

Today's solutions for tomorrow's problems

Bayer develops, utilizes and sells products and processes that enable us and our customers to use energy and material resources sparingly. A responsible approach to potential risks is particularly important for us.

Our environmental policy is currently centered around our commitment to climate protection. In 2006 – the year covered by this Report – we succeeded in keeping greenhouse gas emissions more or less constant despite a 4.4 percent increase in production volume (see page 65).

Bayer is participating in numerous international initiatives to support climate protection. In response to an urgent appeal by the Global Roundtable on Climate Change in February 2007, Bayer also signed the position paper “The Path to Climate Sustainability,” which calls on politicians to define serious, scientifically founded targets for reducing greenhouse gas emissions in the period after the expiry of the Kyoto Protocol (2012). It advocates a globally regulated climate protection policy that includes all the relevant nations, taking into account their respective capabilities. The reduction targets should not endanger economic development and economic growth. The Global Roundtable on Climate Change, which includes not only industrial companies but also many associations and scientific institutions, was initiated in January 2005 by Professor Jeffrey Sachs, Director of the Earth Institute at New York's Columbia University (United States).

In January 2007, Bayer and a number of other companies had publicly launched the project “3c: Combat Climate Change.” This campaign, too, aims to limit climate change and sets out to help politicians set a global framework for cutting emissions that offers all companies around the world fair competitive conditions.

Only recently, the Bayer Climate Challenge Program was established. It aims to identify solutions that will enable Bayer to contribute to climate protection and deal with the consequences of climate change (see pages 4, 24 and 46).

Energy-saving innovations: Tried and tested in Europe, introduced in China

In the international research institutions, Bayer engineers are working intensively on developing new technologies that lower costs and reduce the burden on the environment. Bayer MaterialScience is currently testing, for example, innovative processes for the production of two polyurethane starting products in Antwerp (Belgium) and Dormagen (Germany). One is aniline, which is used for the production of diphenylmethane diisocyanate (MDI) and toluene diisocyanate (TDI). The two processes consume up to one third less energy than their conventional counterparts. The test phase has been successfully concluded and the processes will in future be deployed on an industrial scale at Bayer's site near Shanghai, China.

The world's largest hydrochloric acid recycling unit is under construction in Shanghai. It will be able to produce 215,000 metric tons of chlorine from hydrochloric acid every year and will use the oxygen depolarized cathode technology (ODC). The plant is scheduled to go on stream in 2008. A hydrochloric acid electrolysis plant using the ODC technology with an annual capacity of 20,000 metric tons of chlorine already went on stream in Brunsbüttel in 2003 (see also Sustainable Development Report 2005, page 64). The advantage of this

process is the enormous energy saving: Compared with the established membrane process, the ODC process requires about 30 percent less electricity. The technical principle corresponds to that of a fuel cell. By feeding in oxygen gas, the electrolysis can be performed at a far lower voltage.

We are currently further refining this process with the support of the German Federal Ministry of Education and Research (BMBWF) to enable us to also apply the increase in energy efficiency to the production of chlorine from sodium chloride (chlorine-alkali electrolysis).

Saving fuel:

Creative solution developed

Our company contributes to climate protection not only by improving existing processes, but above all through its innovative products. Polyurethane insulating materials, for example, ensure that the amount of energy needed to heat or cool buildings is significantly reduced. Also, Bayer CropScience offers numerous solutions for use in the field of renewable raw materials (see page 24).

Another major challenge in this connection is to significantly reduce energy consumption in transport, because the number of vehicles and the amount of traffic is increasing at an enormous speed all over the world. Bayer MaterialScience experts are working on a particularly creative solution, although it is initially only suitable for niche markets: In conjunction with Swiss automotive visionary Frank M. Rinderknecht and his firm Rinspeed, they have developed a "glass" concept car with a completely transparent body and floor made of Makrolon® plastic. The two-seater fuel economy model is called "eXaxis" and was presented for the first time at the Geneva Motor Show in March 2007 – 40 years after Bayer first attracted attention in the automotive industry in 1967 with its "K67" concept model, the world's first all-plastic car.

