

European Responsible® Care Award 2008: Special Award BASF's Carbon Balance

Detailed Description

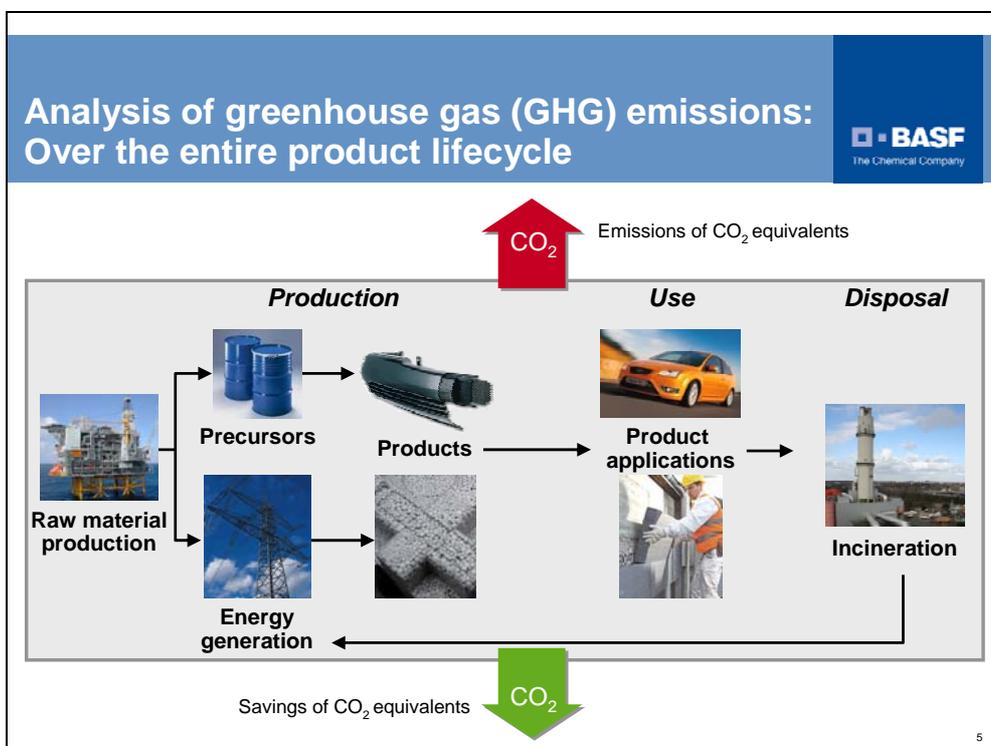
Climate protection as an element of BASF's sustainable development strategy

Climate change is one of the key challenges facing society. Industry, scientists, politicians and society are called upon to halt rising emissions of greenhouse gases and make more efficient use of existing resources. BASF has taken up the challenge and offers a variety of solutions to help protect our climate.

