

# Data and Trends

## Environmental protection and safety

2007



EMS-GRIVORY  
EMS-GRILTECH  
EMS-PRIMID  
EMS-PATVAG  
EMS-SERVICES

# Data and Trends 2007

Protection of the environment and health and safety of our employees are factors given top priority by the companies of the EMS Group during manufacturing and distribution of their high-quality products in the fields of performance polymers, fine chemicals and engineering. As a supplement to our brochure, "Environmental protection and Safety", we also provide information about current trends and measures and take this opportunity to comment on changes and special events. These facts and figures refer to the business units EMS-GRIVORY, EMS-GRILTECH, EMS-PATVAG, EMS-PRIMID and EMS-SERVICES. These companies employ a total of 1200 workers at the production site in Domat/Ems.

Each graph shows the specific quantities which are used or produced during the manufacture of 1 ton of sales product. These figures are independent of quantities manufactured annually.

Since the reporting year 2006, the quantities of finished products (sales quantities) have been taken as a basis for the ratio numbers and data from the previous year has been recalculated accordingly. This allows a comparison of the figures to be made.

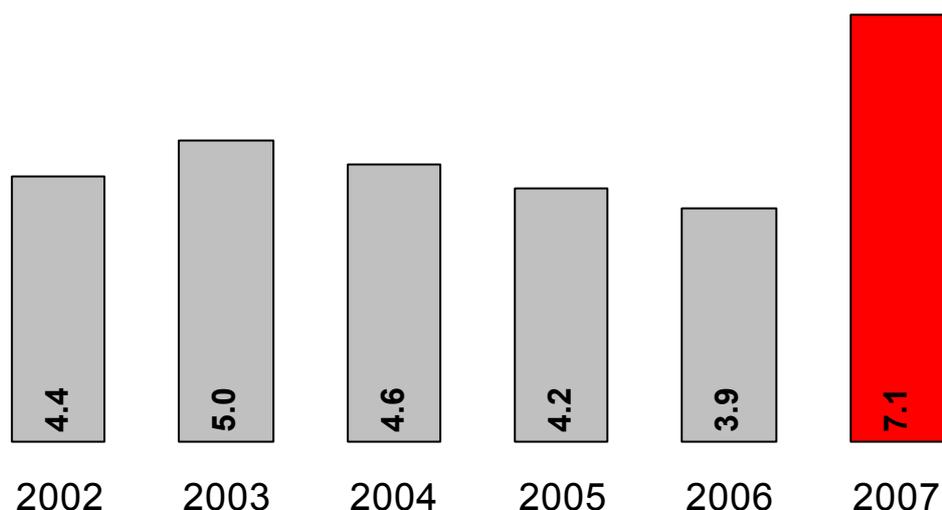
## Investments

### *Investments in work hygiene and energy supply*

In 2007, particular attention was paid to improvement of work hygiene, i.e. a reduction in noise and other pollution at the work place. In the HT plant, equipment which produced raised amounts of dust under specific operating conditions were encapsulated. Contaminating vapours are now immediately collected and eliminated by a newly installed filter system and noisy plant components have been housed. Along with these improvements at the work place, noise and polluting emissions have also been significantly reduced through installation of sound absorbing material as well as the installation and optimisation of a new exhaust air scrubber.

In the area of energy supply, we further increased use of process steam produced from the renewable energy source timber. Establishment of the independent company "Tegra Holz & Energie AG" on the worksite has provided us with a source of process steam produced using this renewable raw material. Along with this, different investments have been made in all business units to enable us to improve utilisation of energy resources as well as to reduce consumption of cooling water, nitrogen and compressed air.

