2003

Perspectives
Today's ideas for tomorrow's world

Münchener Rück
Munich Re Group

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Dear Reader,

Risk is our business. As the world's leading reinsurer, our fundamental responsibilities include not only risk assessment and risk management, but also and above all protection against risk. This requires us to monitor long-term trends throughout the world, both with regard to natural hazards and in terms of social and technological processes. Such developments as those observed in the context of global climate change, genetic engineering, and demographic structures not only have a direct impact on our risk portfolio but also affect us as a major institutional investor and as a listed company. Our know-how thus constitutes a challenge and an obligation to provide the right stimuli to trigger necessary changes. For us, sustainability is not a concept we only pay lip service to: it is a fundamental aspect of our entrepreneurial activity.

Financial analysts have also established a link between a company's achievements in the area of sustainable development and the performance of its shares. This effect is not reflected in day-to-day prices and only becomes evident in the long term. This rigorous attention to sustainability on the part of financial analysts is prompted by the following idea: the more a firm succeeds in integrating ecological and social criteria and future trends in its business, the more competitive and profitable it will be. Sustainable development consequently has a positive long-term effect on the company's value.

This has also given rise to a growing demand for greater transparency in business. Firms are increasingly being required to prove that they are acting in a responsible manner. We have succeeded here, for Munich Re shares are included in the leading sustainability indexes and funds.

In addition, new markets are developing due, among other things, to international agreements on climate protection. The system of emissions trading to be launched in the EU in 2005 offers a great opportunity to reduce greenhouse gas emissions with the aid of market economy mechanisms. It is up to industry and politics to establish the basic conditions for a smoothly functioning trading system, with investors and insurers playing a key role. In this context, we provide, as a leading risk carrier, "development aid" when new technologies are launched, as in the case of renewable energy sources. Without insurance of the numerous associated risks, it would be vastly more difficult for these new technologies to penetrate the market and meet vital development targets.

Here too it is a question of Munich Re managing risks efficiently because we know more about them – in keeping with the sustainable development of our company and the world we live in.

Munich, July 2004

Stefan Heyd

Prof. Dr. Dr. Peter Höppe

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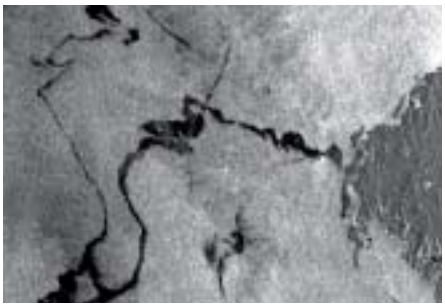

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The environmental report

Skating on thinner ice

Climate change is a fact. What kinds of response are open to us? And how far removed are we from realising our options? What about international environmental policy? This article by Prof. Dr. Klaus Töpfer, Executive Director of the United Nations Environment Programme (UNEP) and former German Environment Minister, provides some surprising answers.

By Prof. Dr. Klaus Töpfer

No-one would dispute today that climate change is happening. The change is already demonstrable and has long ceased to be an ominous cloud on a distant horizon. It has in some cases been drastically proved by the results of measurements. Every year, the ice on the Tornio river in Finland, for instance, breaks earlier than in the past. The Arctic ice is already 1.3 m thinner on average and the Norwegian Environment Ministry has calculated that the Arctic is losing 3.5 billion m^3 of ice every year. The impact on nature is immense. Hundreds of examples could be quoted here. The general public must realise that our climate is already changing and that we must come to terms with it. In this article, however, I am more interested in the next step, namely the answer to the question of which strategies we can pursue in the light of climate change and how we are responding.

Strategies for a world with a changing climate

How can we respond to climate change? Essentially, we have three possibilities: one is *mitigation*, reducing the emission of substances harmful to our climate; the second is *adaptation*, adjusting to the new climate; and the third is *compensation* – which means, in this context, repairing or replacing the damage done.

The possibility of *mitigation* was raised very early on by researchers. They investigated the emission of gases affecting our climate, such as carbon dioxide, methane, and nitrogen oxide, as well as ways of reducing these emissions to a tolerable level for our climate. The United Nations Framework Convention on Climate Change obligated the countries of the world to emit fewer pollutant gases. This climate convention will only become valid when it has been ratified by the nations: no fewer than 170 have done so to date. Yet conventions alone are not explicit enough; they must be specified in concrete terms in so-called protocols, such as the Kyoto Protocol.

But the Kyoto Protocol has not come into force yet. For this to happen, it must be ratified by 55 nations – that is the first condition to be met. So far, it has been ratified by 123 countries. In addition, however, it must be ratified by enough industrialised nations to cover 55% of all emissions worldwide – a condition which had still not been met in spring 2004. The USA is responsible for 35% of all emissions and Russia for 17%. As long as these two countries do not ratify the Kyoto Protocol, all the other nations together cannot achieve more than 48% in total. This places Russia in a key position. In addition, even those nations which have ratified the Kyoto Protocol and undertaken to reduce their emissions often fail to do so. Some Eastern European countries, for example, have objected that they are required to reduce their emissions in relation to the level in 1990 – when their economies and therefore also their emissions were at a very low level. Instead of cutting back their emissions, some of these countries are now emitting more than before.

The USA is similarly miles away from achieving the goal set by the Kyoto Protocol (which they have at least signed, although not ratified!). Even Germany, which for a long time played a model role here, has drifted "off course". This is because emissions dropped appreciably in the 1990s following the closure of lignite-fired power plants, for example, but this trend has not continued in recent years.

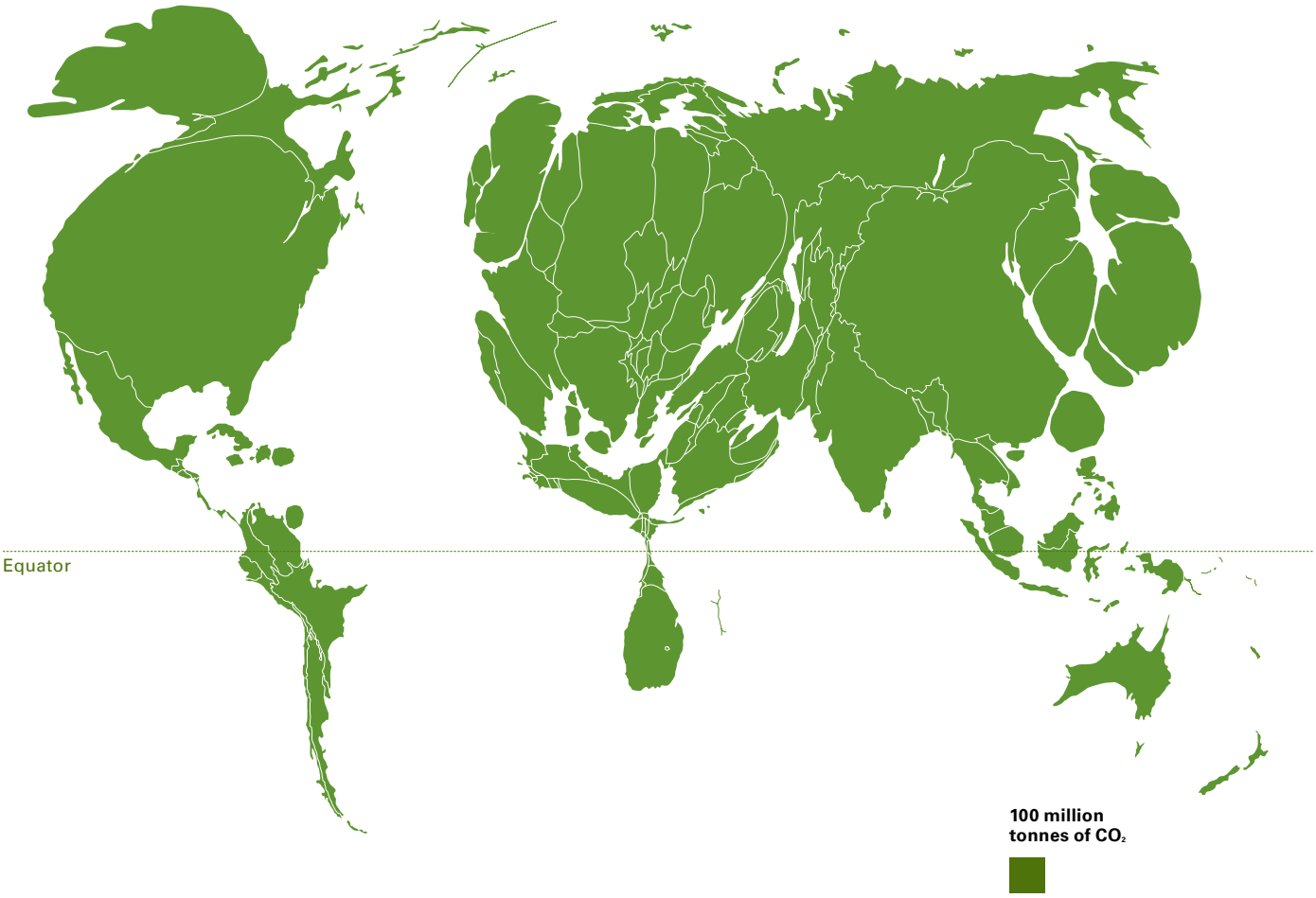
Reducing the emission of climate change gases is not unrealistic and certainly not an uneconomical fantasy dreamt up by environmentalists. We have the alternative technologies with which to reduce the inefficient use of such fossil fuels as coal and oil. Modern power plants are twice as efficient as they were just a few decades ago and alternative forms of energy, such as solar energy or wind energy, have left their teething troubles far behind.

"Reducing the emission of climate change gases is not unrealistic and certainly not an uneconomical fantasy dreamt up by environmentalists."

Prof. Dr. Klaus Töpfer

For the last six years, Prof. Dr. Klaus Töpfer, the Federal Minister of the Environment from 1987 to 1994, has been head of the United Nations Environment Programme (UNEP). UNEP was set up 32 years ago; its headquarters are in Nairobi, Kenya. Töpfer believes this is the best possible location. He is constantly urging the world to consider the environment and development as two sides of a single coin.

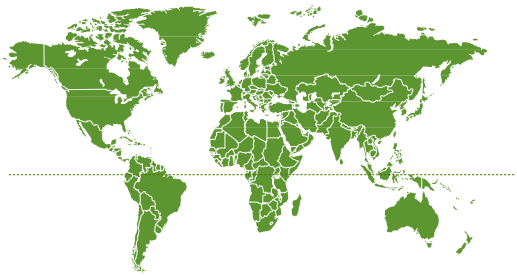
Global CO_2 emissions



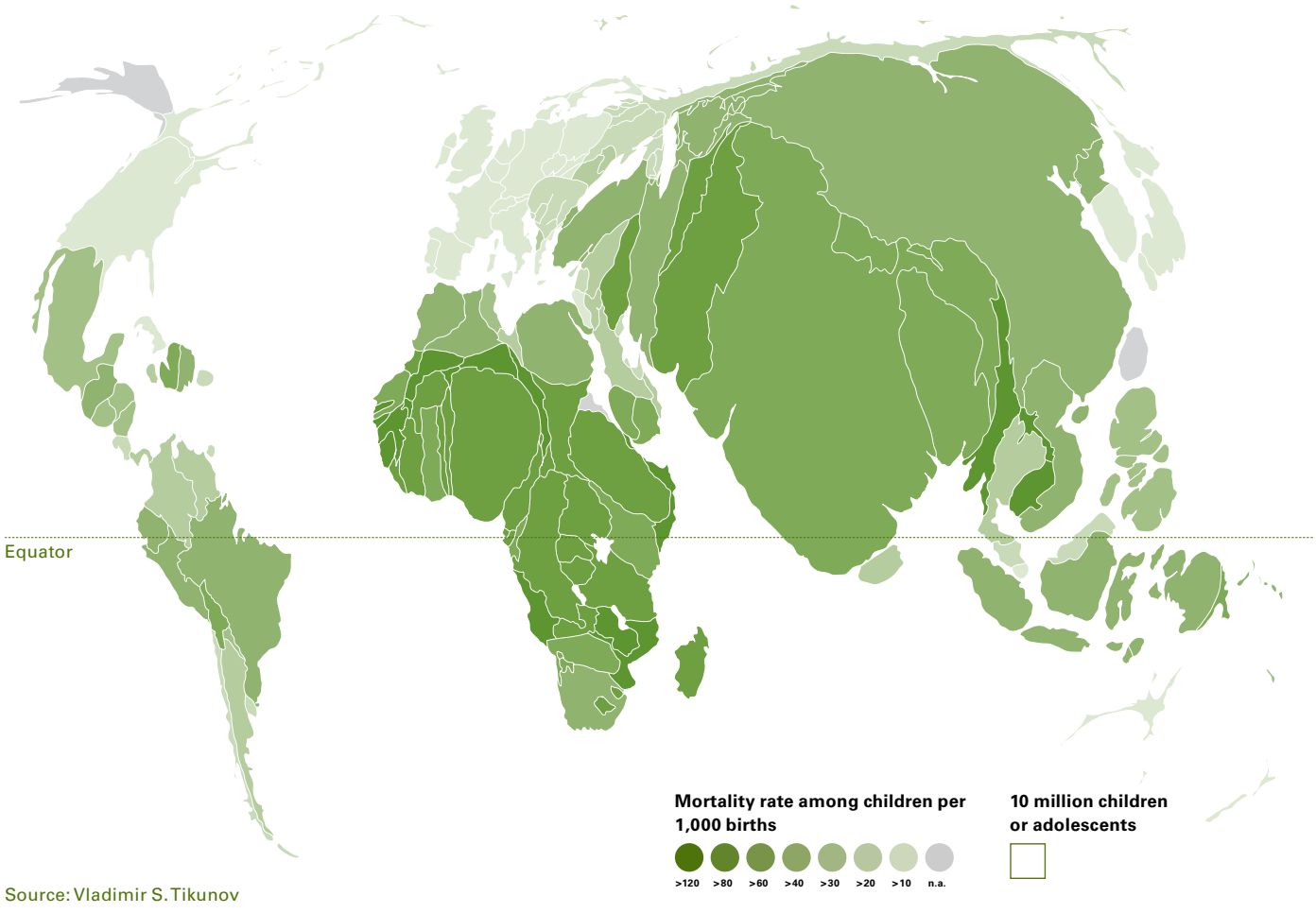
Source: Vladimir S. Tikunov

Who is responsible for industrial CO_2 emissions? An unusual perspective. In this map, the countries of the world are weighted according to their CO_2 emissions. The imbalance between the continents clearly shows that the energy-hungry north blows the most greenhouse gas into the atmosphere.

