

2001

Givaudan<sup>®</sup>

**Safety and Environmental Protection:  
The Givaudan Group Report**



**Safety  
and Environmental  
Protection:**

**The Givaudan Group Report  
2001**

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## F o r e w o r d

**Dr. Jürg Witmer**  
Chief Executive  
Officer

Givaudan has seen a favorable development in 2001 from the perspective of safety as well as industrial hygiene and environmental protection. This is the result of the constant adaptation of our S&E policy, the evolution of production processes and technology as well as the strong commitment of our collaborators at all levels.

During 2001, no major changes occurred in Givaudan's structure that had a significant impact on the S&E results. Givaudan S&E policy is based on prevention and continues to be implemented worldwide with the same sense of responsibility as we apply with regard to quality, productivity and cost-efficiency.

We are pleased to report that in 2001 Givaudan attained the lowest accident index in 20 years which underlines our high safety standards. Also, no incident with significant impact on the health of Givaudan workers and on the environment occurred during the last year. Despite these good results, the fight against accidents and incidents remains a key objective.

A lot has also been done to adapt the working conditions to the evolution of production practices and the substances handled. The health surveillance programme started in 1998 has been generalised in 2001 to the whole Group. No occupational illness has been recorded among Givaudan employees.

In environmental protection Givaudan continues to strive to decrease air and water emissions and waste production, despite the continuous increase of the production volume.

The Vernier site in Switzerland, including chemical and compounding activities, has been successfully certified ISO 14001. The Spanish chemical manufacturing site in San Celoni site is in the process of being certified.

In 2002 we will continue to integrate safety and environmental aspects in all areas of our activities, to provide safe working conditions for our employees and to carry out customer-driven operations that are respectful of the environment.



## Comparison of the 2001 with 2000 data

### **Production**

Overall production of fragrances and flavours has grown by 5.8 %.

### **Energy**

Overall energy consumption has increased by 5.6 %.  
Fossil energy: 5.1%.

### **Carbon dioxide**

Emissions of CO<sub>2</sub> have, parallel to the fossil energy, increased by 4.0%.

### **Inorganic gas**

These are the gases emitted by the combustion of fossil energies. SO<sub>2</sub> emissions have increased by 5.7 %. SO<sub>2</sub> and NO<sub>x</sub> emissions are following the fossil energy growth.

### **VOC emissions**

Total VOC emissions have decreased by 29%.  
Halogenated by 30%.

### **CFC consumption**

Consumption means the replacement due to leaks in the refrigerating systems. The consumption remains constant and about 10% of the inventory.

### **Wastewater**

The Total organic carbon (TOC) coming out of the chemical plant wastewater treatment installations remains constant.

### **Hazardous waste**

The overall quantities of hazardous waste, mostly flammable solvents have decreased by 8.0%.  
The part landfilled (4.1% of the total) remains very low.

### **Non-hazardous waste**

Non-hazardous waste has decreased by 6.2%.  
The year 2001 recycling rate is 63%.

### **Internal Accident Index**

This index expresses the number of working days lost by each employee by year. Compared to last year, the index has decreased significantly.

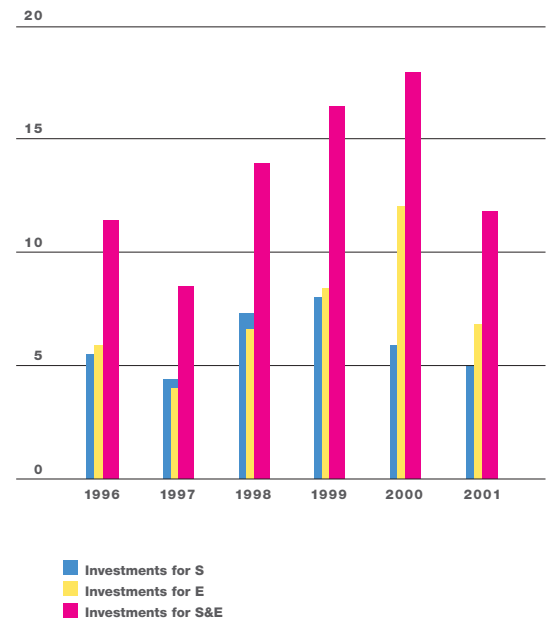
## Investments

**Investments include full expenses made for S&E specific pieces of equipment for fire detection, water/air treatment or fire water supply and the percentage of expenses for investments in relation with the operating facilities.**