## Share of E+S investments as a % of total investment

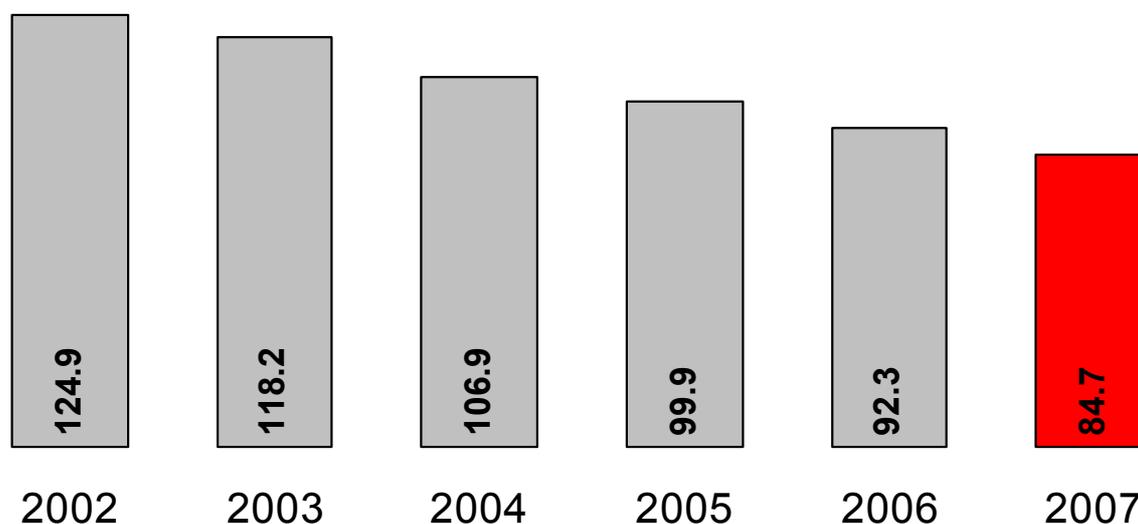


## Operating expenses

### *Lower costs due to improved efficiency*

Outlay towards protection of the environment is mainly made up of operating costs for the waste water and exhaust air cleaning plants and waste disposal management. Operating costs in the area of safety result mainly from measures to ensure protection of health, fire prevention, security and working safety (prevention of accidents). In 2007 we were able to reduce these costs again due to improved efficiency in all areas of our work.

### U+S outlay CHF/t product



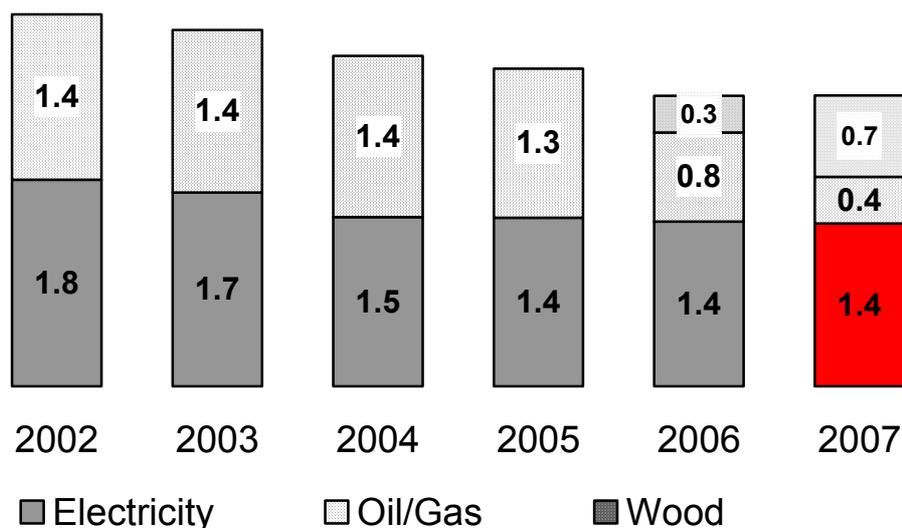
## Energy

### *Increased energy production from timber*

At the beginning of 2006, operation of the first line of the independent company "Tegra - Holz & Energie AG" located on the worksite was started. This company produces energy from the renewable raw material wood. Already in 2007 the second power-plant block started operations to produce electricity and steam. This makes the Tegra the largest timber power station in Switzerland. It sources its fuel directly from timber suppliers in the canton Grisons or from the neighbouring timber works "Stallinger Swiss Timber". In 2007, 64% of the total process heat for our worksite was produced using timber. In this way, CO<sub>2</sub> emissions from heat production have been reduced by 66% since start-up of operations of the biomass power-plant. A third power-plant block will start operation in 2008. This will enable us to produce all process heat required on the production site from wood.

As in previous years, measures to reduce energy consumption were continued.