Bottom right: For the sake of comparison, the countries of the world seen from the usual perspective.



World population under 15 years of age



Source: Vladimir S. Tikunov

The surfaces of the individual states in this map are not shown within their true boundaries. Rather, they are based on the number of their population under 15 years of age. The map therefore shows where the largest demand for energy is to be expected in the future: in the developing and emerging countries. To satisfy this demand with fossil fuel sources would raise CO_2 emissions enormously and would trigger a tremendous political struggle for access to the deposits.

The question of alternatives to fossil fuels must therefore be considered in the industrial countries as in the developing and emerging countries.

In December 2003 the staff at Munich Re followed Klaus Töpfer´s talk with interest and curiosity.

Fuel cells powered by methane, ethanol, or hydrogen are no longer confined to laboratories. Most carmakers including Toyota and DaimlerChrysler have at least one prototype undergoing road tests.

The goal set for what is known as the first phase of the Kyoto Protocol – namely to reduce carbon dioxide emissions by slightly more than 5% between 2008 and 2012 – is modest. The Protocol is flexible and offers governments and industry a variety of possibilities for reducing emissions at home or abroad – including emissions trading.

The European Commission anticipates that as a result of emissions trading in Europe the costs incurred in reducing climate-change gases will be cut by 35% by 2010. This would mean savings of €1.3bn.

Instruments such as the Clean Development Mechanism allow industrialised nations to set off their own emissions against investment in developing countries. Such projects will not only give poorer nations access to urgently needed electricity schemes but also bring considerable advantages to the industrialised nations. These investments can help to win new markets, promote exports, and create jobs.

Creative tax systems that stimulate technological innovation and new lifestyles are another aspect.

The Kyoto Protocol is not a blueprint for economic disaster. On the contrary: in the long term, it will bring affluence and savings instead of economic suicide. Munich Re has calculated that natural catastrophes due to climate change resulted in economic losses totalling US$ 65bn in 2003. Then there is the cost of health damage due to air pollution and the loss of natural resources and eco-systems.

Developing countries are already reeling under the effects of the climate change which industrialised nations have unleashed on the world and are therefore demanding that the industrialised nations at least help them with the second possible reaction, *adaptation*. What form could such adaptation take? One possibility is to be found in industrialised nations in winter: as the snowfall boundary rises ever higher and less snow falls in the valleys, they resort to the use of snow cannons or build indoor skiing halls called snow domes. Technology is replacing nature. Paradoxically, however, so much energy is needed to produce artificial snow that it is boosting the greenhouse effect and driving the snowfall boundary even higher. In this case, *adaptation* is creating a vicious circle.

Adaptation means replacing nature with technology. Many people believe that *adaptation* is our only alternative. But what chance does a small, flat island nation have to adapt? The only remaining option is compensation: those who cannot adapt can at least demand *compensation*. And that opens up a wide field for liability law.

"Human action always involves risks. The ability to make a decision in the light of complete information is a divine attribute – if we humans had complete information, we would never get anything done."

Prof. Dr. Klaus Töpfer

Looking ahead

One much-uttered comment on the subject of climate protection is that these are "all just forecasts". Environment politicians are well known for foretelling scenes of doom and gloom that somehow never come about. The forests have survived despite having been declared as good as dead on many occasions. Was it wrong to predict that the forests would die? I do not think so, for we environment politicians like to forecast trends precisely in order to prevent them becoming reality. Simply because the predicted events do not materialise does not mean that the prognosis was bad. On the contrary: a socially effective prognosis is particularly significant when predicted events are prevented from materialising on account of that prognosis. The purpose of looking ahead to what could happen if the climate continues to change is to stop that process of change. Prognoses are meant to be provocative.

According to the Intergovernmental Panel on Climate Change, the world temperature will rise by between 1.4 and 5.8°C in the course of this century. Politicians ask whether we can be sure that this will be so? Should we act now? The answer is philosophical: human action always involves risks. The ability to make a decision in the light of complete information is a divine attribute – if we humans had complete information, we would never get anything done. This is the ancient wisdom inherent in the detective paradox: if the criminal and the detective are both fully informed, neither will act because each knows exactly what the other will do. Making decisions with incomplete information is consequently a classical human situation for triggering political action. This premise was set out as the "precautionary approach" (Principle No. 15) in the Earth Summit Declaration issued in Rio de Janeiro in 1992: "In order to protect the environment the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Environment politicians have often been told that the precautionary approach principle is unscientific. It is in fact a necessity.

In keeping with the precautionary approach, UNEP is investigating various possible reactions, such as the question as to whether particle emissions could counterbalance global warming. It also draws up prognoses of what could happen if permafrost were to thaw. Permafrost is a permanently frozen region, such as in Siberia. Would global warming receive a sudden boost if this region were to thaw, because the permanently frozen ground contains vast quantities of methane which is known to have a highly detrimental effect on the climate? The basic question behind all these efforts is: how does human activity affect the conditions for life on earth? And how can we stop the injustice of industrialised nations exporting and globalising their environment problems? One thing is clear: only an efficient multilateral system can provide the answers. We need the cooperation of the 191 member states of the United Nations more urgently than ever before.

World Bank and IFC guidelines: Promoting sustainability in the insurance industry

Protection of the environment, nature and climate, social affairs and health have been aspects of sustainable development for many years – also in the insurance industry. The environmental and social standards drawn up by the World Bank and the International Finance Corporation (IFC) may serve as central elements of risk prevention in the underwriting context.

By Utz Groetschel

The insurance industry was well advised to analyse the subject of natural and ecological catastrophes in detail. Result: the enormous population growth and accumulation of ever greater assets in many regions have resulted in insured losses running into the billions when "rich" coastal regions are flooded, for example. Modern society has become extremely vulnerable and sensitive with its expensive and highly developed technology and economy. Worldwide records and detailed meteorological studies show that such occurrences as heatwaves, droughts, windstorms, floods, and hailstorms are becoming more intense and more frequent, even in countries with a temperate climate, such as the UK and Germany. It is now a well-known fact that the reasons underlying natural catastrophes are by no means as natural as one might think. The growing burden of losses due to natural catastrophes cannot be explained purely by the higher population density in regions exposed to storms or floods. Rather, natural catastrophes and climate change are largely determined by the industrial activities and transport needs of a rapidly growing population.

Prevailing opinion in the insurance industry holds that developments can be assessed and that risks and their accumulation can be controlled. The necessary reinsurance capacity could also be made available with adequate controls. But: the uncertainties are growing and it is above all doubtful whether the higher prices required for insurance cover can be enforced and paid. At the same time, there is growing concern that risk exposure in third-party liability and health insurance could increase as a result of environmental damage and change – firstly because the ecological problems are escalating and secondly because legislative requirements are becoming more stringent. Liability regulations are becoming more stringent and more complex, not only in the developed nations; the developing nations are also becoming more aware of their social and ecological responsibility and are implementing this accordingly in their statutory regulations. Insurers are therefore rightly concerned about the potential losses covered by their policies.

These are just a few of the reasons underlying the insurance industry's growing environmental awareness. Insurers will have no choice but to actively take steps to protect the environment, for the statutory regulations and precautions implemented by industry are far from sufficient, particularly in the developing countries. Above all, however, it is the industrial activities of our own society that are affecting the environment, nature, and our climate. The measures implemented by industry should therefore also have a positive effect on these impacts.

Property insurers are often closest to the risk. In the case of technical plant, they primarily assess and underwrite the potential property and business interruption loss. Poor quality and safety can be discussed by the policyholder, insurer, and reinsurer, and the insurance cover can be made contingent upon maintenance, inspections, and protective systems.

Plant technology in the 19th century: Borsig's foundry and machine factory in Berlin, 1847.

The combined cycle power station at Rye House, north of London, produces electricity with a high thermal efficiency and low emissions of pollutants.

However, an industrial firm's quality and safety also influence other classes of insurance business, such as third-party liability and worker's compensation insurance, health, or life insurance. This is because the firm's staff, third parties, and the environment all benefit from the prevention or reduction of property losses, as well as from compliance with certain minimum standards. The various classes must therefore be considered jointly – property insurance on the one hand and third-party liability, worker's compensation, health, and life insurance on the other – so that the exposure of the risks covered in other lines is not ignored when underwriting property business.

The inspections and risk assessments of industrial facilities, which are primarily undertaken by property insurers, should include a consideration of where there might be overt or latent liability and health risks. Such a holistic approach makes it possible to assess the risks associated with industrial plant more effectively and more efficiently; it also allows the insurer to discuss means of countering the identified risks and shortcomings with the policyholder.

In such a "risk partnership" we implement, among other things, the guidelines of the UNEP insurance initiative. In specific cases, using our own means to help in reducing pollution, conserving natural and mineral resources and protecting the global climate can also mean supporting the implementation of internationally recognised standards, such as those of the World Bank or International Finance Corporation (IFC).

The World Bank and IFC have drawn up standards and guidelines for a whole variety of critical branches of industry and infrastructure projects: from production of aluminium through dairies to the pulp and paper industry. The technological requirements to be met by new breweries are identified in the standards as are the specific risks and hazardous substances associated with petrochemical plants and the recommended safety precautions.

By directing their attention to the environmental and social aspects associated with risks, the underwriters who assess and possibly also inspect risks in property business play a major part in risk prevention – for their own portfolio and in the interests of other insurance lines. Taking into account the possibly long-term effects, such as the impact on global climate change, is particularly important in this context.

Electricity from the North Sea

The German federal government is planning many large wind farms in the North Sea. A great challenge but also a major field of business for insurance companies.

Source:
Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety

The wind in their wings

The first two offshore wind parks in German waters will be located north of the North Sea islands Juist and Borkum. Almost 30 more are planned – with investments worth hundreds of millions. Despite all the difficulties, Munich Re has accompanied such plants from the outset as the leading reinsurer.

By Alfred Fackler

The wind sector has already proved onshore that it can seize its opportunities without wasting time: in 1992, the roughly 1,200 wind power plants in Germany supplied just 0.05% of the country's electricity. Little more than ten years later – in late 2003 – the 15,387 wind plants now installed provided no less than 6% of the country's electricity in a year with average wind strength. Wind energy is also on the advance throughout the world, primarily in Spain and the UK, but India, China, and Australia are also opting for wind power. In 2000, the International Wind Energy Agency predicted that wind power would account for 22% of the world's electricity by 2040. In Germany, offshore wind power offers the best prospects for future growth as many good onshore wind-energy locations are already occupied. German authorities forecast that wind power plants with a total output of up to 25,000 MW will eventually be operating in the country's North Sea and Baltic waters.

Most of the plants in German waters will be almost invisible from the shore and the continual, stiff sea breeze guarantees a high energy yield.

Munich Re has already acquired experience in the construction and operation of the world's two largest offshore wind parks at Horns Rev and Nysted-Rødsand in Denmark and can now make use of this experience in future projects. From the very beginning, the company agreed to provide reinsurance for such plants and has developed terms meeting the special demands of such offshore projects. Munich Re is negotiating with primary insurers, manufacturers, and operators so that it can offer concepts commensurate with the risk to cover these operations. One project has already been underwritten in the Baltic.

Wind turbines being loaded onto a ship.

Insurers had been unable to collect much useful empirical data with offshore wind parks until 2001: almost all the wind turbines erected in the sea before then were located in shallow waters off the Baltic coast.

Offshore wind parks in the middle of the North Sea present very different challenges, yet insurers lack the statistical data and experience necessary to appraise the associated risks. Through comparison with existing technologies and risks, however, insurance experts can draw conclusions that permit insurance cover even without specific statistical information. In the case of offshore wind parks, Munich Re has combined its experience in underwriting offshore oil platforms with its experience of onshore wind power plants, with the result that it can already offer insurance solutions.

The example of Horns Rev

The world's largest wind park, Horns Rev, is expected to prove that offshore technology can meet these requirements. Since 2002, 80 wind turbines have been in operation amidst the North Sea waves, between 14 and 20 km from the sandy beaches of mainland Denmark. The wind park delivers sufficient electricity to supply 150,000 Danish households. The annual yield is in the order of 600 million kilowatt-hours.

The park's construction was in itself a series of challenges: first of all, so-called mono-pillars (steel tubes roughly 4 m thick) had to be rammed 25 m into the seabed for the foundations. The water is between 6 and 14 m deep at this point and the individual turbines are 560 m apart. Special ships were needed to set up the wind power plants with their rotors measuring 80 m in diameter. The towers bearing the nacelle with generator and rotor are 70 m tall. Each tower weighs 160 t, each nacelle 79 t.