The overall S&E investments have decreased in 2001, particularly those dedicated to the environment. This is the result of a series of major specific investments that were made in the preceding years and concluded at the beginning of 2001, namely: the improvements in the Vernier wastewater treatment plant and Duebendorf biofiltration equipment. Among the investments realised in 2001, can be mentioned the increase in capacity of the Barneveld biofiltration facility.

Most investments are adaptations or upgrades of existing safety and environmental equipment following process evolution.

**S&E Investments**  
(In million of Swiss francs)



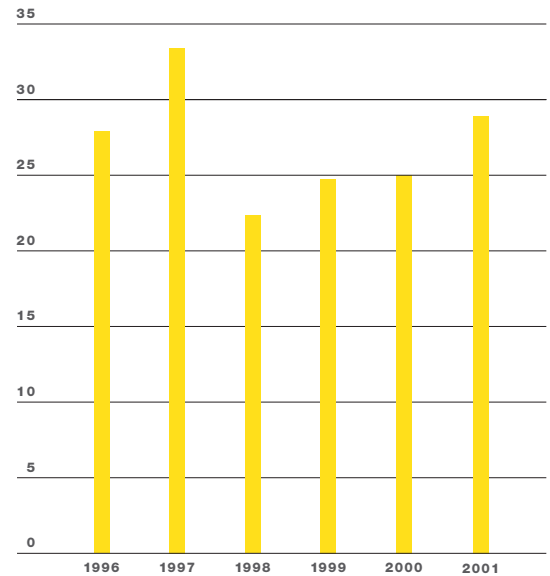


## Expenditure

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

S&E Expenditure has increased by about 16%. This growth is mainly due to: the increase in waste elimination costs, the increase in S&E controls and the additional running costs of all kind of S&E devices and equipment installed to improve the S&E level.

**S&E Expenditure**  
(In million of Swiss francs)





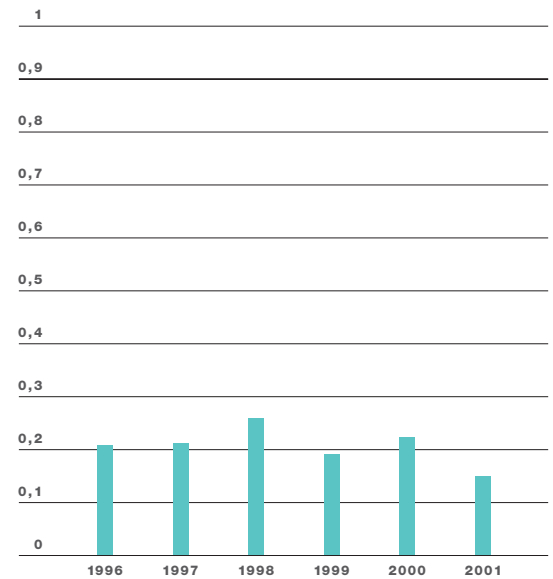
## Safety

The Internal Accident Index (IAI) expresses the amount of workdays lost per employee and per year.

The year 2001 has been particularly favourable, as the Internal Accident Index has reached, with 0,149, a level that has never been obtained during the last 20 years of Givaudan history. Five sites among 23 have recorded zero accident.

Similarly, the accident frequency of 13.9 per 1000 employees has also reached an exceptionally low level.