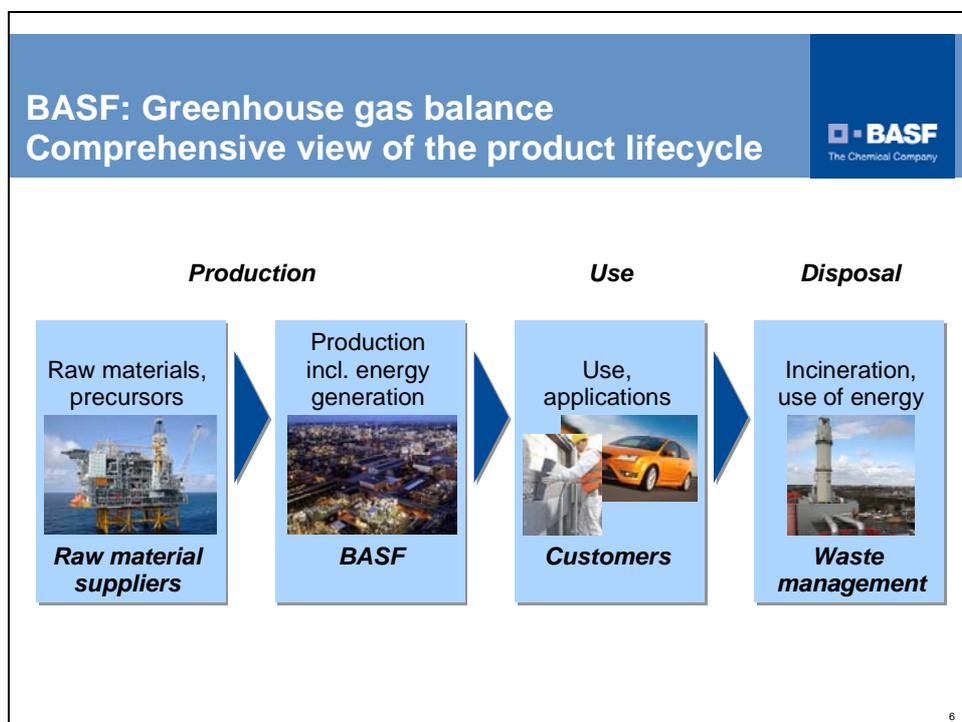
BASF is the first company to present a comprehensive carbon balance. The analysis includes not only BASF's own emissions, but the entire production process including raw material supply chains and the disposal of all products. BASF has also produced a carbon balance for the lifecycles of key products. The carbon balances are part of a climate action program to respond to the climate challenge: At the same time, BASF is appointing a Climate Protection Officer to coordinate its climate protection activities around the world and has set new and ambitious climate protection goals for the company.

Climate protection is an integral part of BASF's sustainability strategy and hence a key element of the corporate strategy ("We ensure sustainable development").

Total lifecycle analysis



With the carbon balance, BASF presents the most comprehensive analysis of greenhouse gas emissions ever conducted by a company in relation to its own activities. BASF's greenhouse gas emission calculations are based on the entire lifecycle of its products. The carbon balance does not only include all the emissions at BASF sites, but also the raw materials and precursor products, including their manufacture, and the disposal of all chemical products at the end of their life. In addition, BASF has reviewed its product portfolio and identified many products that mitigate greenhouse gas emissions, in some cases considerably, when used by its customers.

From raw materials to disposal

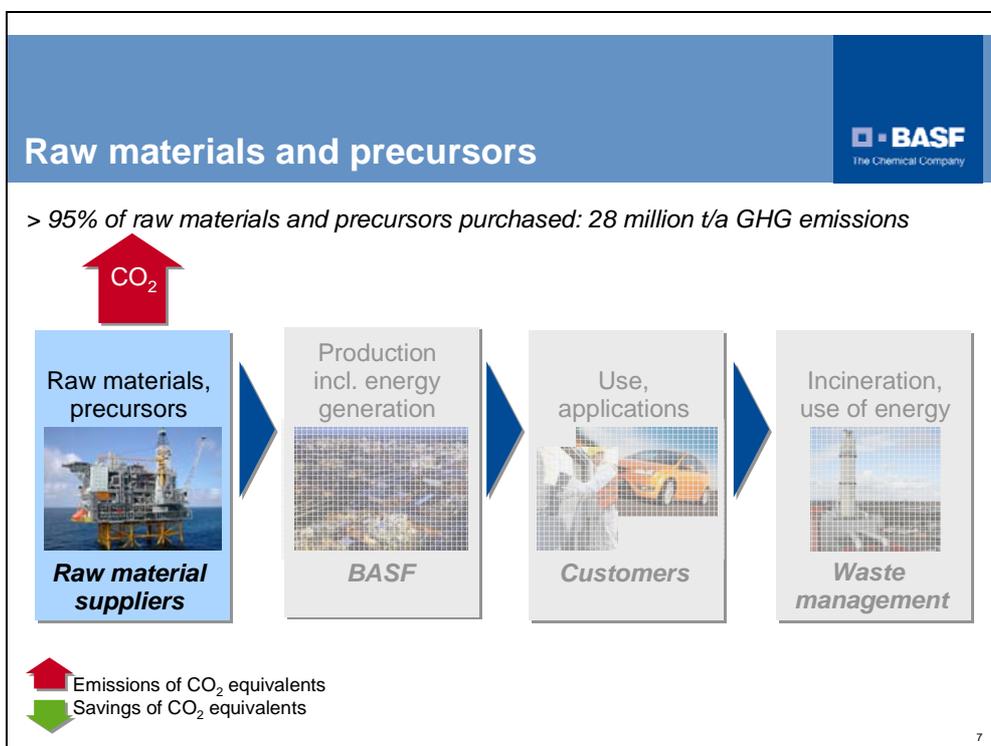
For the analysis, the lifecycle was divided into four phases:

- Raw materials and precursors at our suppliers' facilities
- Our own production, including energy production
- Use of major products by our customers
- Disposal.

