount of hazardous waste decreased by 7.8 %. The major part is incinerated and only a very small amount of waste water treatment sludge is still landfilled.

Since 2000, constant efforts were made to reduce the hazardous waste amount by either improving the recycling rate or by reducing waste generation. A reduction of almost 50% in hazardous waste has been achieved in the past five years, when compared to the total production volume.

## Hazardous Waste

in thousand tons



# Non-Hazardous Waste

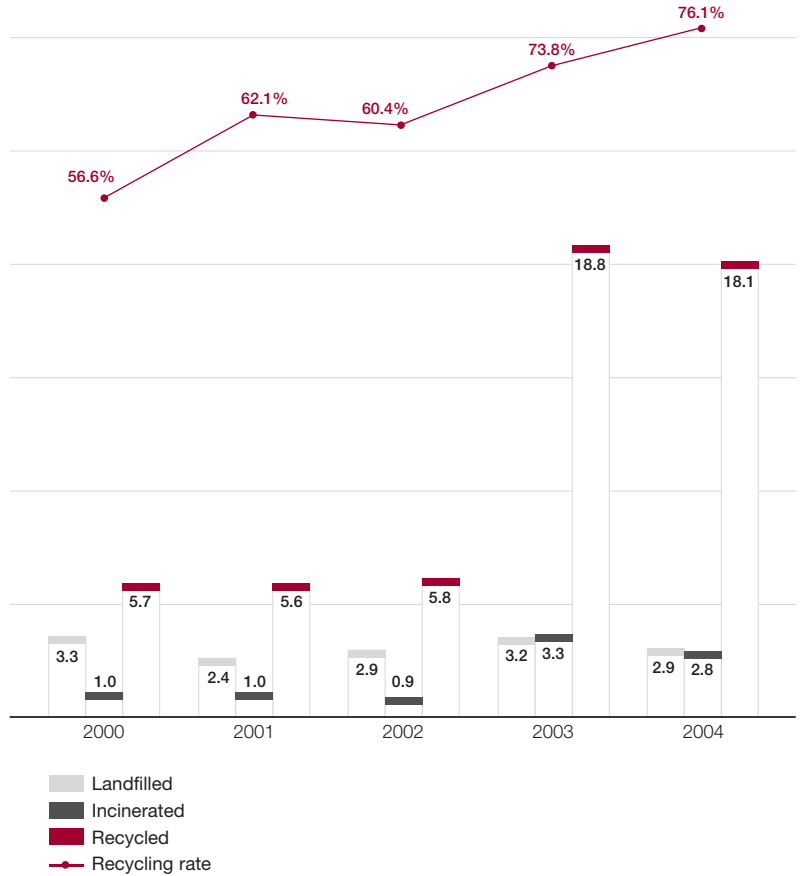
Non-hazardous waste is mainly packaging of all kinds, vegetable matter, etc.

The overall non-hazardous waste decreased by 6.5% in 2004. All types of elimination methods are showing reductions.

Since 2002, the recycling rate has been constantly increasing to reach 76.1% in 2004. These excellent results are based on the efforts to maximise all opportunities to recycle waste.

## Non-Hazardous Waste

in thousand tons



# Audits

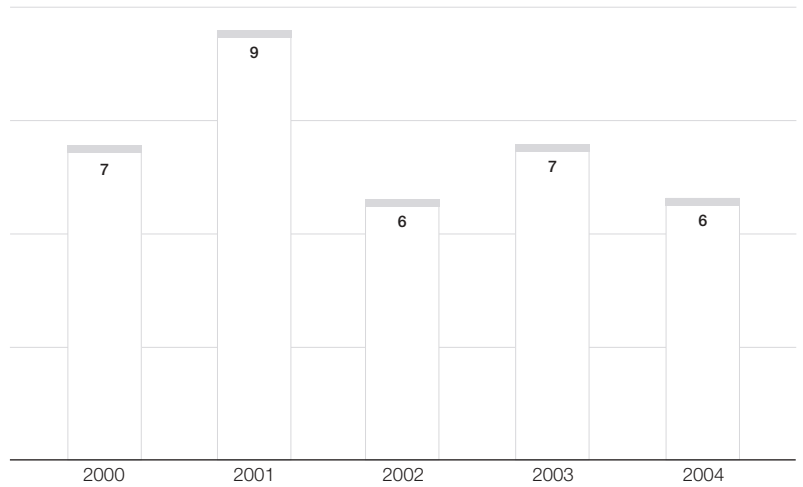
**Safety and environmental audits are performed on a regular basis in Givaudan's 24 production facilities.**

In 2004, six sites were audited in Europe, USA and Asia. During these audits no significant issues were identified, demonstrating again the high level of safety, hygiene and environmental protection achieved in Givaudan. It is also a result of the commitment by all employees to constantly maintain and improve the S&E working conditions.

Some of the audits were conducted in co-operation with an insurance company, confirming Givaudan's high level in the area of S&E.

## Audits

number of audits



# Sites

Sites participating in the 2004 S&E Report

## Sites

### USA

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Cincinnati	(Ohio)
Devon	(Kentucky)
East Hanover	(New Jersey)
Lakeland	(Florida)
Mount Olive	(New Jersey)
New Milford	(Connecticut)
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)
Jakarta	(Indonesia)
Shanghai	(China)
Singapore	(Singapore)

### Oceania

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Sydney	(Australia)
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# Odour Emission Control

Givaudan is the undisputed leader in the area of smell and taste. As our activities, particularly in the area of flavours, often involve processes that are similar to cooking, discharging odours in to the immediate surroundings of our sites is unavoidable. These odour emissions are harmless to the environment from a toxicological standpoint, however there are sometimes perceived as unwelcome smells by the neighbourhoods adjacent to our sites.

Léon and Xavier Givaudan, the founders of the company, moved in 1898 to the banks of the Rhône in Geneva, as their neighbour in Zürich, a baker, kept complaining that his bread smelled of violets. When the brothers moved to the Vernier site, there was no

residential area close by. Over time, urbanisation has increased and many of our sites are today surrounded by housing estates. As a good corporate citizen, Givaudan strives to maintain a good relationship with its neighbours. In order to reduce to a maximum the natural odour emanations deriving from its activities, Givaudan has undertaken substantial efforts to decrease their effect.

The main challenge in odour emissions lies in the fact that the substances which are responsible for the unpleasant odour perceived by the neighbourhood are present in very small amounts but are often contained in very large volumes of air. To properly treat the air produced by our manufacturing installations before it is discharged



Installation of a bio-filter unit on top of the manufacturing building in Dortmund (Germany)



Bio-filter units in Dortmund (Germany)

into the atmosphere, various technologies have been used over the years. One method consists of washing the air emitted by blowing it through a shower of water. A more efficient method is to burn the exhaust air, but is more onerous from an energy cost standpoint.

In recent years, bio-filtration technology has been more widely developed. A bio-filter, installed on the roof of the manufacturing building, treats the tainted air stream by biologically destroying the contaminants. These are then absorbed by a bed of vegetal material and decomposed by different types of micro-organisms.

Givaudan widely uses bio-filtration technology at its manufacturing sites because of its excellent efficiency. Investments in this

technology amount to over CHF 10 million over the past years and the technology is in use at our sites of Barneveld (Netherlands), Dortmund (Germany), Dübendorf and Kempththal (Switzerland), and East Hanover (USA).



Exhaust air channels in Dübendorf (Switzerland)

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