Internal Accident Index (IAI)







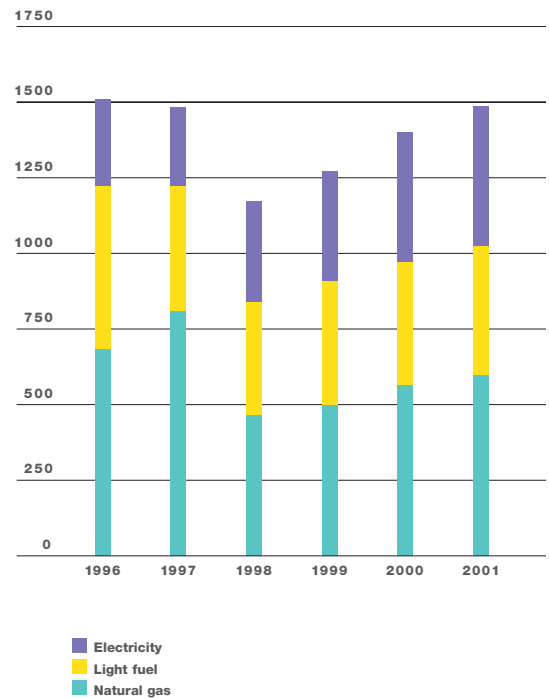
## Energy

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

Energy consumption has been constantly increasing since 1998, following the constant growth of the production volume. However, the energy consumption per tons produced has decrease by 1%, as the production volume has increased by about 40% during the same period.

Specifically for 2001, the energy consumption has increased by 5,6 % as the production volume has grown by 15,8 %.

**Energy consumption**  
(In terajoules)





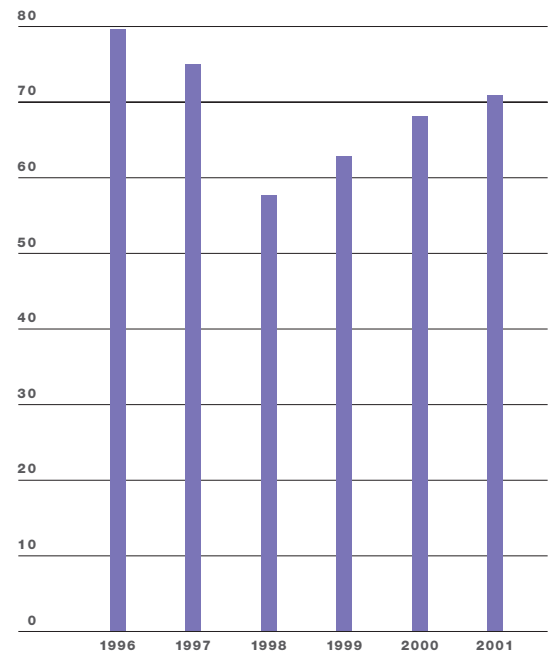
## Air / CO<sub>2</sub> emissions

CO<sub>2</sub> emissions result from the combustion of fossil energy to generate steam necessary to produce flavors and fragrances and to heat the buildings.

The carbon dioxide emissions in 2001 continue to increase following the growth of fossil energy consumption.

In 2001 the use of natural gas, producing less carbon dioxide, has been adopted by more than 80 % of Givaudan sites covering 70 % of the production volume.

CO<sub>2</sub> emissions  
(In thousand metric tons)