MWh/t product



## Manufacturing waste

*A slight increase in hazardous waste for the first time in years*

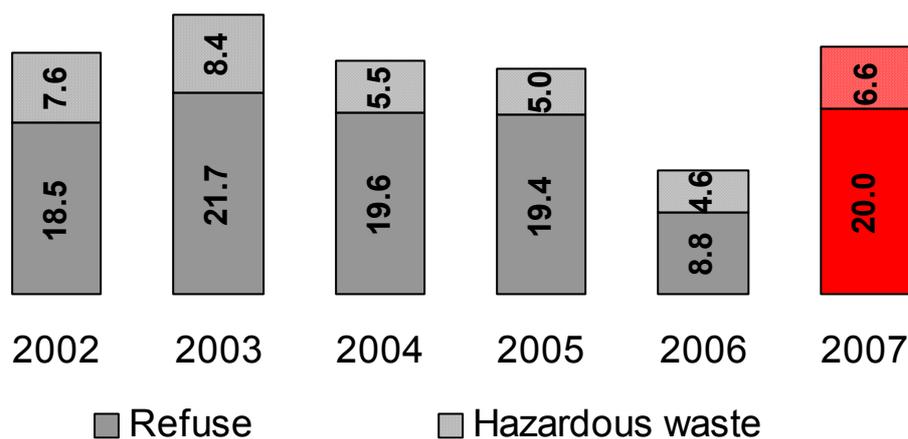
Our guiding principle is:

“Prevention before recycling and recycling before disposal”.

According to this principle it is our on-going aim to avoid producing waste. Where this is not possible we look for solutions for material or thermal recycling. Within the framework of our efforts to recycle as much of our waste material as possible, a large amount of our polymer manufacturing waste was sent to other companies for reuse. Due to technical problems however, these companies were not

able to recycle the material and we were forced to return to thermal recycling in a refuse incinerator.

The increase in hazardous waste was caused mainly by a leak in a railway wagon in which raw materials were delivered to us. During melting for transfer into storage tanks the material ran into the collection tanks. It was then no longer suitable for use and we had to dispose of it.



## Waste water

### *Less waste water entering the treatment plant*

The waste water load disposed of the works-owned water treatment plant decreased in 2007 by 23% compared to the previous year. This was achieved by comprehensive, in some cases already mentioned measures, implemented in the individual plants.

The specific waste water quantity treated in 2006 increased by nearly 25%. In 2007 it increased again by nearly 10%.

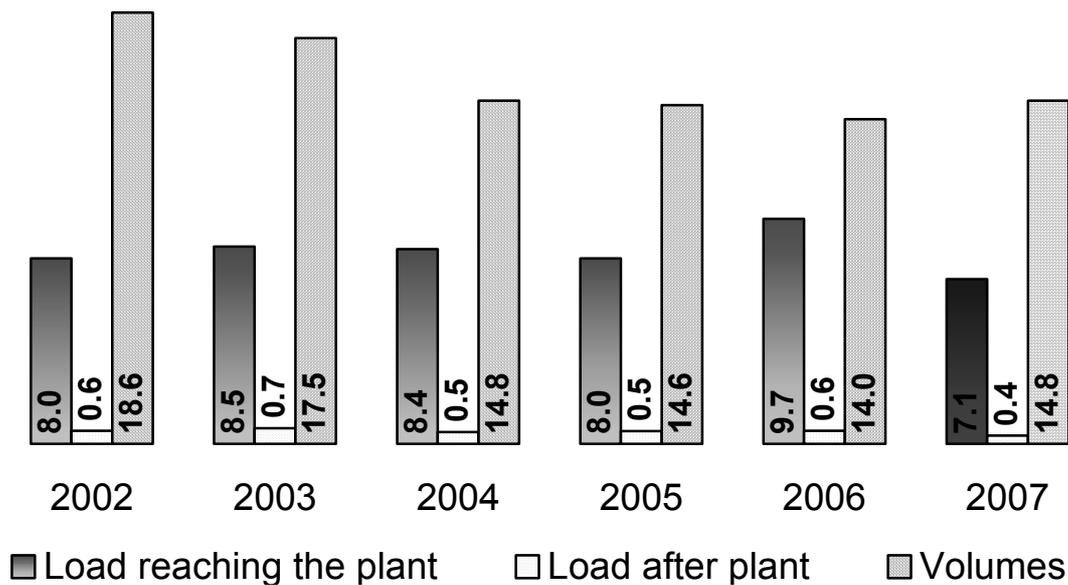
In addition to processing our industrial waste water, the company water treatment plant also separately treats waste water from the local towns of Rhäzüns, Bonaduz and Tamins. The dry sludge is dewatered and transported to other treatment plants for further processing. Gas generated during these processes is made use of directly in the water treatment plants and the dry sludge is used by a local cement work as a valuable alternative fuel source.