In order to ensure that the immense investments pay off, turbines with maximum power output are installed in offshore wind parks. However, this also means that the plants must always be at the forefront of technological development. It is almost impossible to test them adequately on land. As a result, for example, 3.6 MW plants were installed in an offshore wind park in Ireland although their first prototype had only started operation a few months earlier!

Rotor hub of a turbine at Horns Rev wind farm. One blade weighs 6.5 t.

Wind: A source of energy but also a risk factor

Offshore wind parks are exposed to a whole series of risks: they have to withstand the rough weather – wind, the motion of the sea, salt water, spray, and ice attack and corrode the material, causing problems with the electrical insulation. Storms, ice, and lightning flashes damage the rotor blades. Although modern rotor blades are now equipped with internal lightning arresters, they may still be damaged by lightning strikes.

It is not clear how offshore wind parks will survive severe storms. The experience with onshore plants is contradictory: in one case in India, 40% of the wind turbines were demolished by a cyclone. In Denmark, on the other hand, the gale Anatol merely destroyed 13 older plants out of a total of 3,500 installed plants. The probability of storms occurring is appraised by experts in Munich Re's Geo Risk Research Department. One storm scenario which they have developed for Germany with a probable return period of one hundred years shows that such a storm will pass through precisely the area where offshore wind power plants are being planned, for that is where the wind is strongest.

Risks above and below the waterline

The electricity generated by the wind turbines is brought onshore through sea cables buried in the seabed. Heavy ship anchors can catch in these cables and damage them. Repairing sea cables is very expensive and takes a very long time, particularly in spells of bad weather. A wind park cannot feed electricity into the grid while repair work is in progress.

The weather is also an uncertainty factor when problems arise with the plants themselves: in winter, the North Sea can rage for weeks on end and heavy seas make it difficult or even impossible for ships to dock and engineers to land. The problem is only partly solved by platforms located at the top of the wind generators, onto which engineers can be lowered from a helicopter, because heavy replacement parts cannot be transported in this way.

Repairing a damaged turbine in the sea is several times more expensive than repairing the same damage on land. Simply deploying the special ships required for the job can incur one-off costs of between €500,000 and up to €1m, plus further costs of between €50,000 and €100,000 a day.

Limits of insurability

Despite all Munich Re's efforts to offer concepts for offshore technology, it must never lose sight of the extent to which such plants can actually be insured. These limits are reached in the following cases, for example.

– Losses are foreseeable, as when, for instance, cutting costs for maintenance and repair leads to avoidable damage or when damage due to the same cause occurs in a whole series of plants. Only the first losses in such a series can be accepted as unforeseeable.

– The probability of a loss occurring can no longer be assessed, because, for example, plants are built with a considerably higher output than in the past. Some parts may be inadequately dimensioned as a result of the obligation to cut costs, thus resulting in damage during operation. The insurance sector cannot cover losses suffered when testing prototypes.

– Potential losses exceed the capabilities of an insurer or of the entire insurance industry. Such a situation could arise, for example, if offshore wind parks were concentrated in a small area of the sea and the strength and frequency of storms in this area increased dramatically due to climate change. Insurers can ensure the necessary transparency of risks with the help of precise accumulation control.

The limits of insurability can be identified in good time by analysing past experience and continuously monitoring developments. Within these limits, insurance solutions must be developed which by and large satisfy the wants and needs of all concerned.

In the case of offshore wind power, Munich Re is once again proving to be a reliable partner for all concerned – manufacturers, operators, insurers, governments, and society – when it comes to spreading the risk.

Further information on the subject of renewable energy sources can be found in our brochure "Renewable energies – Insuring a technology of the future".

A fitter climbing up to the lower platform of a wind turbine.

Beware of drifting genes: Who is liable when genetic engineering products cross with organic farming products?

The peaceful coexistence between farmers is threatened. Losses of considerable magnitude are possible wherever organic seed and genetically modified seed are sown on adjacent fields.

By Dr. Manuela Zweimüller and Helmut Steber

"Fatted chicken with creamed sweet corn (genetically modified)". Such dishes have occasionally been found on menus in restaurants or canteens since April 2004 – the idea is not exactly appetising. The supplement "genetically modified" is prescribed by a new EU Directive, which states that genetically modified foods and animal feedstuffs must be labelled as such more strictly than before. It affects all products containing genetically modified organisms or constituents made from such organisms if produced after 18 April 2004. On the other hand, it only applies if certain thresholds are exceeded. Munich Re welcomes this mandatory labelling, as it gives consumers the freedom to choose.

Further changes involving genetic engineering were resolved by the German parliament, the Bundestag, in June 2004. First of all, the federal government translated the Deliberate Release Directive (2001/18/EC) into national law, which the EU had originally scheduled for October 2002. Secondly, the amendment clearly shows the requirements to be met by German liability rules in cases of coexistence, i.e. the side-by-side existence of organic farming with conventional seed and farming with genetically modified seed, as well as the resultant crops in both cases.

The new German law on genetic engineering will help to end the de facto moratorium which has been in force throughout the EU since 1998: since then, genetically modified organisms – including plants – have no longer been brought onto the market anywhere in the European Union. Although this was not actually prohibited by law, the public authorities simply ceased to grant further permits in a kind of voluntary commitment. It was agreed that stricter environmental tests and labelling guidelines would have to be introduced first. Particularly the new Deliberate Release Directive (2001/18/EC) and the new EU Regulations on genetically modified foods and feeds are considered to lay the foundations for ending this de facto moratorium.

Stricter liability

The new law on genetic engineering will mean stricter liability for all farmers who grow or use genetically modified seed in Germany. Such farmers would have to pay organic farmers compensation for lost earnings if the latter were no longer able to supply their customers with goods which have not been genetically modified. And that applies regardless of the question of fault. In addition, the concept of joint and several liability (all are liable for one, one is liable for all) has likewise been embodied in the new law.

Schlossgut Hohenkammer, 35 km north of Munich, is the largest producer of ecological seed in Bavaria.

Turkeys at Schlossgut Hohenkammer.

"A problematic issue," according to Helmut Steber, manager of the agricultural facility at Hohenkammer, 35 km north of Munich. The estate farmed by Akademie Schloss Hohenkammer GmbH is wholly owned by Munich Re. It is the largest seed propagation operation for organic species (e.g. winter barley, rye, triticale, spelt, wheat, oats, peas, broad beans) in Bavaria and strictly follows the guidelines of Naturland, an association of organic farmers. That was not always so. In 1992, master farmer Steber changed over from conventional to organic farming and transformed the estate's 235 hectares of farmland. He is now an organic farmer through and through. For him, the significance of the new law is as follows: "The problem is first and foremost economic." The price of organically produced seed is roughly twice as high as that of conventional seed. In future, however, organic farmers cannot be sure that their organically grown maize has not been genetically modified. "Plant pollen travels long distances, sometimes over hundreds of kilometres. That applies to all pollen, including the pollen of genetically modified plants," explains Steber. Pollen could cause genetically modified maize to cross with conventional maize. Just as conventional and organically grown maize varieties can cross with one another. If genetically modified maize pollen were to land on an organic farmer's field, he could at best sell his maize as conventional maize. A restaurant, however, would have to specify that such maize was "genetically modified" if it exceeded the thresholds for adventitious and technically unavoidable mixtures, even if it had been grown on an organic farmer's field. "What is much more likely is that the organic farmer will not be able to sell such a crop," according to Steber, for customers expect the goods to be totally free from genetic engineering and would not even tolerate values below the statutory thresholds. The same basically also applies to conventional farmers who prefer to work without genetic engineering. Anyone who sells seed would also have to have the complete production output tested in order to establish whether it is without genetic modification. According to Steber, this would cost several thousand euros per year and would jeopardise the farms' existence.

Opinions diverge over whether or not the random outcrossing of genetically modified plants constitutes a loss in insurance terms. After all, farmers are permitted to grow officially approved, genetically modified plants. Can a farmer consequently be obliged to compensate another if he legally grows genetically modified maize? According to the new law on genetic engineering, the answer is yes. But how are we to stop the pollen flying across to the neighbouring field?

Steber is convinced that liability cannot be a matter solely for the farmers who grow genetically modified plants. The seed industry (as the manufacturer of genetically modified plants) must bear part of this liability.

Dr. Manuela Zweimüller, Munich Re's biotechnology expert, and Helmut Steber, head of the agricultural facility at Hohenkammer.

Munich Re is also against letting the farmers bear all the liability, for "they are the weakest link in the chain," according to Dr. Manuela Zweimüller of the Casualty Risk Consulting Unit and an expert on genetic engineering in Munich Re's Centre of Competence for Biosciences. She points out that the usual limits of indemnity for farms would have to be increased if they were to cover genetic engineering risks, but that could make them unaffordable for the individual farmers.

The insurance industry is also debating over whether such risks as purely financial loss due to pollen dispersal can be insured at all. "Liability insurance normally only covers unforeseen losses," explains Zweimüller. Growing genetically modified plants, however, inevitably includes the foreseeable and unavoidable risk of these plants crossing or mixing with others which are not genetically modified. "It's rather like trying to insure a house in an area with a very high risk of flooding." In other words, a contradiction of the principle of insurance. Munich Re believes that the risk should be ascribed to the day-to-day costs of the business. Such costs are normally not covered by liability insurance, which aims to protect against unforeseeable personal injury and third-party property losses.

Public opinion as a risk of change

Another very important factor for "green genetic engineering" as a risk is that the general public virtually does not accept genetically modified foods. Fear of genetic engineering could cause people to file claims leading to high defence costs for losses which, as it turns out years later, had not been caused by genetic engineering at all. The risk for the insurance industry may also be increased by more stringent statutory regulations and by the opponents of genetic engineering influencing public opinion – a typical risk of change.

Munich Re concurs here with the Association of German Insurers (GDV) and its doubts over the insurability of these risks. Nevertheless, it has not generally excluded genetic engineering from its terms of insurance. The risks are considered in each individual case and analysed in detail. Munich Re considers the general law on liability to be adequate: even before the genetic engineering amendment, airborne genetically modified pollen constituted a major impairment for organic farmers, and they were able to avert it by legal means in the past too.

Genetically modified and non-modified pollen may cross. There has been little research into how genetic engineering affects ecology and biodiversity.

Complex interrelationships must be investigated further

For organic farmer Steber, genetic engineering entails other risks too, including those which do not feature in any debates on liability. "We do not know what effect genetic engineering will one day have on such beneficial organisms as bees," he says. One genetically modified variety of maize damages the European corn borer, a caterpillar that nibbles maize. The genetically modified plant protects itself against the pest without the help of pesticides. "Yet who can guarantee that this maize is not also harmful to other butterflies and particularly those which we want to preserve?" asks Steber. Further research is therefore needed to investigate the impact of genetic engineering on ecology and the diversity of species. Much to Munich Re's regret, however, long-term trials are difficult due to disruptive action by the opponents of genetic engineering. After all, research into safety is indispensable for the approval process; genetically modified plants are subjected to strict and careful testing before being released onto the market.

As an organic farmer, Steber is also concerned about the following possibility: pollen of genetically modified plants, such as maize, could land on an organic farmer's field. If the genetically modified maize pollen were then inadvertently to cross with the organically grown maize and the farmer were to use these plants to produce seed, which he in turn uses for propagation, then he himself could help to produce genetically modified maize, albeit unwittingly. That would not only cause him to make a loss because he would earn less than with organic maize, but would also lead to further losses because the manufacturer of the genetically modified maize would see this as a violation of its patent rights and could therefore demand royalties from the organic farmer.

In a dispute between a Canadian farmer and an international agrochemical corporation, the Canadian Supreme Court ruled at the end of May in favour of the corporation.

Conclusion

The new laws will probably have a variety of effects on organic farming: both positive, because the mandatory labelling of genetically modified foods opens up new market opportunities for organic farmers and gives the consumer greater transparency, but also negative, because seemingly uninsurable financial losses must be expected. Munich Re is strongly committed to continuing talks on the subject of genetic engineering, for this is the only way to find constructive solutions and at the same time take advantage of the opportunities presented by genetic engineering.

Schlossgut Hohenkammer's production is strictly in line with the guidelines laid down by the Naturland association.


Naturland
TREVISO
AVANTI

1 to 82 million:
the probability of contracting BSE in Germany,
and further on the decrease since 2002.

1:82,000,000

Environmental protection and health: Sharp disparity between the public perception of risks and reality

Environmental influences may pose health risks which also impact life and health insurers. Yet these risks are often incorrectly assessed. As a result, measures are not taken where they are most urgently needed and where they would be most effective.

By Prof. Dr. Dr. Peter Höppe

Environmental medicine is a discipline which examines the way in which the environment affects human health. This includes risks through harmful substances present in the air, but also, in a broader sense, nutrition-related medical risks such as a high-fat diet or lack of exercise. The negative environmental influences are assessed according to the illnesses (morbidity) and the number of additional deaths (mortality) they cause and their impact on life expectancy.

In recent years, countless scandals and misjudgements – some genuine, some exaggerated – have shaped the perception of environmental health risks: chemical risks such as PCB emissions in nurseries and schools; microbiological risks such as BSE; risks caused by air pollution involving, for instance, ozone or physical influences such as electrosmog.