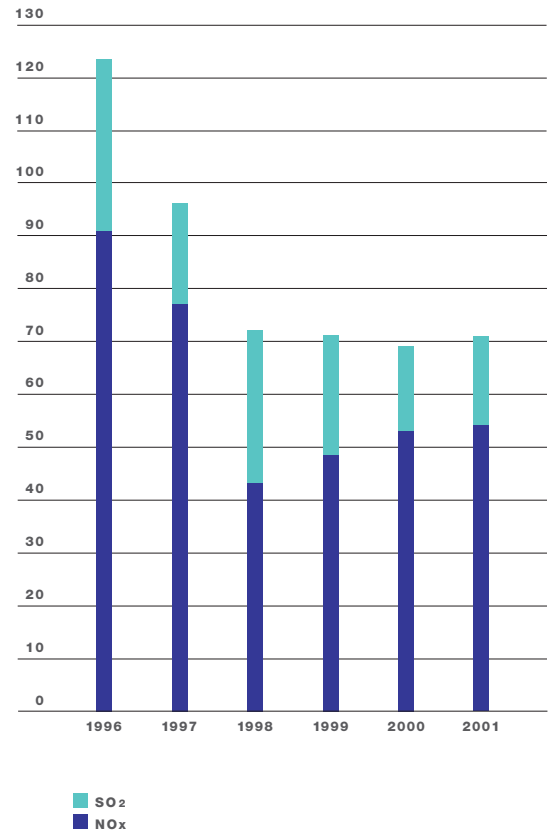
## Air / Inorganic gas emissions

Inorganic gases are sulphur oxides and nitrogen oxides emitted by the combustion of fossil energy.

The emissions of NO<sub>x</sub> increased following the consumption of fossil energy. The SO<sub>2</sub> emissions, after a strong reduction until 1999, slightly increased the past two years.

The use of fuel and combustible gas with low content in sulphur, available on the market, has been now generalised to all Givaudan sites.

Inorganic gas emissions  
(In metric tons)



## Air / VOC emissions

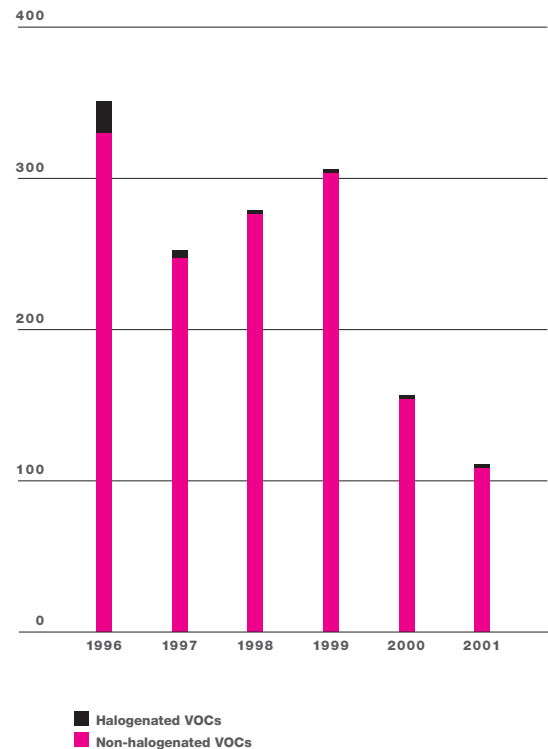
VOC emissions have been divided into halogenated solvents (mainly methylene or ethylene chloride) and non-halogenated solvents such as aliphatic alcohols and toluene.

Both halogenated and non-halogenated VOC emissions continued to decrease in 2001. The halogenated part represents only 1.5% of the total emissions.

The development work accomplished to replace halogenated solvents with non-halogenated ones has allowed this year a further reduction in emissions of 30 %.

Non-halogenated VOC emissions have also decreased due to the continuous upgrading of the equipment and processes improvement.

VOC emissions  
(In metric tons)





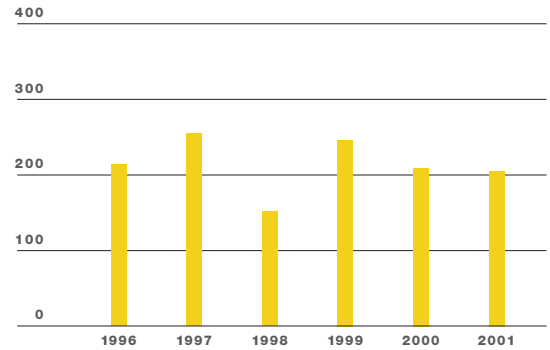
## Water / Total organic carbon (TOC)

TOC expresses the amount of organic substances rejected into receiving waters after the wastewater treatment plant.

The TOC rejected into receiving water from Givaudan chemical plants remained constant during 2001.

The TOC rejected is well below the limit imposed by the local regulations thanks to the major investments made during the past three years to increase the capacity and the efficiency of the wastewater treatment installations.