The cleaning performance of the water treatment plant for solute organic materials was, on average over the year 2007, 95.8%.

The graph shows the development of waste water quantities and wastewater load before treatment at our plant. As the water load is made up mainly of organic material, this is shown as TOC (total organic carbon).

Load in kg TOC/t product

Volumes in m<sup>3</sup>/t product



## Air emissions

### *Reduction in inorganic gases and CO<sub>2</sub>*

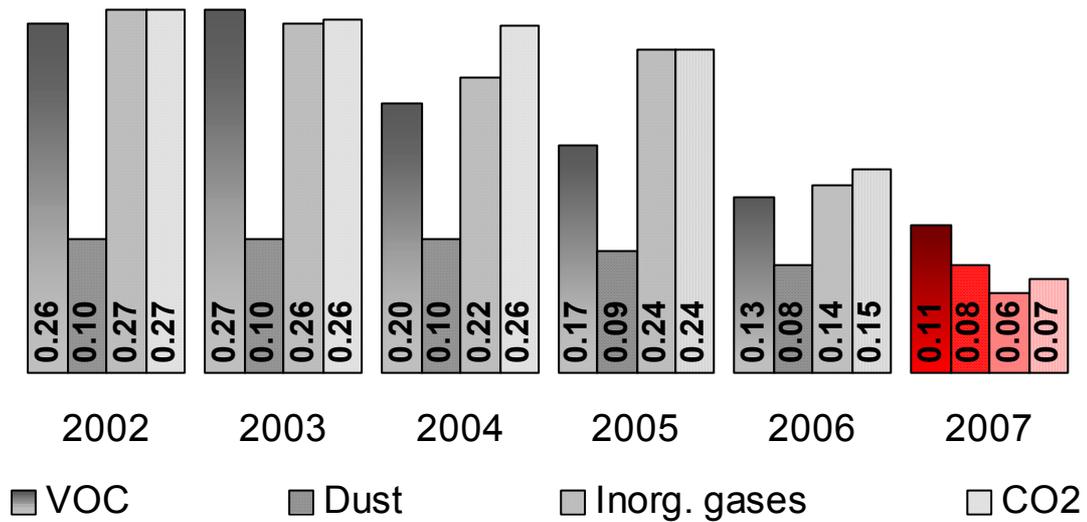
The trend from the last few years was continued. In the past we continually reduced the emissions of highly volatile organic compounds. Although we have installed additional suction systems to reduce dust at the working places, use of improved filter technology has enable us to maintain dust emissions at a consistent level.

Emissions from the energy supply (boiler plants) are declining due to supply from the wood-heated biomass power plant and optimisation of energy consumption. Emission of the "greenhouse gas" CO<sub>2</sub> is 66% lower than before start of operations of the biomass power plant. Emissions of inorganic gases, sulphur dioxide and nitrogen oxide decreased by 44%.

In order to allow a comparison of environmental factors, exhaust air emissions are given as an emission factor kg/t of manufactured product.

- The emission factor indicates the quantity of pollutant of a particular class which escapes into the air for each ton of product manufactured.
- VOC are volatile organic compounds such as solvents or secondary products from the manufacturing processes of our performance polymers.
- Dust emissions are mainly fine particles which are not all collected in the exhaust air cleaners.
- Inorganic gases, mainly nitrogen oxide, are generated during combustion of natural gas for heating purposes.
- CO<sub>2</sub> is released during combustion of natural gas or heating oil for heating purposes.

## Emission factor in kg/t product



## Protection of health

### *Accidents can be prevented*

Despite intensive efforts to prevent accidents with implementation of measures on a technical, organisational and personal level, for the first time in several years we suffered a slight increase in the number of work-related accidents in 2007. These were mainly slight injuries. This fact is supported by the reduced number of work hours lost which gives an indication of the seriousness of an injury. This number has dropped by 44% since 2004.

We intend to further promote safety awareness of employees through consistent handling of safety-related topics.

### Work-related accidents /1'000 employees