A hazard in itself: Environmental risks in the media

The media's treatment of environmental risks is often at odds with the true dangers involved and the probabilities of occurrence. And changes in eating habits and lifestyle over the last few decades are topics with little public appeal although they have led to an adipositas (obesity) epidemic, the consequences of which claim several thousand times more lives than BSE – the ultimate media obsession. The BSE hysteria, which struck Germany in the winter of 2001 – when it became virtually impossible to sell beef – is one of the most glaring examples of a misconception of environmental risks. In the United Kingdom, around 250 times as many cattle died of BSE than in Germany. In the period up to 1 March 2004, 139 cases of Creutzfeldt-Jakob New Variant (vCJD), a condition affecting humans which has been linked to BSE, were recorded in the UK (University of Edinburgh, the UK Creutzfeldt-Jakob Disease Surveillance Unit).

If we apply the ratio of BSE-infected cattle to vCJD cases in the UK to the total number of German BSE cases to date, then, statistically speaking, the number of vCJD cases to be expected in Germany comes to less than one. What is more, the temporal development of the figures for new vCJD cases in the UK indicates that the peak was passed as early as in 2002. The risk of BSE is thus already on the decline. Up to the spring of 2004, several hundred million euros had been spent on BSE tests. This must be seen alongside a single potential case of vCJD in Germany.

Environmental risks are often overrated and in some cases can even lead to environmental psychoses. Some genuine risks, on the other hand, do not receive the attention they merit. Consequently, there is a risk of funds for research and environmental policy measures being directed into the wrong channels.

Ranking of assessed risks
Parents

Rank	Risk factor	(Experts' ranking)
1	Head injury while cycling without a helmet	(4)
2	Tick bite	(19)
3	Injury sustained in a road accident	(1)
4	Meningitis	(20)
5	Health system cuts	(25)
6	Consequences of children's illnesses	(29)
7	Hepatitis	(36)
8	UV rays	(12)
9	Ozone	(14)
10	Pathogens in animal food products	(23)

Parents considered these ten risks to be the worst threat to their children. Some of these risks were dealt with in depth in the media. The experts' ranking is shown in brackets.

Source: University of Munich

Ranking of assessed risks
Experts

Rank	Risk factor	(Parents' ranking)
1	Injury sustained in a road accident	(3)
2	Accidents (not including road accidents)	(22)
3	Lack of exercise	(33)
4	Head injury while cycling without a helmet	(1)
5	Passive smoking	(11)
6	Diesel exhaust particulates/particles	(27)
7	Allergens	(34)
8	Unbalanced diet	(24)
9	Psychological stress	(26)
10	Carbon monoxide	(15)

This is the experts' ranking of the most dangerous risks. The parents' ranking is shown in brackets. Experts and parents were only in agreement on two points: road accidents and cycling accidents while not wearing a helmet.

Source: University of Munich

Experts and the lay public apply different standards to environmental risks

In order to investigate the discrepancy between genuine and perceived environmental risks, the University of Munich (Institute and Outpatient Clinic for Occupational and Environmental Medicine, Institute for Social Paediatrics and Adolescent Medicine) conducted a study entitled "Kind und Umwelt" (Children and the Environment), which was funded by the Bavarian Ministry of Health. A total of 8,500 parents completed a detailed questionnaire as part of a survey of pupils starting school in Bavaria in 2003. The aim was to provide an overview of the environmental risks perceived by the public. Scientists asked parents how they assessed the risk of their child being harmed by a total of 40 environmental factors. Possible responses ranged from "No effect" to "Life-threatening". As a basis for comparison, environmental experts from a variety of different disciplines prepared their own assessment of these environmental risks at a workshop.

The assessment of risks by parents and experts are clearly poles apart. Only two risks, "road accidents" and "cycling without a helmet", featured in the top ten risks of both parents and experts.

Needless to say, even if parents assess some risks differently from the experts, their concerns for their children must be taken seriously. However, some of these fears could be allayed if parents were better informed.

"Needless to say, even if parents assess some risks differently from the experts, their concerns for their children must be taken seriously. However, some of these fears could be allayed if parents were better informed."

A crash helmet can prevent serious injuries following a bicycle accident.

Sports and games: unperceived risk sources

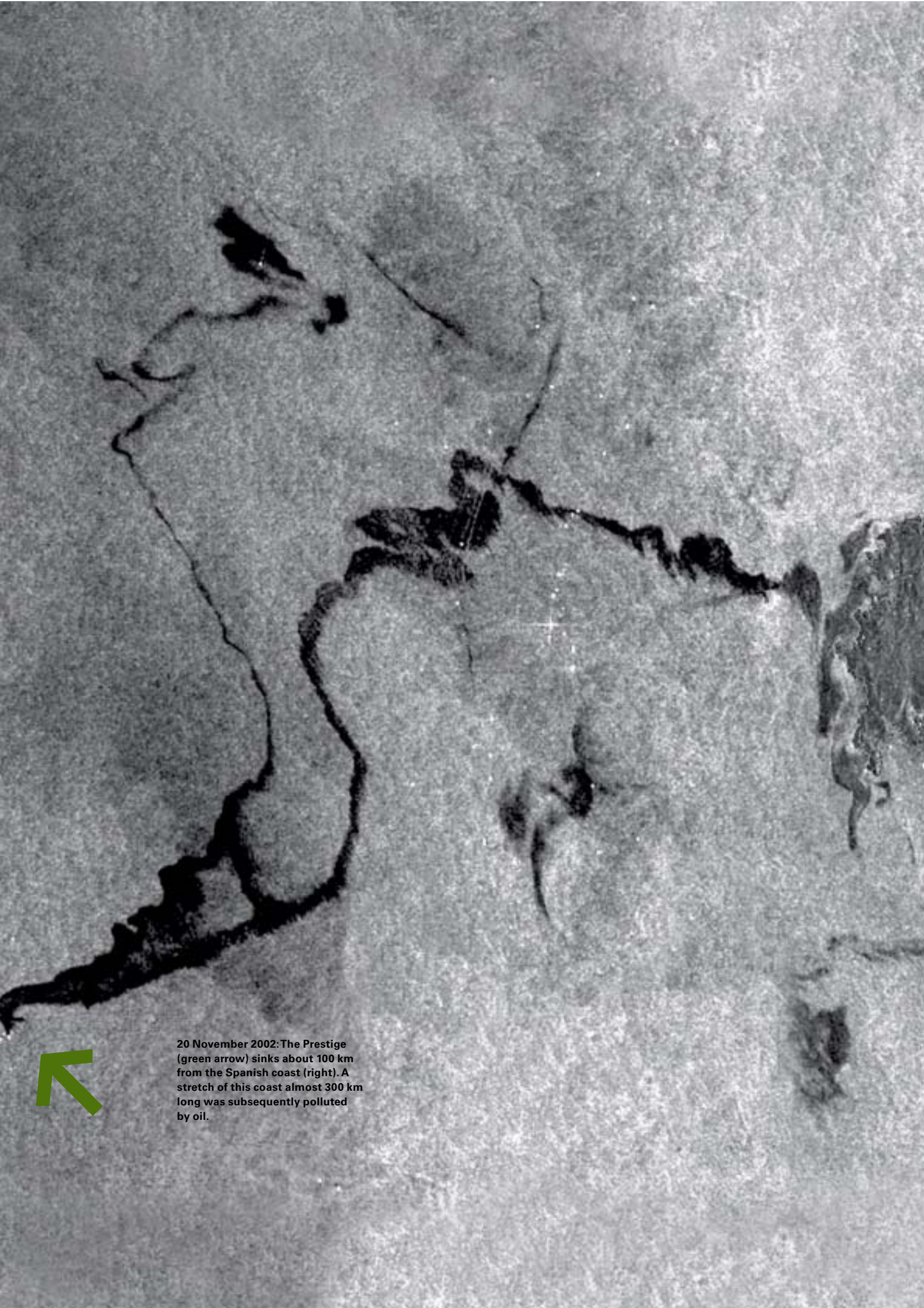
Compared with the experts, parents mostly overrated the risks of hepatitis infections, nuclear radiation, the consequences of childhood diseases, radiation from mobile telephone transmitters, and cost-savings in the health care system. On the other hand, they vastly underrated other risks: lack of exercise, allergens, noise, diesel exhaust particulates, accidents during sports and games, and the greenhouse effect (climate change). The health risks which experts expect to result from the greenhouse effect are, above all, the exposure of children to quite severe physical stress as a result of more frequent and extreme heatwaves. Increased temperatures will also affect carriers of diseases (insects) and the safety of foodstuffs; cases of diarrhoea will presumably increase. Some of the risks which parents placed higher than the experts are topics which frequently hit the headlines: meningitis, particularly in Bavaria in the last few years; likewise tick bites; and "pathogens in animal food products" – in the case of BSE a much-hyped media topic for years.

The response "I don't know" in the parent survey gives some indication of the risks about which parents are not adequately informed. The uncertainty was greatest when assessing the following risks: greenhouse effect (climate change), natural radiation, hazardous substances in construction materials, radiation from mobile telephone aerials, and heavy metals in car exhaust. Parents crossed the "I don't know" box least frequently for risks caused by accidents, UV radiation, tick bites, and noise. They feel better informed about these topics.

The experts surveyed were scientists of international renown with a great deal of experience in the assessment of environmental risks. We can therefore assume that their estimations give a "true" depiction of the risk situation according to the current state of the art. The following recommendations for environmental and health policy can be derived from the findings of the study:

– The public should be better informed about the risks they overrate. This would reduce many unfounded fears about the environment.
– Risks which are underestimated by the public should be addressed in the media more often. This would increase risk-awareness and could induce less people to expose themselves to these risks.
– If a risk is very high, and if it is practically impossible for individuals to reduce this risk through their own behaviour, then this risk must be lowered through environmental policy. One example of this is diesel exhaust particulates: a regulation prescribing the installation of particle filters in diesel vehicles would help in this case.

Studies such as this reveal how to make the most effective use of the ever-dwindling funds available for environmental protection measures, in order to improve the population's health and quality of life. They reveal important facts to the insurance industry on the environmental risks affecting their life, health, and third-party liability portfolios.



20 November 2002: The Prestige (green arrow) sinks about 100 km from the Spanish coast (right). A stretch of this coast almost 300 km long was subsequently polluted by oil.

Double hull – Poor protection?

The disasters in recent years in which oil tankers have sunk off the Atlantic coasts of France and Spain have prompted the European Union to impose more stringent safety standards for ocean transports. Among other things, it would like to banish single-hull tankers from European waters. But double-hull tankers are by no means the ultimate weapon in the struggle to protect the seas. Immense risks still remain.

By Edwin W. Mast

In December 1999, the oil tanker *Erika* found itself in distress in heavy seas off the coast of Brittany. The authorities refused the captain permission to enter an emergency port. The *Erika* went down. More than 19,000 tonnes of oil poured into the sea and caused an ecological disaster. Barely three years later, in November 2002, the captain of the oil tanker *Prestige* reported from his position off the Atlantic coast of Spain that the hull was fractured and that the ship was losing oil. Despite its distress call, the tanker was not permitted to enter any port. The *Prestige* finally broke apart and sank 140 sea miles off the Spanish coast. Most of the 77,000 tonnes of oil on board spilled into the sea and polluted long stretches of coast in France and Spain.

Are single-hull tankers really the problem?

At the end of 2002, 41% of the world's tankers were single-hull vessels, like the two mentioned above. At the time of sinking, the *Erika* was sailing under the Maltese flag, the *Prestige* under the flag of the Bahamas. They had both changed flags and owners several times already and were aged 24 and 26 years respectively. Vessels which are more than 20 years old account for almost two-thirds of the total losses involving tankers.

The European Union decided to send out a political signal following each of these disasters and passed two packages of measures – Erika I and Erika II. The central element of Erika I is the gradual replacement of single-hull tankers with double-hull vessels in European waters by 2015. The measures met with scepticism from experts, since the EU Commission had already ascertained in 2000 that oil pollution was caused not only by accidents at sea but also by the operation of ships as such.

Erika I has been in force since March 2000 and essentially comprises the following points:

– Single-hull tankers will gradually be replaced by double-hull tankers and will not be permitted to enter European ports after 2015.
– Stricter controls: Vessels flying flags of convenience which are stopped more than once during controls on account of their poor condition will not be permitted to enter EU ports again. They are entered in a black list published by the European Commission.
– Safety and environmental controls with uniform high standards: The "technical inspection agencies" for ships (i.e. the classification societies) are to be subjected to stricter controls.

Erika II includes the following points:

– A reporting system for all ships in European waters.
– Existing liability funds for environmental damage caused by ships are to be augmented.
– The limit of compensation is to be increased from €200m to €1bn.
– Negligence in oil transport is to become punishable.
– "Slavery at sea" is to be combated and working conditions improved for the crews.
– Shipowners are to receive tax benefits if they re-register their ships under European flags after having sailed under flags of convenience for reasons of cost. Objective: these ships are to be controlled according to the more stringent European safety standards again.
– "The Single Sea": Introduction of a European traffic management system by 2010 in the enlarged EU. This system is to monitor all ships' movements from the Black Sea to the Baltic.

Cross-section of a double hull. The narrow and winding space between the two steel hulls must be properly protected with a coating of special paint to prevent the steel from rusting.

Two of the provisions contained in Erika II have already been implemented: a European Maritime Safety Agency (EMSA) has been set up and the member states have agreed to designate emergency ports for ships in distress. When the *Prestige* sank in 2002, Spain was one of the EU countries which had already designated emergency ports for precisely such cases. Despite this, however, Spain refused to grant the distressed ship refuge; European law conflicted with national law.

Double hulls do not mean double safety

As a result of these initiatives by the European Union, double-hull tankers were quickly accepted as the cure-all by the general public. Doubts voiced by such experts as shipbuilders, owners, classification societies, dockyards, and manufacturers of ship coatings were largely disregarded.