**Total organic carbon (TOC)**  
(In metric tons)





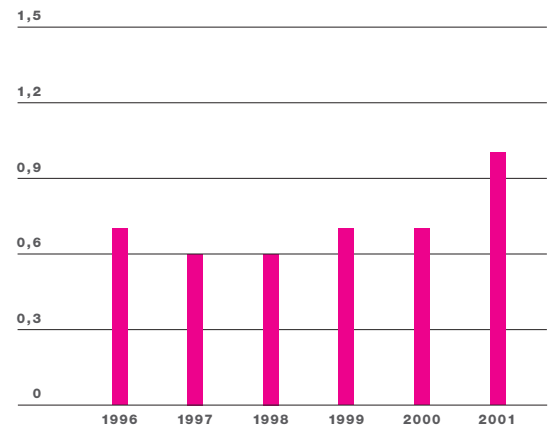
## CFCs

CFCs are only used in cooling or fixed fire extinguishing systems.

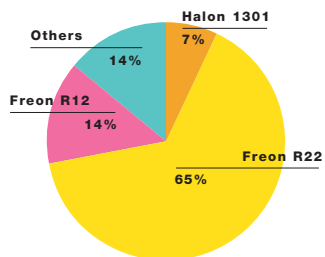
The 2001 CFC inventory is mainly made up of R12 and R 22.

The overall consumption representing, losses from the cooling systems, has reached 10 % of the 2001 inventory.

**CFCs consumption**  
(In metric tons)



**CFCs inventory distribution**





## Hazardous waste

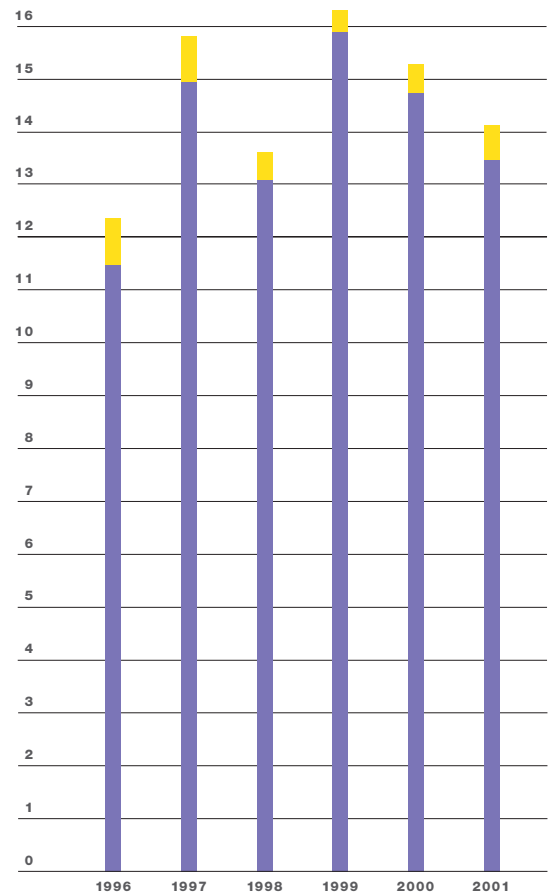
Hazardous waste mainly covers flammable solvents, distillation residues and mineral sludge from wastewater treatment plants.

The overall hazardous waste production has decreased constantly during the last three years by 14 % as the production volume has grown by 36% during the same period. This favourable situation is the result of constant efforts to optimise the processes.

During the last four years about 5 % of the hazardous waste has been landfilled. This part is made up of mineral sludge from the wastewater treatment.

The incinerated part is mainly organic materials containing only carbon, hydrogen and oxygen. This excellent fuel with a high calorific power is incinerated in special ovens.