The extensive analysis looked at all chemical businesses. The oil and gas activities of BASF's subsidiary Wintershall are not included in the balance. Naturally, there is scope for major savings here too, as can be seen for instance by comparing the CO₂ emissions of a modern gas-driven power plant with those of a coal-fired plant. However, such factors are not comparable to the effects and value chain of the chemistry business and as such did not form part of this report.

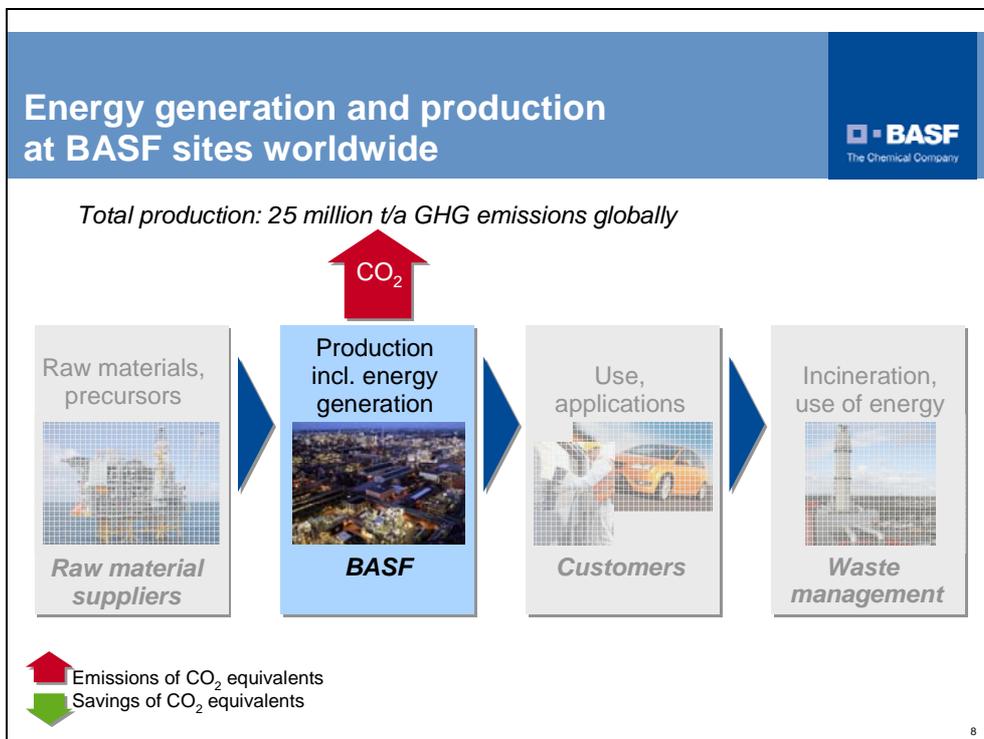
The Freiburg Öko-Institut has reviewed the carbon balance in terms of its methodology, calculations of greenhouse gas emissions and savings, and the documentation of procedures, and has confirmed their quality in an expert report.