Ship designers take account of two accident scenarios: grounding or stranding and collision with another vessel. Double-hull tankers are safer than single-hull tankers in both cases. The latter have only one steel hull, the ship's side, separating the oil from the sea, whilst double-hull tankers have two steel walls with a gap in between. If the outer wall of a double-hull tanker fractures, the oil cannot leak directly into the sea.

The only trouble is that neither the *Erika* nor the *Prestige* stranded or collided with another ship. They quite simply broke apart during normal operation! Such accidents are rarely attributable to engineering defects: in most cases, the ships have simply not been maintained properly, they are very old, and the material shows signs of fatigue.

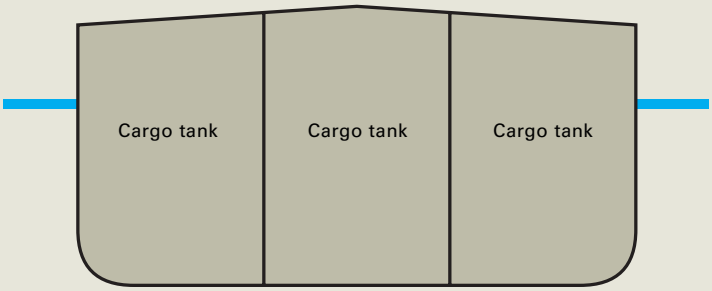
That is precisely why double-hull tankers must be considered problematical on account of their design. When these vessels sail unladen, seawater is pumped into the gap between the inner and outer walls of the double hull to provide ballast. If the anti-corrosion coating has not been applied flawlessly, rust will form very quickly.

Double hulls are safe – but for how long?

For this reason, some experts consider the maximum safe service life of double-hull tankers to be equal to the service life of the corrosion-proof coating inside the double hull. As yet there is no long-term experience. Coating manufacturers claim their products have a service life of between 15 and 20 years. Yet: one 7-year-old tanker was found to be so severely rusted that its permission to trade was withdrawn (by the classification society). The steel plates of double hulls are thinner than those of single hulls – double-hull tankers are consequently weakened by rust more quickly than single-hull tankers.

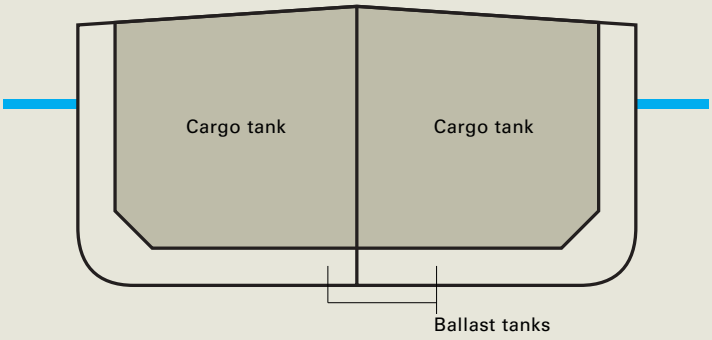
Cross-sections of oil tankers

Single-hull tanker



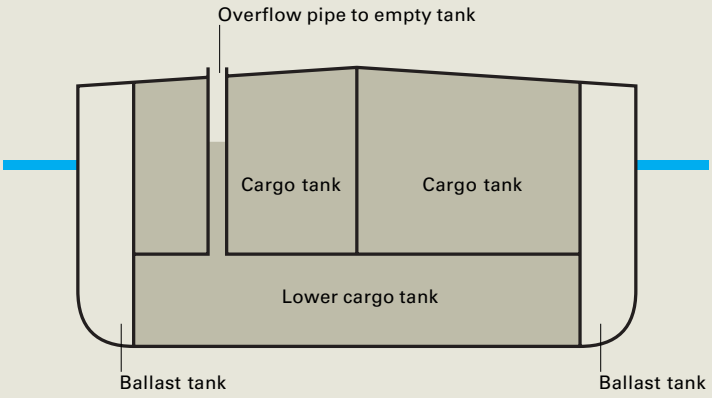
The classical design: Two wing tanks and a central tank, only separated from the sea by a steel hull.

Double-hull tanker



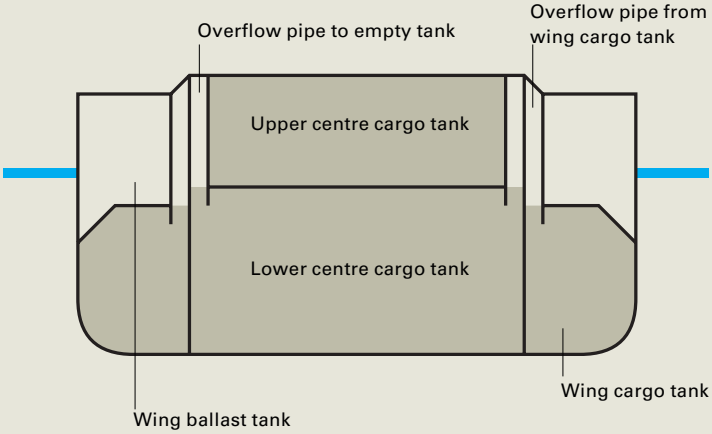
Tanks and outer hull are separated by a gap. If the vessel sails unladen, this gap serves as a ballast tank, which is filled with seawater. If the outer hull is torn open, the tank itself is not damaged at the same time. Drawback: maintenance of double hulls is difficult; rust may form and quickly weaken the structure.

Mid-deck tanker



Oil is lighter than water. If the floor is torn open in an accident, the water entering the tank pushes the water upwards. The oil flows along the pipes into the overflow tank. The side walls are designed as on double-hull tankers, with the same advantages and disadvantages.

Coulombi Egg tanker



In those areas where the side wall can be damaged in the event of a collision with other vessels, the oil is protected by a wide double hull. As in double-hull tankers, this space is used as a ballast tank if the tanker sails unladen, but it is also wide enough to permit easy maintenance.

The bottom and the lower side walls are of single-hull construction in line with the "oil is lighter than water" principle of the mid-deck tanker.

Fractures at critical points in the hull are a permanent problem in the case of single-hull vessels. They can also occur in double-hull tankers but may remain undiscovered as inspection and repair are more expensive and more complex. Furthermore, if the inner wall of a double-hull tanker is fractured, some of the cargo, e.g. oil, will seep into the space between the hulls. A highly explosive gas mixture can result when volatile constituents in the oil evaporate.

There are, in fact, other designs than single and double hulls: these include mid-deck tankers and the Coulombi Egg tankers developed in Scandinavia. Although they have certain advantages, it is unlikely that either of these designs will become widely accepted, the main reason being that the US Coast Guard only allows double-hull tankers to enter US waters or ports.

Conclusion: Double-hull tankers and their alternative construction forms offer great advantages in collisions and in cases of grounding. Nevertheless, they too can break apart, particularly if the ships are poorly maintained and therefore age more rapidly. The pollution caused by oil is the same for both types of hull: if the worst comes to the worst, the entire cargo will pour into the sea.

Only a package of measures could minimise the risks

In a report published in November 2003, the environmental organisation Greenpeace proposed organisational measures designed to improve safety in maritime traffic. They include the following:
– Cross-border emergency plans for busy and high-risk transport routes
– Extension of liability rules to include, in particular, the cargo owners
– Monitoring of still-to-be-designated coastal shipping lanes with a particularly high ecological risk

The advantages of double-hull tankers are mentioned last of all in the report. Unquestionably, Greenpeace has thus adopted a thoroughly realistic, holistic approach to the question of environmental protection and tanker safety.

With the amount of oil being transported by sea increasing, environmental protection and oil transportation will continue to be an important topic of discussion. A sustainable answer to the problem of worldwide oil pollution can only be found on a global level. Several problems have yet to be solved:
– Ships are usually ordered where they can be purchased most inexpensively, but quality has its price.
– For economic reasons, shipowners cut costs on construction, crews, maintenance, and repairs.
– Tankers are resold and in the worst case run down until they become a safety risk.

Conclusion for the insurance industry

If double-hull tankers do indeed prove to age faster and become structurally weaker at an earlier stage than single-hull tankers, they will clearly fail to solve the problem of pollution due to oil transportation – and will merely defer the risks to a later point in time. For this reason, insurers should not be tempted to rely on the latest, relatively brief experience. It is the age of the vessels that determines their safety and insurability: from a certain age onwards, therefore, they must undergo an individual examination as a basis for an assessment of the risk involved in each particular case.

Tanker discharging its load at the terminal.

Europe bakes

The long hot weeks of summer 2003 made this a record-breaking year for temperatures. In Germany, meteorologists recorded average temperatures that were 3.4°C higher than the average for the period between 1961 and 1990. Central, western, and southern Europe also sweltered in the extreme heatwave.

From a climatological point of view, the summer heatwave was an event with an occurrence probability of roughly once every 450 years. The heat claimed over 20,000 additional lives in Europe. It reduced the performance levels of employees and held up inland navigation. The very high temperatures and the persistent drought damaged plant stocks in various regions from mid-June onwards. The cooling systems of power plants were unable to function effectively due to a water shortage and the warming of river water. Some had to cut back their output, others were shut down completely; a number of nuclear power plants in France had to be externally sprayed with water for days on end.

We can expect heatwaves like this to recur with growing frequency in the future. Climate scientists have explained that even slight rises in mean temperatures can wreak major changes in the extreme values – record rainfalls, thunderstorms, severe weather events, and hailstorms are also increasingly on the cards. This poses a challenge at a number of different levels: neither people, buildings, infrastructure, agriculture, nor nature are prepared to deal with rising extreme values. This is why the losses are so high. What is more, as a result of climate change, events which we now refer to as hundred-year events will recur at intervals of 10 to 20 years.

What effects did the 2003 summer heatwave have on the various insurance and financing sectors? Experts from Munich Re report:

There were substantial crop losses in many areas.

"As a result of the extremely hot and dry summer of 2003, farmers in many European regions, particularly France, sustained high crop losses. In Germany alone, the total loss came to over €1bn. As insurance against drought cannot be obtained in the agricultural sector in Germany – as is the case in most EU states – the impact on the insurance industry was only marginal.

However, the drought did precipitate discussions throughout the EU on the introduction of a state-supported multi-peril crop insurance oriented towards the US model."

Brigitte Engelhard
Underwriter, expert on crop insurance and genetic engineering

Old people in particular suffered from the sweltering heat.

"We know from population studies that extreme weather situations can influence the general mortality of the population. As a rule, very cold general weather situations have a stronger impact than summer heatwaves. The record summer of 2003 did not send mortality figures soaring.

France topped the list in Europe with over 15,000 heat deaths, primarily due to heart and circulation conditions. As elderly people aged over 70 were mainly affected, we have not noted a dramatic increase in mortalities or morbidities in either life or health insurance to date."

Dr. Achim Regenauer
Chief Medical Director at Munich Re

The stock exchanges were unconcerned.

"The summer heatwave had no effect on the financial markets."

Peter Meybom
Head of Financial Management & Consulting

Fire crews fought the fires night and day – in many places without success.

"The forest fires which raged around the globe, in Australia, Canada, the USA, France, and Portugal, were devastating. Although a summer heatwave in Europe alone cannot be cited as adequate proof of climate change, the circumstantial evidence is slowly piling up. Indeed, there are so many signs that it is now practically impossible to deny the phenomenon of climate change.

The worst part of this is the fact that climate change is also accompanied by extreme events: torrential rain and floods as witnessed in central Europe in 2002 and a stupendous summer heatwave just one year later. And these extreme events will occur with ever-growing frequency in a warmer climate. Needless to say, this is all a major challenge to the insurance industry."

Thomas Loster
Head of Weather/Climate Risks in the
Geo Risks Research Department

Low water levels in the rivers threatened the power supply.

"The hot summer of 2003 impacted the power supply. It became increasingly difficult to cool power plants and the output dropped. At the same time, the demand for electricity rose, above all in southern European countries, as air-conditioning systems were running full blast.

If an overload in a situation like this triggers the collapse of the power supply, many companies may be hit: they may lose data or be unable to continue production without electricity, goods which need to be chilled may perish, and property damage to factories may even result because, for example, control systems fail.

Up to now, however, last summer is not known to have caused losses of this kind which affected Munich Re as a reinsurer."

Utz Groetschel
Head of Section: Energy Facultative

The stock exchanges are also realising that sustainable investments pay off.

Sustainability investors – New target group for Investor Relations

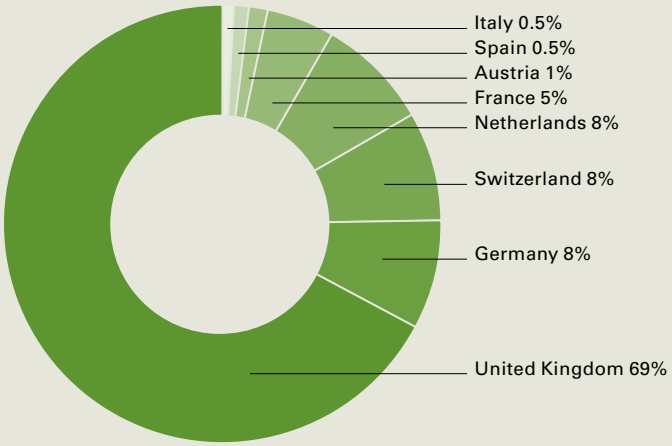
Investor relations, i.e. the cultivation of contacts with our present and potential shareholders, now addresses the issue of sustainable investments as well. This is because more and more analysts and investors are interested in the contribution that Munich Re is making toward sustainable development.