The low fuel consumption of the eXaxis comes from Bayer MaterialScience's exceptionally lightweight but stable plastics. Nearly every part of the subgroup participated in the development of the vehicle, with products such as surface coatings and polyurethanes being involved.

Customer relations: Competitive advantage through environmental protection

Sony recently presented Bayer MaterialScience with the "Excellent Supplier Award." Bayer MaterialScience is the main supplier of the flame-retardant polycarbonate blend Bayblend®, which is used, for example, in flat LCD TVs. Bayblend's flame-retardant packages are free of bromium, chlorine and antimony. In addition, Bayer MaterialScience is listed with Sony globally as a "Green Partner" under the so-called "Green Partner Environmental Quality Approval Program."

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Greenhouse gas emissions under the international GHG Protocol

To be able to compare the greenhouse gas emissions data from companies worldwide, which had previously been collected using a variety of different methods, the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) got together to develop an international standard known as the Greenhouse Gas Protocol (GHG).

The GHG Protocol takes into account not only the direct emissions of a company – i.e. all emissions connected with its own activities – but also indirect emissions resulting from the generation of electricity and heat by external suppliers. A third category covers extended indirect emissions from starting products, logistics, the utilization and disposal of a company's products, business travel and employee commuting.

A major change has been made to the definition of emissions limits: Conventional reporting is performed for a company's consolidated activities in accordance with its annual report. According to the GHG Protocol, the greenhouse gas emissions for all previous years must be related to a company's structure in the current year and must be retroactively calculated to take account of that structure. By doing this, the GHG Protocol should ensure that emissions and reductions can always be unambiguously accounted for. This is a challenge insofar as companies such as Bayer develop dynamically over the course of time: They take over other enterprises, sell parts of the company or carve out certain operations. Consequently, the greenhouse gas emissions data have to be recalculated retroactively each time.

Measures to reduce greenhouse gas emissions

Since 1990, Bayer has carried out wide-ranging measures to reduce direct and indirect greenhouse gas emissions. Significant investments and efficiency increases have contributed to this.

Some milestones:

- ❑ Between 1997 and 2002, the chlorine-alkali electrolysis units were gradually converted from the mercury-cell to the membrane process (reduction: 0.4 million metric tons CO₂e/year).
- ❑ Up to 1999, the heat network of the sites was optimized with the aid of the "pinch point method" (reduction: 0.5 million metric tons CO₂e/year).
- ❑ In 2000, two outdated coal power plants were closed; since then, the power has been supplied by a modern gas and steam turbine plant from RWE AG (shift from 1.2 million metric tons direct to 0.6 million metric tons indirect CO₂e/year)

Steps that were taken to reduce emissions in areas of production that now no longer belong to Bayer are, under the GHG Protocol, eliminated from Bayer's emissions data reports. Instead, any measures undertaken in newly acquired companies before their integration into Bayer are covered by the retroactive adjustment of the emissions at Bayer.

Another significant advance made by Bayer with regard to climate protection since 1993 has been the incineration of the N₂O generated in the production of adipic acid, and the utilization of the resultant energy for the production process (4 million metric tons CO₂e/year). In 2005, the plant was transferred to Lanxess following the carve-out and is now no longer considered in Bayer's figures.

Bayer's greenhouse gas emissions according to the GHG Protocol

(in million metric tons CO₂ equivalents)

Greenhouse gas emissions	2004	2005	2006
Direct	4.30	4.06	4.05
Indirect	3.49	3.70	3.85
Total	7.79	7.76	7.90

Solutions for global water management

Efficiency is also the key issue when it comes to one of our most precious natural resources, water. At present, some 70 percent of the world's fresh-water taken from lakes, rivers and aquifers is used in agriculture, and the figure is rising. Global warming will make the water shortage even worse. Bayer AG's three subgroups have initiated projects on sustainable water management in their different business units.