Raw materials and precursors

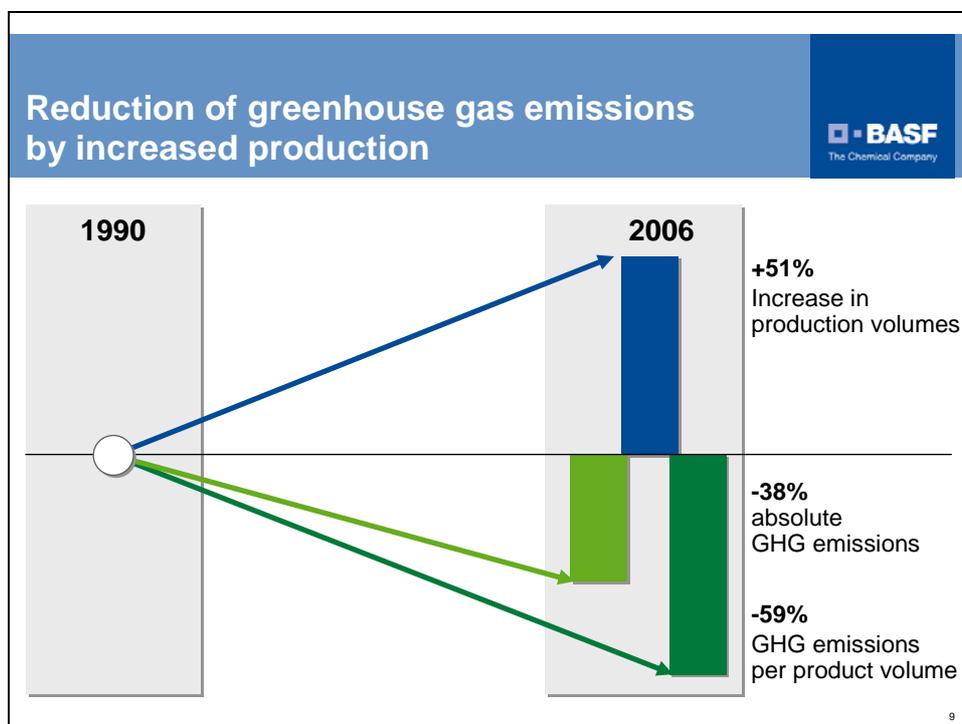


BASF primarily uses naphtha and natural gas as raw materials. Naphtha is obtained from crude oil in petroleum refineries. A full carbon balance must therefore include not only the CO₂ quantities from production, but also the emissions generated during transport and in the refinery. This is why BASF accounted for the entire supply chain for about 95 percent of the raw material volumes BASF purchases. BASF included not only the raw materials themselves but also products, such as the solvents and chemicals BASF needs for its production processes.

Production including energy

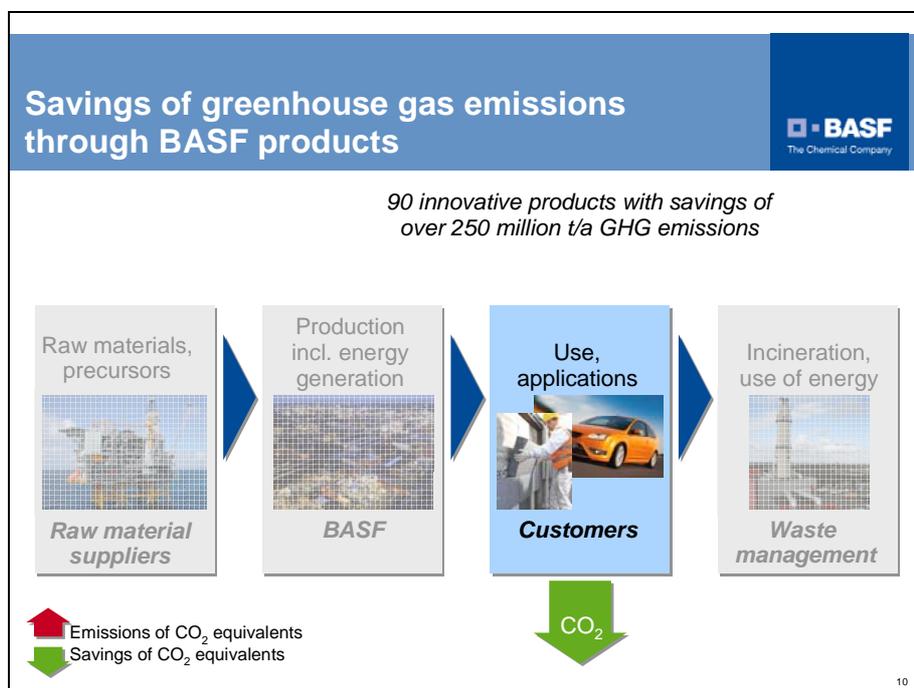


BASF reports its own emissions annually in the corporate report. In 2006, the production activities emitted 25 million metric tons of CO₂ equivalents. This figure includes direct emissions from the power plants and production plants and all indirect emissions from the generation of electricity and steam by the energy suppliers.