By Karl-Christian Jacobi and Rolf Häßler

Assessing and minimising risks is Munich Re's business and its strength. Sustainability and environmental compatibility are important criteria for its underwriters when assessing those risks. Its geoscientists and liability experts collect and evaluate the key data required. However, Munich Re's commitment to sustainability also increasingly involves servicing investors who pursue the socially responsible investment (SRI) approach. These – mostly institutional – investors base their decisions on which shares to buy at least partly on whether a company supports sustainable development. The Investor Relations Division at Munich Re is the central port of call, inter alia, for rating agencies specialised in sustainability; they supply the SRI market with information about companies' environmental and social commitment. All areas of corporate activity are scrutinised – corporate governance, environmental and social policies, knowledge and risk management, and much more besides. Many banks and other financial institutions, too, are stepping up their competence in the SRI segment to supplement the classic financial market analysis. Investor Relations has adjusted to this new need for information. It is able to present Munich Re shares as an attractive investment option because of our traditionally high commitment to sustainable development. A wide network of experts from all areas of Munich Re support Investor Relations in this respect.

The basic idea behind SRI is not new; its beginnings go way back to Victorian times, when investing Quakers sought to avoid putting their money in companies that had links with slavery or arms production. Today, of course, the dynamics of this market and the volumes invested worldwide have a new quality. Two factors are of special importance: first, the growing interest shown by financial markets in the subject of sustainability following the 1992 World Summit on Environment and Development in Rio de Janeiro; second, the previously mentioned professionalisation of the market.

Distribution of SRI investments of institutional investors in Europe



Source:
Eurosif – SRI among institutional investors – 2003 report

A young segment is growing

Today, there are over 110 retail funds operating in the German-speaking region alone, investing their capital in line with ecological, social, ethical, or sustainability-related criteria. In Europe, there are some 360 SRI funds managing an investment volume of approximately €12.2bn. A recent analysis of the biggest European SRI funds has shown that Munich Re shares qualify for over three-quarters of the 74 SRI funds that are basically relevant – i.e. funds that invest, for example, in German companies and in enterprises operating in the financial sector.

For institutional investors, in particular, sustainable investment is gaining in importance, as Munich Re has repeatedly observed in its discussions with investors. A study performed by the European Social Investment Forum (Eurosif) in 2003 reveals that approx. €336bn is now invested in Europe in line with SRI criteria. Some 10% of the total SRI volume, i.e. €34bn, meets strict positive and negative criteria. According to the Eurosif study, most of this (69%) is managed in the UK.

In the US, according to SiRi Company, currently the world's largest amalgamation of independent sustainability rating agencies, a total of some US$ 2.16 trillion is being managed in line with SRI criteria.

Competitive return

The days when investors were willing to place convictions before financial return are now largely history. Today, investors expect sustainable investments to yield a return that is at least comparable with conventional investments, although some financial-market theorists do point out that sustainable investments should, in fact, tend to have poorer performance, and this for two reasons: firstly, because the range of shares is more limited and, secondly, because the social-ecological corporate valuation entails costs.

In the meantime, numerous scientific studies are available that examine the links between sustainability and financial performance. These are the chief results:

– An investment policy geared to sustainability reduces risks in the portfolio.
– Sustainability criteria in asset management still allow a competitive return to be earned, so that investors need not put up with an adverse return relative to conventional investments. Some studies even detect a slight performance edge in sustainable investments.

"Investor Relations can present Munich Re shares as an attractive investment option because of our traditionally high commitment to sustainable development."

Creating transparency

Our network of experts work through numerous detailed questionnaires every year in order to provide rating agencies and analysts on the SRI market with the information they need. The European Business School at Oestrich-Winkel has analysed such questionnaires within the scope of the project "Environment and sustainability transparency for financial markets", which Munich Re is supporting. The result: some 300 different criteria and around 150 indicators are used to vet a company's sustainability performance.

One problem is that the questionnaires often change substantially from year to year. It would certainly be desirable if, in designing the questionnaires, their creators were to pay more heed to companies' development horizons. Companies need time, for instance, to formulate guidelines or to implement management systems.

In recent years, Munich Re has made increasing use of roadshows and presentations at major European financial centres to inform investors of its commitment to a sustainability-driven approach. These presentations have met with lively interest, not only among specialised sustainability analysts.

Munich Re's commitment is paying off, as is demonstrated by the successes scored so far. Since 2001, our shares have featured in the Dow Jones Sustainability Index and in FTSE4Good, as well as in three further indexes. These successes, which we must work to achieve year for year, are an incentive for us to further strengthen our future commitment both as regards sustainability and in servicing investors on the SRI market.

Further information on this topic may be found at the "Investor Relations" section on Munich Re's website (www.munichre.com).

Profit and a clear conscience

Sustainable investments are becoming increasingly important. Munich Re's asset manager, MEAG, is now offering private investors a retail fund which takes account of the environment, social issues, and future global problems in its investment strategy. For investors, it means a twofold benefit: in addition to permitting a clear conscience, the MEAG Nachhaltigkeit fund also offers an attractive performance.

By Christian Greiner and Alfred Wasserle
MEAG

MEAG, Munich Re's asset manager, presented its first sustainable retail fund in October 2003: MEAG Nachhaltigkeit (the German expression for sustainability). The share-based investment fund's portfolio is put together by its management according to ethical, ecological, and social criteria. This consequently makes it a sustainable investment for investors with a sense of responsibility who attach great value to good rates of return. A global equity fund, MEAG Nachhaltigkeit invests in firms which base their business on social and ecologically compatible criteria. Companies dealing in tobacco products, alcohol, armaments, and lotteries are taboo.

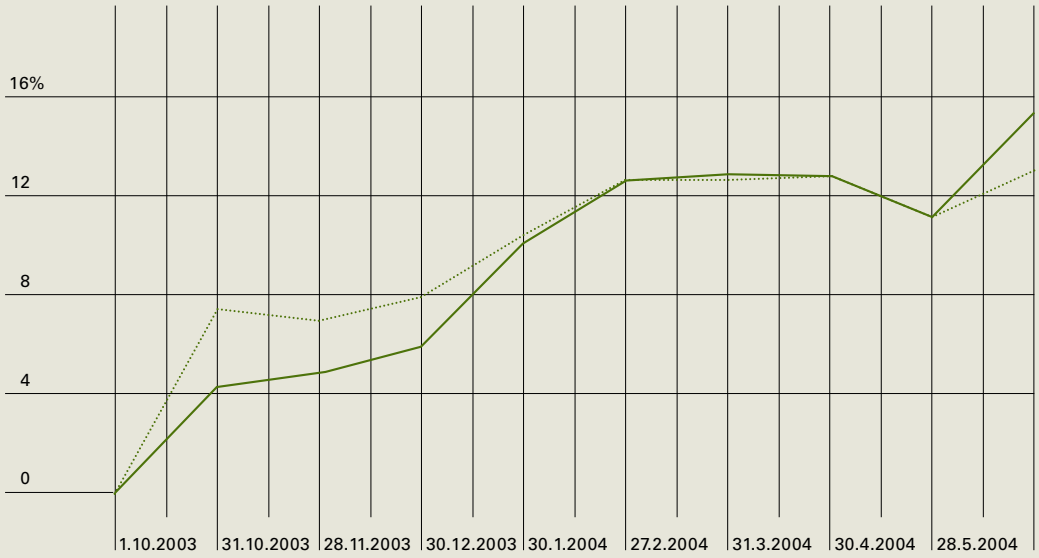
The best in terms of sustainability are also financially successful

Operating according to the principle of sustainability means satisfying today's needs without jeopardising future generations' basis for survival. Firms are consequently expected to use resources sparingly, to organise work sequences and production processes accordingly, to introduce innovative strategies and thus recognise global risks at an early stage. For MEAG, sustainability in conjunction with investments also means assuring steady growth without pursuing any unduly risky approaches, while remaining adaptable and seeking to shape the future. Integrating sustainability into everyday business when investing capital is a considerable challenge. Those who master the challenge can reap the benefits twice over: first by obtaining a portfolio that is demonstrably less susceptible to fluctuations and secondly by earning a return on investment commensurate with the market. Sustainability is gaining ground at an increasing number of companies and contributing towards business success.

In this way, a sound firm that invests in environmental protection and social factors also protects its own reputation and takes the stakeholders' needs into account more strongly. In fact, sustainable business management also reduces legal risks and legal expenses. The link between quality and sustainability is equally close.

The Dow Jones Sustainability World Index ex All reflects the share performance of those companies which engage in sustainable development. The index is compiled by the independent financial services provider SAM, Sustainable Asset Management, in Zurich. In a comprehensive procedure, it investigates whether the firms publish environment reports, continuously save energy, produce little waste, and whether their environmental management systems meet the latest requirements. SAM also assesses such social factors as social benefits or general employee satisfaction. SAM is currently analysing firms in 59 sectors and 33 countries with the aid of questionnaires specific to the individual sectors concerned, as well as through interviews and the evaluation of corporate documents. What remains is the top 10%, i.e. the best "sustainability firms" in each sector. This selection is then revised again by SAM: all firms which manufacture tobacco or alcohol products, earn their money with games of chance, or produce armaments and firearms are deleted from the list.

On average, the MEAG Nachhaltigkeit fund contains roughly 100 shares in various countries and sectors. The security of this investment is enhanced by the mix of different-sized firms in different sectors and countries. Established firms in the fund include Siemens, Deutsche Bank, the US Citigroup bank, Johnson & Johnson as a supplier of medical products, and the pharmaceuticals company Pfizer, as well as Munich Re, which meets the strict sustainability criteria.



Performance development since 1.10.2003

Since being launched last October, the value of MEAG Nachhaltigkeit has recorded impressive growth.

Fund accumulated

Benchmark accumulated

The fund management invests between 10% and 20% of the fund volume in so-called innovators. These are mainly small firms which are not included in the Dow Jones Sustainability Index. In order to be included in the fund, they too must operate on sustainable basis. Examples of such firms include producers of wind power or manufacturers of water-processing plants. Innovators offer particularly good opportunities for growth, as they operate in future-oriented markets.

Making use of reinsurance know-how for managing investments

"In the long term, MEAG Nachhaltigkeit is expected to develop better than a conventional global equity fund. That is our claim," according to MEAG's managing director, Dieter Wolf. MEAG also profits from its parent company when managing MEAG Nachhaltigkeit. "Munich Re has been researching into global environmental and climate changes for almost three decades," says Wolf. In addition, it has long been intensively studying the other great challenges facing our world, such as population growth and dwindling natural resources. Munich Re's enormous pool of knowledge and almost 125 years of risk experience provide a knowledge platform for the MEAG Nachhaltigkeit fund's management. The know-how exchanged with the parent company plays a decisive part in permitting trends and risks to be identified early on so that they can be soundly assessed and the fund's concept implemented successfully.

The management of this fund also makes use of the proven MEAG investment process which has already prompted leading fund-rating agencies to award distinctions to other MEAG retail funds. Together with MEAG's classical and highly decorated bond-based funds, its European share-based fund MEAG EuroInvest won top marks from Germany's three leading fund-rating agencies, FERI-Trust (A), Morningstar, and Standard & Poor's (five stars in each case).

The brochure on the MEAG Nachhaltigkeit fund can be ordered at www.meag.com or at the number +49 (0) 89/28 67-29 99.

Once a goods station, now a natural asset

First a goods station, then a derelict site, now a biotope: the site of Munich Re's new office building at MünchnerTor has a colourful history.

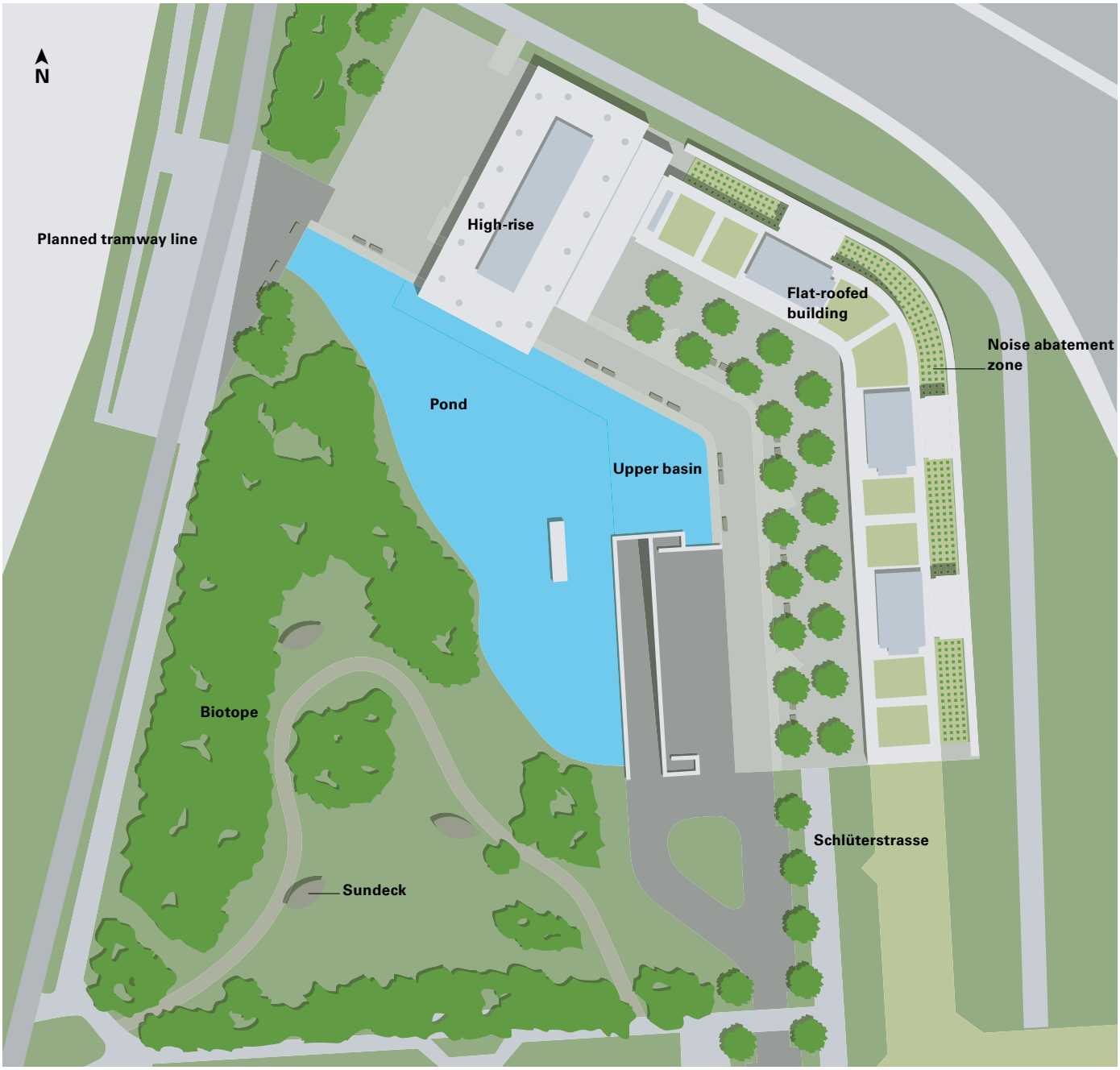
By Christoph Pyka

The high-rise in the north of Munich and the adjacent flat-roofed building provide offices for some 1,200 staff.