At Bayer MaterialScience, a new process has been developed for the production of polycarbonate, enabling considerable volumes of process water to be saved.

Bayer CropScience, too, must adapt to changes in cultivation methods or in the use of agricultural crops. To discuss the effects of increasing water shortages and possible countermeasures, Bayer CropScience organized a workshop in October 2006 attended by representatives from its many different departments as well as external stakeholders.

Bayer CropScience is already involved in numerous projects to foster the efficient use and protection of water. Here are some examples:

- ❑ Providing solutions for healthy plants as these use water more efficiently,
- ❑ Introduction of integrated water protection methods in the areas of research, development and product stewardship,
- ❑ Encouraging land management programs to support better water management.

Supply networks:

Relined with new materials

In the United Kingdom, the provision of adequate drinking water supplies has become a problem, especially in the big cities. One of the reasons is old, leaking water pipes. In London, for example, one third of the expensively treated drinking water is lost because of leakages. A new coating system is now being used to reline damaged drinking water pipes on a permanent basis (see Sustainable Development Report 2005, page 61). Thanks to this coating, which is based on raw materials

from Bayer MaterialScience, pipelines can be relined permanently and also very much faster than before. The modern generation of inliners was used for the first time in 2005 in maintenance work in the United Kingdom. In 2006, the technology received the Queen's Award in the "Innovation" category, and, by the end of 2006, had also proved itself in other projects in Ireland, Norway, Spain and India.

Pharmaceutical residues in the water:

Investigations continued

Before we launch a new product onto the market, we carry out wide-ranging analysis, in the course of which we investigate its eco-toxicological potential for example. That also applies to our active pharmaceutical ingredients. With the introduction of environmental risk assessments for the licensing of new drugs in the EU, which has been obligatory since the end of 2006, the effects on the environment are now also regulated. We also evaluate on an ongoing basis active ingredients that are already on the market, especially hormones, antibiotics and contrast media. Toxicologists and ecotoxicologists at our company are very much involved in the scientific evaluation of environmental risks of our active pharmaceutical ingredients by carrying out research of their own. Based on present knowledge, there is no reason to suppose that either the x-ray contrast media or the antibiotics or hormones constitute any risk to the environment.

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Responsible handling of potential risks

The REACH Regulation requires all manufacturers and users of chemicals to accept responsibility for the safe handling thereof. As far as Bayer is concerned, this means that, for all substances and preparations we produce, we must provide product information and recommendations for their safe handling in all the applications known to us and should pass this on to downstream users. The same applies to our suppliers.

In order to implement the necessary registration, evaluation and, if necessary, authorization of chemicals in line with the Regulation, the Group Management Board is planning an internal Directive entitled "REACH Implementation in the Bayer Group," which will come into force in 2007. It will define responsibilities and necessary organizational and infrastructure conditions and give recommendations for implementation.

Pharmaceuticals, crop protection products and biocides are exempt from the compulsory legislation under the EU REACH legislation passed in December 2006 because they are already subject to their own comprehensive licensing regulations (see page 30).

Environment and health strategy: Prepared for dialogue

The European Environment and Health Strategy published in June 2003 sets out to determine on a broad basis any connections between environmental influences (e.g. chemicals) and health impairments. This gave rise to the SCALE Initiative, which focuses on children as a particularly sensitive section of the population. SCALE stands for "Science, Children, Awareness, Legal instruments, Evaluation." In the first step, which is scheduled to last until 2010, the initiative will focus on gaining a better understanding of the causes of respiratory diseases, asthma and allergies, and cancer as well as development anomalies and hormone malfunctions in children. This year, the European Commission will publish an intermediate report. So far, the

priority has been on collecting data, but the phase of political evaluation and implementation is now about to begin.