**Hazardous wastes**  
(In thousand metric tons)



■ Landfilled  
■ Incinerated



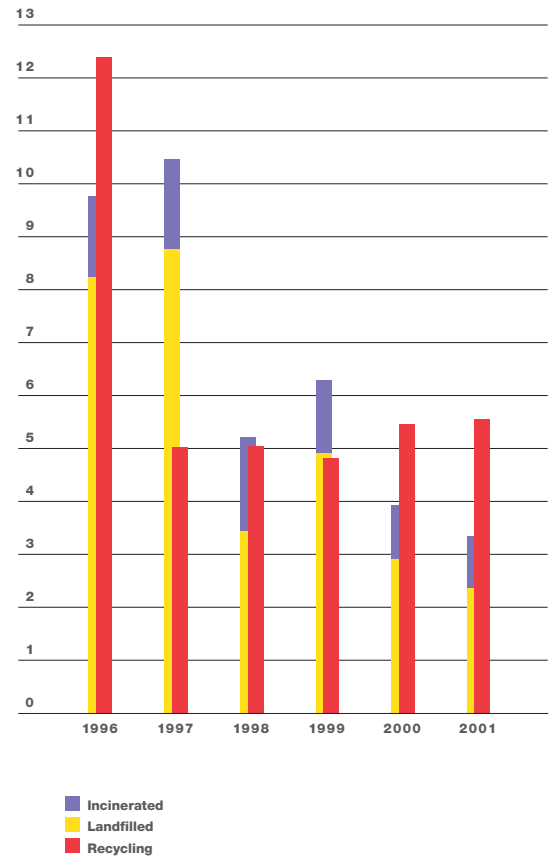
## Non-hazardous waste

Non-hazardous waste is mainly packaging of all kind, vegetables, etc.

The total quantity of non-hazardous waste has decreased in 2001 by 5%.

The 2001 recycling rate is with 63% the highest over the last four years.

Non-hazardous waste  
(In thousand metric tons)







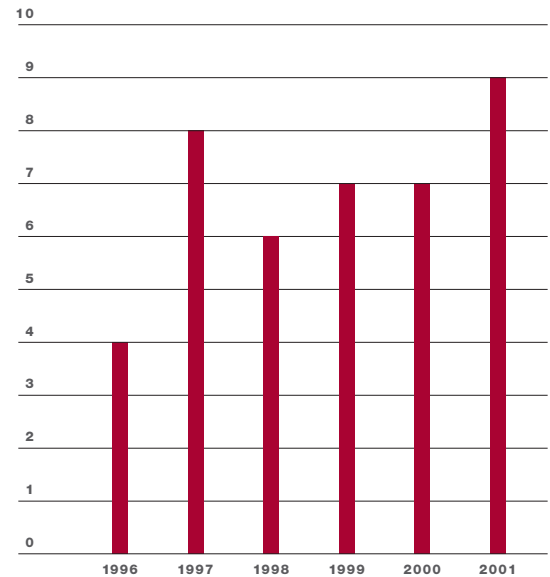
## Auditing

**Safety and environmental audits are performed on a regular basis in the 23 Givaudan production facilities.**

S&E audits remain an important tool to evaluate the S&E level of each Givaudan site and to fix improvement objectives.

The number of audits performed in 2001 has been particularly high covering the sites of the Asia-Pacific region and some European sites. The results of these audits have shown that a very good S&E level, fully in line with Givaudan S&E policy, has been reached.

Audits



## Sites

participating in  
the 2001 S&E Annual Report.



### USA

- 1 Mount Olive (New Jersey)
- 2 East Hanover (New Jersey)
- 3 Lakeland (Florida)
- 4 Cincinnati (Ohio)
- 5 Devon (Kentucky)
- 6 Saint Louis (Missouri)

### Mexico

- 7 Cuernavaca (Mexico)

### South America

- 8 Munro (Argentina)
- 9 Sao Paulo (Brazil)

### Asia

- 10 Bangalore (India)
- 11 Singapore (Singapore)
- 12 Jakarta (Indonesia)
- 13 Shanghai (China)
- 14 Fukuroi (Japan)

### Oceania

- 15 Sydney (Australia)

### Europe

- 16 Argenteuil (France)
- 17 Lyon (France)
- 18 Vernier (Switzerland)
- 19 Dübendorf (Switzerland)
- 20 Barneveld (Netherlands)
- 21 Dortmund (Germany)
- 22 Sant Celoni (Spain)
- 23 Milton Keynes (Great Britain)





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