Hairy sedge, cocksfoot, and red fescue are the names of the grasses which grow here. The bushes are traveller's joy, European spindletree, and purple willow, the trees include wild cherry, plane maple, and mountain elm. All flourish within Munich's boundaries, alongside the new office building at MünchnerTor. With this 23-storey high-rise over the entrance hall and the flat-roofed six-storey structure, Munich Re, the owner, and MEAG, its asset management company, which was responsible for the construction work, have shown what can be done.

Even office buildings in which more than 1,200 people work can be designed according to ecological principles today. This is emphasised by the area around the building. It comprises five parts: the so-called noise abatement zone, the roof of the flat-roofed building, the promenade to the south of the high-rise, the pond, and the biotope.

Bird's-eye view of the site at MünchnerTor.



The noise abatement zone is the area between the north-eastern façade of the flat-roofed structure and the barrier erected to keep out the noise of the traffic on the Middle Ring Road. This area covers around 450 m^2 and can be seen from most of the office floors.

The glacier-green glass gravel on the ground reflects the light in various colours. Such grasses as sedge, fescue, woodrush, and grey moor grass grow here in clusters. With their diversity of shapes and shades, the appearance of these ornamental grasses shifts and changes over the course of the day.

Plants which tolerate dry conditions, such as snow-in-summer, betony, and simple grasses, grow on the top of the flat-roofed structure. These rooftop plants fulfil an important ecological function: they collect rainwater, let it drain off more slowly, and improve the micro-climate.

The noise abatement zone: Air, space, and green area between the flat-roofed building and the noise barrier wall.

The entire site of the office building at MünchnerTor was originally part of a goods station. It was later abandoned and left to its own devices, developing into a derelict site extensively covered with refuse in some parts. Only one species of butterfly, the cabbage white, was to be found in this species-poor area, as well as a few large earth bumblebees. The only animals in the area were rabbits and such birds as blackbirds and magpies. Landscape ecologists described it as a "habitat with no significant fauna". Without ecological landscaping, bushes would one day have dominated the entire site. Today, it looks completely different.

View to the south from high-rise, with the natural bank and the path through the biotope.

Tuliptrees along the promenade

The "promenade" to the south of the high-rise links the quarter on "Berliner Strasse" with the future tram stop on Schenkendorfstrasse and the bridge which is to span the Middle Ring Road. From here, the eyes sweep over water and biotopes. The steps for sitting beside the pond invite people to stop and rest a while in good weather, as do the benches under the unusual trees lining the promenade: these are tuliptrees (Liriodendron tulipifera). Their crowns are egg-shaped and they flower in June: the tulip-like blossom is green-yellow on the outside and orange-coloured on the inside. In autumn, the tuliptree's large leaves turn brilliant golden yellow.

The pond which is of such importance in ecological and micro-climate terms is intended above all to collect all the rainwater from the rooftops and promenade. The surface of the water is broken into two technically separate parts. The geometrically shaped upper basin has an overflow edge over which the water falls into the lower part of the pond. This part has a natural bank rising gently to the biotope in the south.

The promenade south of the high-rise is an invitation to sun oneself. Beyond it is the upper basin, with the overfall edge leading to the lower part of the pond.

Preserving the diversity of species in the biotope

The biotope is located in the south-western part of the site: such bushes as the blood twig dogwood have survived here, as have fruit trees, maple, and ash trees. The borders have been thinned and one-third of the purple willow and poplar trees removed. There are now more open spaces and a clear, warmth-loving woodland edge. Roughly one-third of the trees and bushes are removed every six years to prevent the open spaces and clear borders becoming overrun with bushes.

Gravel has given the site a completely new outline. A dry lawn is developing on this gravel. It is only cut once per year, in early July. Open gravel areas are the most striking feature. Wooden decks and sundecks have been integrated everywhere as rest areas for the staff. A small footpath offers an inviting prospect for a stroll around the biotope.

This biotope creates outdoor areas for the people and at the same time preserves and develops ecologically important areas within the city of Munich. In this way, the former goods station has now become a natural asset.

More light and biodiversity. Wood is removed regularly so that the biotope is not overrun with bushes. The various habitats – gravel, clear woodland edge, dry lawn – are thus preserved.

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Munich Re environmental report 2003

Munich Reinsurance Company's environmental statement
Munich, 26 May 2004

01 Introduction

Dear Reader,

Environmental protection and sustainable development are of strategic importance for Munich Re. We regard economy and ecology not as opposites but as two inseparably linked aspects of our long-term-oriented business operations. One of the areas in which these links are particularly close is climate protection. By systematically integrating aspects of sustainability into our business, we ensure the highest possible quality in the acceptance of risks and thus promote the success of our business in the long term.

This long-term commitment, which we pursue with the support of systematic environmental management, was again confirmed at the end of last year by the external accredited environmental verifier, who examined our environmental management for the second time in terms of its conformity with the European EMAS Regulation. Munich Re's site in Munich has also been certified to the international standard DIN EN ISO 14001, an important prerequisite for extending environmental management to our international organisation.

What is even more important to us than confirmation by the accredited environmental verifier, however, is confirmation by the markets in which we operate. Responsible underwriting of risks and judicious risk management are conditions we must fulfil to ensure the quality of our business in the long term and to maintain and enhance the value of our company. As insurers, we are especially committed to the precautionary principle. What is more, Munich Re is affected by major losses on two counts: through our assumption of a large portion of the indemnification and by the reaction of the capital market to such events, which can have a major impact on the value of Munich Re shares. This applies above all to the topics that are to be seen as the central global challenges for the future, e.g. climate change, dwindling natural resources, or the development of genetic engineering, and their implications on our underwriting business and our investments.

Furthermore, we expect the market for Socially Responsible Investment (SRI) to continue growing throughout the world – especially in the light of the fact that, as various studies have shown, an investment in sustainable capital market offerings does not necessarily entail lower returns. Investors consider not only the traditional investment criteria of return, risk, and solvency but also the social and ecological performance of investments. Consequently, higher demands are placed on reporting within the companies concerned. Fund managers, rating agencies, and research teams expect and insist that the approach adopted and the corresponding activities are transparent. Here too, Munich Re has a two-fold role to play: as an object of investment and as a large investor. It therefore has to require transparency of itself, but it can also profit from these developments in its own capital allocation.

In other words, there are sufficiently good reasons for continuing to work on implementing the guiding principles of sustainable development and integrating the environmental guidelines in all areas of our business operations.

You will find a detailed report on our activities and the results of the past year on the following pages. The various chapters present extracts from the new environmental programme for 2004–2006, which was formulated in the process of revalidation. They will give you an idea of our objectives and the tasks that lie in store for us. We also present a record of the extent to which we have attained our past objectives.

This report is an update of our environmental statements of previous years. We look forward to continuing our lively exchange of ideas and dialogue in partnership with you.

Prof. Dr. Dr. Peter Höppe

Claudia Wippich

02 Munich Reinsurance Company

Our company, our business, 2003

This environmental report (environmental statement) relates to Munich Reinsurance Company (hereinafter referred to as Munich Re) at its Munich site. It is the parent company of the Munich Re Group.

Munich Re works as a reinsurer throughout the world in all classes of business. A reinsurer's business is, in simple terms, "insuring primary insurance companies". The risks the reinsurer assumes from the primary insurer may be reinsured individually, e.g. a large passenger ship, a space risk, machinery insurance for a power plant, or life or accident insurance with a high sum insured. Or they may be reinsured en bloc, i.e. the reinsurance company accepts a share in a large number of individual risks.

Munich Re has embodied competence in its handling of risks since 1880. Today, 5,000 insurance companies in around 150 countries rely on our expertise and financial strength. Munich Re finds solutions for the entire spectrum of risk management.

Natural catastrophes again had a major impact on insurance business in 2003. More than 77,000 people throughout the world died as a result, seven times as many as in the previous year (11,000). In Europe, the heatwave alone claimed more than 20,000 victims.

We recorded around 700 natural catastrophes in 2003, which was roughly the same as in the previous year.

Economic losses rose to over US$ 65bn (2002: US$ 55bn). These were mainly the result of tornadoes (United States), heatwaves (Europe), and forest fires (United States) – but also severe floods in Asia and Europe.

For Munich Re, the year 2003 was marked by several important events.

On 11 November 2003, the company successfully completed a substantial rights issue. This increased our shareholders' equity by around €4bn and also significantly enhanced its quality. The issue of two subordinated bonds in mid-April 2003, with a total volume of €3.4bn, further strengthened our shareholders' equity too.

Munich Re became the first international reinsurance company to be issued a licence by the China Insurance Regulatory Commission (CIRC) which is valid for reinsurance business throughout the People's Republic of China and for all lines of business. This marks the beginning of a new era in the long-standing cooperation between Munich Re and the Chinese insurance market.

With effect from the end of the year, the general agreement between Allianz AG and Munich Re was terminated. This was a logical step after the mutual participations had already been reduced to below 15%. In spite of the termination of this agreement, however, the two companies will continue to work together closely in the fields of reinsurance and retrocession.

Clement Booth left the Board of Management as at 30 September 2003, after being a member of this body since 1999. With effect from 1 October, Dr. Torsten Jeworrek and Georg Daschner were appointed full members of the Board. Dr. Jeworrek is responsible for Special and Financial Risks and IT, Mr. Daschner for Europe 2/Latin America.

At the end of 2003, there was also a change at the very top of the company. After eleven years as the Chairman of the Board of Management, Dr. Schinzler was succeeded by Dr. Nikolaus von Bomhard, who has been working for Munich Re in various areas and functions since 1985.

Munich Reinsurance Company in figures (in €m)

(cf. Annual Report of Munich Reinsurance Company 2003)

	2003	2002	2001
Gross premiums written	21,748	21,857	15,464
Investments	70,893	57,955	48,655
Net underwriting provisions	52,099	46,091	39,592
Shareholders' equity	11,375	7,115	4,449
Profit for the year	511	2,606	441
Dividend	286	223	221
Dividend per share (€)	1.25	1.25	1.25
Share price at 31.12. (€)*	96.12	108.43	290.04
Market capitalisation at 31.12.	22,067	20,368	53,961

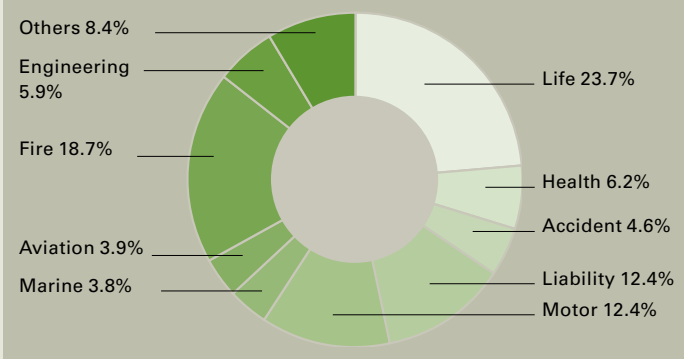
* Share prices adjusted to take account of the capital increase in November 2003.

The fair value and carrying amount of Munich Reinsurance Company's most important investments: (in €000)

	Fair value	Carrying amount 31.12.2003
Real estate	2,856,708	1,049,044
Equity investments*	31,461,173	26,532,238
Fixed-interest securities	16,482,372	16,198,954

*Equity investments are share certificates and investment fund certificates as well as participations and shares in associated companies. The dividend figures include Munich Re's shares in Allianz.

Munich Re's gross premium income by class of insurance was as follows:



The Munich Re Group

The Munich Re Group employs more than 41,400 people throughout the world, almost 6,500 of them in the reinsurance group.