With its product portfolio, Bayer contributes in many ways to improving the living conditions of children. Moreover, Bayer shares the opinion of the European Commission that evaluating the effects of industrialization and industrially manufactured substances is an important step towards safeguarding the health of children. We are convinced that this should be done on the basis of the existing risk assessments, which contain all the necessary elements to ensure the safe handling of chemical substances. At the same time, it is important, in the scientific studies on possible risks such as for children's health, to take account of all the key aspects. Through its commitment to many programs like the international chemical associations' Long-Range Research Initiative, Bayer is participating in important research projects in this field.

An important part of any product development is the evaluation of the benefits and possible risks of a new technology or a new product. Bayer has been involved, for example, for a long time in safety research in the field of nanotechnology. Through its active membership of industrial associations – Bayer is a founding member of the DECHEMA working group "Responsible Production and Use of Nanomaterials" – and its participation in publicly sponsored projects, the company is amassing a wealth of fundamental knowledge in this field. In Germany, it is involved in two ongoing projects, NanoCare and TRACER. Both projects are supported by the German Federal Ministry of Education and Research (BMBF) as part of its "WING" initiative ("Materials Innovations for Industry and Society") and focus on the safety aspects of nanomaterials. In addition, Bayer MaterialScience is currently implementing a product stewardship program for carbon nanotubes, Baytubes®, in which their mode of activity is being analyzed and clarified. This will make an important contribution

to the further development of the test methods needed to ensure product safety.

Environmental compatibility:

New concept for sustainability check

Based on our experience with the Bayer Eco-Check introduced in 2000 for assessing product risks, we are developing a new tool that will enable us to present our activities on sustainable development in an overall context and thus track the changing demands of our stakeholders.

Added together, the many measures implemented throughout the company make an important contribution to easing the burden on the environment. Bayer is active in a number of fields. For example, the media services provider Dynevo (a subsidiary of Bayer Business Services) has been certified by the Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification Schemes (PEFC), and can now offer its customers the printing of publications on FSC/PEFC-certified paper. In return, Dynevo had to prove that the company is able to track every single stage of the production of printed media printed on certified paper – from the forest enterprise via the paper manufacturer and paper wholesaler to the consumer.

Genetic engineering:

Product safety ensured

Safety and environmental compatibility are the overriding considerations for our genetically engineered products, too. We do not sell such products or processes unless their safety and environmental compatibility can be ensured to the extent made possible by state-of-the-art science and technology. This is the commitment expressed in our “Policy guidelines for responsible use of genetic engineering,” which were issued in 1998 and revised most recently in 2006/2007.

Kogenate® from Bayer HealthCare is one example of a successful health care product that has been produced for many years using genetic engineering methods. This drug product for the therapy of

hemophilia contains over 2,300 amino acids and is the most complex protein molecule being manufactured using this technology.

Our canola seed, sold under the brand name InVigor®, demonstrates convincingly that plant biotechnology is safe; it has held a leading position in growing regions in North America since it was launched ten years ago. This seed, developed by Bayer CropScience, combines high yields and tremendous resistance to disease and unfavorable weather conditions with LibertyLink herbicide tolerance, and has become the most successful canola variety in the United States and Canada. Moreover, strong demand in the food industry for oil pressed from InVigor® canola is being driven by its positive nutritional profile.

High-quality canola oil with tailored properties is not only a useful component in a healthier diet but also points the way to solutions for increasingly urgent questions surrounding the future, such as climate protection and raw material supply issues. Against this background, research activities at Bayer CropScience are focused particularly on increasing yields – also under difficult climatic conditions – and developing plants which can provide energy.