Reducing greenhouse gas emissions while increasing production

Since 1990, BASF has increased production by 51 percent and reduced its greenhouse gas emissions by 38 percent in absolute terms during that same period. The reduction was 59 percent per metric tons of product sold. At 25 million metric tons of CO₂ equivalents, less than half of the emissions generated over the lifecycle of BASF products are from its own production processes – despite the fact that it operates large power plants and world-scale production plants. The bulk of CO₂ equivalents comes from upstream and downstream steps in the value chain. On the one hand, this is due to the high efficiency of BASF's Verbund sites. On the other hand, it shows that a solid evaluation of a company's carbon balance requires a more comprehensive approach than has been the case to date.

Products



The second step was to look at the greenhouse gas emissions that are saved when customers – industrial customers and end consumers – use BASF products. BASF chose 90 key products that result in significant CO₂ savings. These savings were multiplied with the actual sales volume of these products.

The calculations factor in two categories of reduction effects: First, savings compared with the use of rival products, and second, saving compared with the non-use of BASF products – for instance, a house built with and without BASF insulating materials. BASF then conducted detailed eco-efficiency analyses. Such analyses always take account of a product's entire lifecycle and correspond to a full ecological footprint plus lifecycle cost analysis. A product's greenhouse gas potential is only one of numerous categories studied. The eco-efficiency analysis is a TÜV-certified (German industrial standards association certified) method that has been published in the scientific literature and has enjoyed widespread acceptance for many years. Five product categories contribute the most to CO₂ mitigation: insulating materials, industrial catalysts, fuel additives, performance products, and processes BASF licenses out. Some examples are:

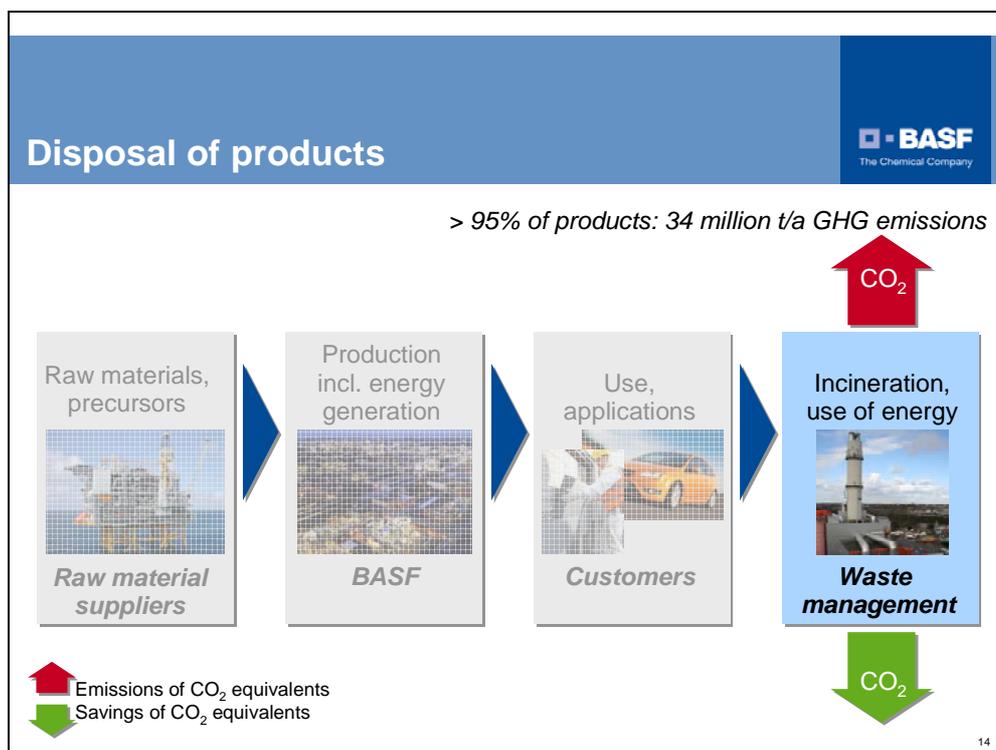
Product example – housing: Modern insulating materials supplied by the chemical industry can lower the amount of energy required to heat dwellings by more than 70 percent. In

combination with other innovative solutions, a number of low-energy dwellings throughout the world have been built, even to the point of creating what BASF calls a "zero heating-cost house."