Sustainable farming:

A balance between economy and ecology

The aim of the products supplied by Bayer CropScience is to increase the productivity of crops, improve their quality, and reduce loss of yield due to pests, diseases and weeds. In this way, the company can contribute to making optimal use of natural resources like soil and water, thus creating an efficient agricultural basis for a healthy food supply. The principle of integrated crop management, which Bayer CropScience supports, helps to further this goal. Its objective is to combine cultivation techniques, crop rotation, the selection of crop varieties, fertilizers, crop protection products and harvesting techniques in a way that best suits the individual location. This also means for crop protection that biological, biotechnological and

chemical methods of pest and weed control must be used in concert with each other. Chemical crop protection is used in a very targeted way. Land use in the context of integrated crop management helps to maintain and establish habitats, for example by encouraging the creation of field margins, which in turn leads to sustained biodiversity.

Crop protection products:

Support in dealing with obsolete stocks

Large quantities of obsolete pesticides have accumulated particularly in those countries where procurement was governed by planned economies rather than in response to farmers' needs. In Africa, many stocks are left-overs from pesticide donations provided under international development assistance programs, often decades ago. The products come from a variety of manufacturers. Bayer CropScience has played an important part in ensuring that over 10,000 tons of these obsolete crop protection products have been disposed of safely since 1990.

Further progress is expected to be achieved by the "Africa Stockpiles Programme." This 15-year multi-stakeholder project, in which the World Bank, the UN Food and Agriculture Organization, the UN Environment Programme, the conservation organization WWF, the non-governmental organization PAN (Pesticide Action Network) and industry are involved, is intended to help with the disposal of obsolete pesticides from Africa. A meeting of all stakeholders, at which Bayer CropScience was also represented, was held in September 2006 in Cape Town, South Africa. Future action and specific measures to be taken were determined for the seven designated priority countries: Ethiopia, Mali, Morocco, Nigeria, South Africa, Tanzania and Tunisia.

Animal studies:

Reduced as much as possible

Studies involving animals – mainly rats and mice – are legally stipulated and will continue to be an indispensable part of developing safe new active substances and products. The requirements of the

EU's new REACH Directive in fact reinforce the need for these studies. This subject concerns all three Bayer subgroups. The company is part of a broad-based industrial coalition whose aim is to improve the welfare of animals used in studies and to continue reducing the number of animals used in each test (see also the Sustainable Development Report 2005, page 36).

ERAPharm (Environmental Risk Assessment of Pharmaceuticals) is a project supported by the European Union. Experts from Bayer Schering Pharma, Berlin, Germany, are involved in the project as scientific advisors. The emphasis is on identifying potential environmental risks associated with human and veterinary pharmaceuticals. The first results of the project will be presented at a conference in September 2007. The long-term impact of hormones is another important topic. Bayer Schering Pharma is carrying out ecotoxicology studies with fish to establish the effect of hormones on their development and reproduction. The objective of these studies is to evaluate concentrations of these substances which are relevant to the environment as they can be transferred to surface waters from effluent cleaning plants. Estrogens have been characterized in detail, and studies are now being expanded to cover progestins.

Germany:

Current topics from the Chemical Parks

The Trianel Group is planning, on behalf of public services and regional utilities, to build a coal-fired power plant in the Krefeld-Uerdingen Chemical Park. It will supply the Chemical Park with process steam and electricity, and local households and companies in the region with electricity. The benefit of combined heat and power units is their efficient, environmentally friendly generation of energy. When the project is finished, two older coal furnaces in the Chemical Park will be able to be switched off. The new power plant will have higher efficiency, better energy yield and – in relative terms – lower CO₂ emissions. The power plant will thus make an active contribution to climate and environmental protection. In the region, it could help to safeguard

the competitiveness of the site and thus help to save jobs. The permit procedure has been initiated by the Trianel Group.

Carbon monoxide (CO) is an important chemical building block. Bayer needs it to manufacture high-grade materials. To ensure a reliable supply of raw materials, Bayer MaterialScience has decided to build a 70 km pipeline for transporting carbon monoxide gas between the Chemical Parks in Dormagen and Krefeld-Uerdingen. To ensure safe operation of the pipeline, comprehensive safety precautions, a modern leakage alarm system and an emergency response plan will be put in place. Not only do these precautions go beyond the legally required level, the pipeline will also contribute to reducing emissions: With the aid of modern production processes, CO₂ generated in the Dormagen Chemical Park can be used for CO production and, for example, fed to the production plant in Krefeld-Uerdingen. This means an annual saving of 70,000 metric tons of CO₂ emissions. In addition to this, the pipeline will enhance the competitiveness and safeguard the future of the Chemical Park. In February 2007, Bayer received official approval for the plans to build the pipeline. The aim is to have the CO pipeline up and running before the end of this year.

Mercury:

Solution to a global problem

The increasing mercury content of the atmosphere is becoming a serious problem throughout the world, because the concentration of this toxic heavy metal is increasing by around 1.4 percent a year. More than 70 percent of it nowadays stems from the gases generated by industrial combustion processes (primarily coal), and less than 30 percent from natural sources.

To remove mercury from flue gas, use is generally made of activated carbon filters at the end of the flue gas treatment operation. However, the process is rather cost-intensive and, even in modern German power plants, reduces the mercury output by only 70 percent. In contrast, the Environmen-

tal Services Business Unit of Bayer Industry Services has been using a process of its own in its incineration plants that eliminates up to 99.9 percent of the mercury from the flue gases. The process is highly effective and also relatively inexpensive, with the result that this innovation from Bayer Industry Services has been put forward for the German Environmental Award 2007.

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Focus on climate protection:

Improving energy efficiency with Bayer materials

Climate change is developing into one of the biggest threats to man and the environment. Bayer has been well aware for many years of the need to act, and is constantly striving to reduce greenhouse gas emissions in all its production processes. A far greater role with regard to climate protection, however, is played by some of the modern-day materials produced by Bayer MaterialScience that help to minimize the amount of energy consumed in buildings, appliances and vehicles.



“Companies can and must solve the problems by becoming increasingly energy-efficient and developing new technologies.”

Matthias Machnig, State Secretary at the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Matthias Machnig, State Secretary at the German Ministry of the Environment, speaks of “historic resolutions” when asked about the European climate protection targets. The EU has resolved to cut its emissions by the year 2020 to 30 percent below their 1990 level. Machnig is convinced that Germany, as Europe’s largest industrial nation, can assume a pioneering role in this: “The successes achieved by German industry in the field of energy efficiency show that investments in climate protection are well worthwhile from both an ecological and an economic point of view.”

Peter Vanacker, a member of the Executive Committee of Bayer MaterialScience and Head of the Polyurethanes Business Unit (PUR), can categorically confirm this: “Through our global environmental management system, we have been able to considerably reduce absolute and specific energy consumption.” Climate protection is not just a benchmark of the responsibility for tomorrow, underlines Vanacker, “because we also lower our energy costs in the process.” This is not exactly an unimportant argument, because chemical production is highly energy-intensive: At present, the provision of energy accounts for around five percent of overall production costs worldwide.

For the next few years, Bayer has therefore set itself an important goal: By 2015, the specific energy consumption and therefore also the volume of specific greenhouse gas emissions per metric ton of product sold will be cut by a further ten percent (based on 2005). One key area of investment will be that of gas phase phosgenation. “With this innovative process for the last reaction step in the production of toluene diisocyanate (TDI), we can achieve energy savings of around 40 percent,” explains Vanacker. TDI is a key raw material in the production of flexible polyurethane foam, which is used throughout the world in enormous volumes. “In addition to this, we are continuously optimizing our conventional production processes,” continues Vanacker, “for example through the use of waste heat to generate steam.”