Product example – mobility: Mobility is another area where products from the chemical industry contribute to energy efficiency. Examples are plastics that make cars lighter and additives for better utilization of fuels. Reducing the weight of a car by 10 percent equates to about 5 percent less fuel consumption. Furthermore, BASF fuel additives reduce consumption by another 2 percent.

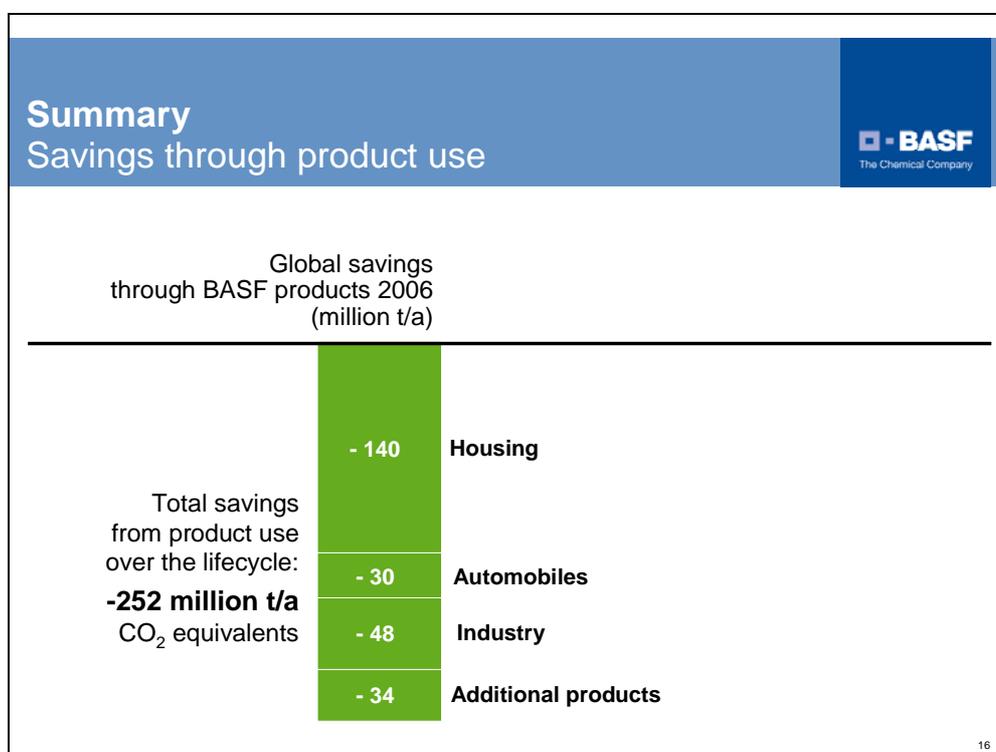
Product example – industrial products: Technology transfer to emerging economies is an important step toward better climate protection. BASF has set up a team of experts to assist that process. One such project involved retrofitting a plant from a Chinese chemical company with BASF technology to reduce emissions of the climate gas nitrous oxide (N₂O). This technology enables that company to reduce its emissions by 10 million metric tons of CO₂ equivalents per year.

Disposal



BASF products are disposed of at the end of their product life either by landfill or incineration. Recycling options also exist in some cases. The landfill approach releases the lowest amount of CO₂. However, the footprint conservatively assumes that all BASF products are disposed of by incineration. The energy thus obtained is used to generate electricity and is offset. Disposal of all products would produce a net annual CO₂ release of just under 34 million metric tons.