Climate protection: A growing market

Yet the positive economic effect of climate protection is not restricted to improved ecology in production. In fact, the demand for new technologies and materials is opening up new markets for innovative companies: “Market studies carried out by strategy consultants Roland Berger put the world market volume for energy efficiency technologies at around €450 billion,” says Matthias Machnig. “This shows that the assumption that growth

is bad for the environment is simply outdated: Companies can and must solve the problems by becoming increasingly more energy-efficient and developing new technologies." Peter Vanacker also sees such opportunities: "Our products can make a major contribution to slowing down climate change. Bayer MaterialScience, in particular, supplies materials that help to reduce power consumption in buildings and transport" – two areas to which State Secretary Machnig also attaches considerable importance: "In the entire building heating sector, at least 40 million metric tons of CO₂ a year can be saved throughout Germany through building modernization and renovation measures." The German government therefore quadrupled its subsidies for improving the energy efficiency of buildings to €1.4 billion in 2006.

Plastics enhance energy efficiency

Against this background, Peter Vanacker says that the most important product in the Bayer portfolio with regard to climate protection is raw materials for rigid polyurethane foam, which has been successfully used for many years to provide highly effective insulation in refrigerators, pipelines and buildings. The Bayer expert sees enormous market potential above all in the growth markets of Asia, the Middle East and eastern Europe.

"Since the manufacture of some of these materials uses up considerable amounts of energy," says Matthias Machnig, "it is important to look at the entire lifecycle of the product. After all, six percent of the crude oil consumed in Germany goes into the production of plastics." In turn, however, a large proportion of these plastics serves to reduce energy consumption. In the case of polyurethane, the lifecycle assessment is extremely positive: Vanacker estimates that the reduction of CO₂ emissions attributable to polyurethane insulation currently in place is at least 90 million metric tons a year.

In future, the field of application for polyurethanes will expand. For example, Bayer is working on processes for the more economical production of photovoltaic modules. "At present, the encapsulation of the solar cells in an aluminum frame accounts for around 30 percent of the

selling price of solar panels," explains Vanacker. "This problem could be alleviated by using a time, cost and energy-saving frame made of Bayflex® polyurethane foam." In addition, Bayer is switching over increasingly to the use of renewable raw materials, for example in the production of polyols, an important raw material for polyurethane. Some polyols already contain up to 25 percent sugar. "Fairly recently, successful trials have also been performed with the introduction of vegetable oils so that the content of renewable raw materials in some polyol grades could in future be increased to as much as 60 to 70 percent," adds Vanacker.

Fuel savings through lightweight materials

The second concern of climate protection experts is the worldwide increase in public and goods transport. In Germany, vehicles already account for around one fifth of total carbon dioxide emissions. The German Federal Environment Ministry wants to stimulate innovation in vehicle engineering at a European level: "The average CO₂ emissions of new cars should be lowered by an EU Directive to 130 g CO₂ per kilometer by 2012," says State Secretary Machnig.

Since the weight of a vehicle has a major influence on its fuel consumption, it opens up an enormous field of activity for Bayer: "We are performing intensive and successful research on new lightweight, high-performance plastics that further reduce the weight and thus the fuel consumption of vehicles," explains Vanacker. For every 100 kg of weight saved, consumption goes down by up to half a liter per 100 km.



"Our products can make a significant contribution to slowing down climate change."

Peter Vanacker, member of the Executive Committee of Bayer MaterialScience and Head of the Polyurethanes Business Unit



Prize-winner.

The Otto Bayer Prize is one of the most renowned awards for scientists in Germany. Now to be among the winners fills me with pride and gratitude. Such awards are more than ever proof that basic research is receiving sufficient recognition. I very much hope that our advances in catalysis research will also help develop new active ingredients. The possibility of now being able to produce a natural anti-tumor substance synthetically is a good start.

PROFESSOR ALOIS FÜRSTNER

Director at the Max Planck Institute
for Carbon Research, Mülheim an der Ruhr;
awarded the Otto Bayer Prize in 2006