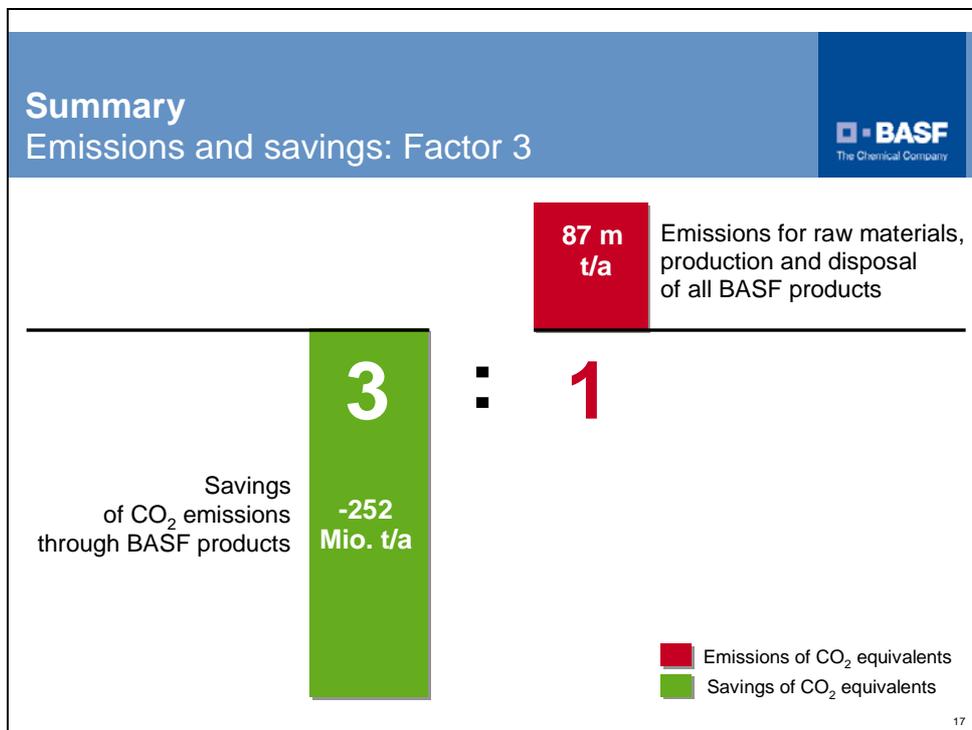
Product balance



The results of BASF's investigations are clear: Considering solely the emissions from sites and production plants ignores the enormous potential arising from the use of innovative BASF technologies and products.

BASF products help our customers to reduce CO₂ emissions – in housing, cars, and production activities. The products sold by BASF in 2006 enable savings of 252 million metric tons of CO₂ globally. This figure is equivalent to one-quarter of Germany's annual emissions.

Summary of Emissions and Savings



Adding up all the emissions from raw materials and upstream products involved in BASF's own production processes and disposal of all products results in a total volume of about 87 million metric tons of CO₂ equivalents. This illustrates again the importance of a comprehensive balance. The carbon savings BASF's customers achieve by using the products far outstrip the emissions produced by BASF's own business activities.

Factor 3

This is what it comes down to: The greenhouse gas emissions BASF's customers save by using the innovative products outweigh all the emissions from the manufacture and disposal of all BASF products by a factor of three. In the long term, BASF aims to maintain or even improve this factor by means of new products and innovations and by continued reduction of its own emissions.

To increase this factor, BASF develops innovative technologies and materials for sustainable climate protection. More than one-third of its entire research spending – about

€400 million Euros annually – goes into energy efficiency, climate protection, saving resources, and renewable resources.

Ambitious climate protection targets

It has been made clear why an all-round approach that takes into account the entire supply chain is essential for achieving a comprehensive carbon balance, and why more attention needs to be paid to products. Having said that, BASF naturally intends to continue its successful work to protect the climate and increase energy efficiency. In addition to the environmental protection goals which BASF defined in 2003, BASF has set itself more ambitious targets for the year 2020. They are aimed at reducing its greenhouse gases and increasing its energy efficiency.

Invisible contributions made visible

BASF has tried to make its “invisible contribution” to climate protection more visible with the help of the carbon balance. It is disclosing the emissions of its raw material suppliers, provides figures to quantify savings through the use of its key products by its customers, and includes disposal in the calculations. Climate protection is another area where BASF intends to be the world's leading chemical company – The Chemical Company.