Besides providing reinsurance, the Munich Re Group focuses especially on primary insurance business and is also active in asset management. Life, health, and personal accident insurances in particular offer good prospects in view of demographic developments. In this respect, we also take advantage of our close ties with HypoVereinsbank.

More than 55% of the premium income in the business year 2003 came from reinsurance.

Our primary insurers are the ERGO Insurance Group, incorporating the well-known brands VICTORIA, Hamburg-Mannheimer, DKV, and D.A.S., Europäische Reiseversicherung, and the Karlsruhe Insurance Group.

In 1999, Munich Re and ERGO founded MEAG MUNICH ERGO AssetManagement GmbH (MEAG). In addition to managing our investments held for trading purposes, it is also responsible for handling our real estate used by third parties, which involves a total of some 600 economic units.

MEAG also provides professional portfolio management for our primary insurance clients and other institutional investors and offers private clients a number of successful investment funds.

The Group's investments total some €172bn.

Further information may be found on these internet pages:
www.ergo.de
www.victoria.de
www.hamburg-mannheimer.de
www.das.de
www.dkv.com
www.erv.de
www.karlsruher.de
www.meag.com

03 Munich Re's environmental guidelines

The environmental guidelines form an integral part of our corporate strategy and are applicable throughout the reinsurance group.

Environmental protection and sustainability: Our commitment
Preamble to the environmental guidelines of Munich Reinsurance Company

As a leading risk carrier and provider of financial services operating worldwide, Munich Re acknowledges its responsibility for environmental protection and sustainability. Preserving the natural foundations of life is also a contribution to value-based management, as our economic success is inseparably linked with protection for people, the environment, and physical resources.

Seeing opportunities in risks

As reinsurers, we support and safeguard innovative technologies and large industrial projects. The risks associated with these form the focus of our interest and responsibility, both locally and globally.
We use our knowledge of climatic and environmental changes – which are increasingly caused by man – to manage risks by consistently promoting preventive measures.
In our financial sphere, we take account of environmental criteria when taking investment decisions. Through our investments, we promote suitable environmental related projects, and we observe ecological aspects when managing our property investments.
In close cooperation with our clients we develop our services further on an on-going basis in order to continually reduce environmental damage and environmental risks for everyone's benefit and to exploit the business opportunities inherent in the risks, both today and tomorrow.

Acting prospectively at our business locations

We aim to reduce as far as possible the environmental impact arising from our business operations and in connection with the use of our properties. Besides complying with statutory provisions, of course, we also need to pay particular attention to consistently avoiding waste and emissions, as well as to reducing our energy and water consumption. To this end, we orient ourselves towards the highest technical standards wherever economically reasonable. We also choose our suppliers and service providers according to these principles.

Learning from each other through dialogue

Intensive research and development help us to assess current and future risks and to find appropriate starting points for our environmental related activities. This enables us to exert a positive influence on our partners' risk behaviour, in order to meet the challenges of the future together.

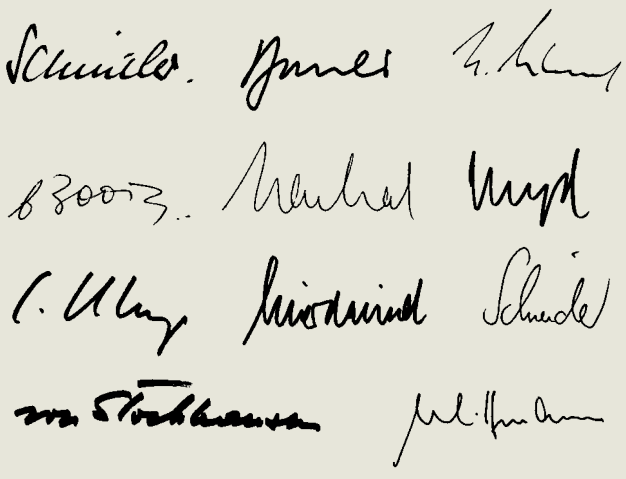
We take our knowledge and experience to the public at large and encourage the exchange of information on relationships in the area of environmental risks.
We communicate openly on the subjects of the environment and risk, both in-house and with the outside world.

Taking responsibility with commitment

Our staff are responsible for implementing the environmental guidelines in their particular area of influence, observing the environmental impact of their actions and decisions. We agree concrete goals which we document each year in our environmental programme and against which we measure our performance. By means of targeted training and promotional measures as part of our environmental management system, we are continually developing our professional and personal skills as regards environmental protection and sustainability.

On the basis of our vision and our guiding principles, we declare these to be the general principles of our dealings.

The Board of Management of Munich Reinsurance Company
Munich, September 2000



04 Product ecology

Compared with firms in the manufacturing industry, insurance companies belong to a "clean" sector in terms of their impact on the environment. Being providers of services, their share in the use of resources is relatively small. How much energy and water they consume depends on the technical design of their office buildings. Besides power consumption, the main source of their CO_2 emissions is business travel necessary for the purposes of client care. Consequently, there is comparatively little scope for exerting an influence. Nevertheless, we are active in these areas too, as we will describe in Chapter 5.

As far as environmental protection and sustainable development are concerned, there is more leverage in a different area: in the context of the original risks that Munich Re assumes as the world's leading reinsurer. This applies equally to insurance business and to investments. In this respect, Munich Re has always kept a close watch on changes in the risks relevant to the Group – and that naturally includes the environment. Global climate change, renewable energies, developments in the realms of environmental liability, and other topics of environmental relevance are therefore always the focal point of a comprehensive risk assessment in the context of both insurance and investments; but they also often provide opportunities with regard to new products and developing (insurance) markets.

International negotiations on climate protection

We were closely involved in the international negotiations on climate protection again last year. In December 2003, Milan hosted the ninth climate conference, COP9, at which the final details of implementing the Kyoto Protocol were to be settled. Regrettably, this conference failed to achieve a breakthrough on the ratification of the protocol, and a speedy ratification by Russia continues to be the only hope. As a result of the United States' refusal to ratify the Kyoto Protocol, the conditions that need to be fulfilled to make the protocol binding under international law can only be achieved by Russia's accession. The protocol must be ratified by at least 55 of the signatory countries, and these must account for at least 55% of the global CO_2 emissions of industrial countries. 123 countries have already complied with this requirement, but they only account for 44.2% of the industrial countries' CO_2 emissions worldwide.

In the meantime, alternative scenarios are emerging, sometimes called "Kyoto light". The central question is whether Japan, Canada, and the EU will implement the targets agreed in the Kyoto Protocol, even if it has not yet entered into force. The EU is taking up a vanguard position with its system of emissions trading, which will be launched in 2005.

Preparations for the *renewables 2004* conference

On the initiative of German Federal Chancellor Gerhard Schröder, the first international conference on renewable energies, *renewables 2004*, took place in Bonn from 1 to 4 June 2004. The aim of this conference was to give further impetus to the dynamic process launched by the United Nations World Summit on Sustainable Development in Johannesburg (September 2002) – and ultimately to promote the global development of renewable energies. The conference was organised and hosted by the German government, represented by the Federal Environment Ministry (BMU) and the Federal Ministry for Economic Cooperation and Development (BMZ).

In line with its long tradition as an expert in the field of climate protection and with a view to consistent and effective risk prevention, Munich Re supports the endeavours for a significant increase in the share of renewable energies. To this extent, Munich Re made a substantial contribution to this conference from the standpoint of the insurance industry. After all, innovative technologies for the use of renewable energies represent an area in which insurers often provide "development aid" by assuming a large portion of the risks involved.

4.1 Reinsurance

Munich Re's operative reinsurance divisions have many very different ways of exerting a positive influence on the environmental aspects linked to the risks they assume. This can be done by providing advice and services or by designing appropriate contracts and products. Owing to the differences between the various lines of business, the specific measures to be adopted have to be defined for each separate line and in the light of the respective market environment. Here are a few examples geared to the reinsurance process:

Marketing, acquisition
- Support for insurers that develop insurance products to promote ecologically beneficial activities (e.g. promoting renewable energies)
- Integration of environmental aspects in seminars for clients and staff and in publications for clients, staff, and the general public
- Public relations: position papers, specialist articles, expert reports, attendance at conferences

Underwriting
- Standardised evaluation of environmental risks (based on the relevant technical regulations and international standards – World Bank, IFC, World Commission on Dams, etc.)
- Contract design (conditions, deductibles, exclusions, claims cooperation)

Claims handling
- Flowback of findings from loss analyses for future loss prevention
- Consideration of ecological criteria in the selection of loss minimisation measures

In 2003, we incorporated additional areas in our considerations and thus further increased the degree to which our environmental guidelines are implemented in our operative business.

Example: Bond insurance

In bond insurance, the insurer assumes the guarantee for the proper performance of certain contractual duties. The insurer thus guarantees, for example, that a contractor will meet its contractual obligation to build the agreed structure such as a dam or a large technical installation. In the event of an insurance claim, the beneficiary is the principal. Bond insurance is therefore of great significance when large construction and infrastructure projects are be realised.

The insurer bases its risk assessment on an examination of the policyholder's solvency and experience in the field in which it has assumed contractual obligations and on an evaluation of the policyholder's technical capacity and manpower capabilities. In 2004, environmental aspects will be considered in the risk identification process as a further component of risk assessment – and for good reason. The main benefits Munich Re sees in this are
- the avoidance of additional costs or delays in projects due to possibly unforeseen problems,
- the protection of Munich Re's image in connection with projects that are a matter of public debate, and
- the promotion of internationally accepted standards (OECD, World Bank).

For certain areas and certain risk volumes, Munich Re will also include environmental aspects as a further criterion in the risk evaluation of its bond business. The very nature of the business we conduct means that any influence we exert will mainly focus on sensitising our clients, the primary insurance companies, during actual treaty negotiations and renewal talks, within the framework of client forums, and in the course of our work on various committees. As in the banking world, the ultimate aim is for all the insurers and reinsurers involved to undertake a joint obligation that when they provide guarantees, they examine the respective projects on the basis of certain environmental standards and insist on compliance with them.

Example: Environmental liability insurance

Our experts in environmental liability insurance focused on the following areas last year:
- Examination of the environmental situation and the liability regulations in the countries of eastern central Europe acceding to the EU and preparation of insurance solutions for the problem of contaminated sites
- Development of practical underwriting aids for environmental liability risks involving mobile communication systems and sewage treatment plants
- Examination of environmental aspects connected with product liability
- Analysis of the liability for "purely ecological" loss or damage (a rather grey area of environmental impairment losses, which, depending on the legal system that is applicable, may not affect individual rights at all and for which there may be no express state responsibility for the assertion of claims, e.g. biodiversity damage)

Emissions trading

The instrument of emissions trading (see above) stipulated in the Kyoto Protocol will be introduced for the first time on a broad scale when the EU's trading system is launched at the beginning of 2005. Past experience with this tool suggests that the cost of avoiding emissions can be reduced with the aid of market economy mechanisms. Allowances that become available for particularly energy-efficient and environmentally sound performance can be bought by companies whose costs for necessary reductions (per tonne of CO_2 or other greenhouse gases) are above the market price for the respective emissions allowance. The envisaged transfer of emission allowances means that reductions can be made where the costs for these reductions are lowest. The flexibility mechanisms of Joint Implementation (JI) and Clean Development Mechanism (CDM) are designed to promote reductions in emissions outside the EU too, in countries with reduction targets within the framework of the Kyoto Protocol (JI – from the beginning of 2005) or in countries with no reduction targets (CDM – from the beginning of 2005). These emission reductions can also be transferred and sold after an independent certification.

The conclusions drawn by the New Products/Markets Working Group in 2002 within the framework of the Challenge of Climate Change Project have only been implemented to a limited degree so far because the market in emission rights is still being established. This also applies to the demand for the coverage of risks connected with emissions trading or other associated emission reduction projects (JI and CDM). Particularly in the area of renewable energies, however, we expect demand to grow in the long term.

Implementation of measures specified in our environmental programme

There now follows a brief summary of the status reached by projects in the reinsurance sector specified in our environmental programme for 2000–2003. This is an update of last year's report.

Goal: Promote our clients' knowledge in the fields of environmental protection and environmental management through information and training

Measure	Deadline	Status	Comment
Produce the brochure "Environmental Management Systems".	10/01	Completed	This brochure informs insurers on the most important aspects of the various environmental management systems in the assessment of environmental liability risks. The brochure was published in 2003 in German and English as part of the series "Casualty Risk Consulting – Information for Insurers".

Goal: Pay closer attention to environmental impact in loss analysis and loss adjustment

Measure	Deadline	Status	Comment
Consider and process existing information on attendant and consequential ecological damage when assessing and reporting losses.	12/03	Completed	A concept and tools were devised for evaluating data on losses with an environmental relevance. The recommendation was to enter environmentally related loss data straight into a database specially developed for this purpose. This allows a broad spectrum of queries at all times. These analyses permit conclusions to be drawn on the handling of environmentally hazardous risks and loss minimisation and prevention. Corresponding follow-up projects are intended with a view to these analyses being considered in the underwriting process. We have also begun documenting information on environmental losses from all relevant perspectives, regardless of the degree of participation on the part of private insurance and Munich Re. Finally, we are working on a system for the documentation and better comprehension of man-made risks and catastrophes which makes a distinction between short-term and long-term risks and between ecological, technological, politico-social, and economic risks.

Goal: **Promote the knowledge and awareness of complex connections in our insurance fields through scientific investigations**			
Measure	**Deadline**	**Status**	**Comment**
In collaboration with recognised institutes and organisations, set up a project dealing with the subject of environmentally sound and sustainable agricultural production.	Ongoing	In progress	Financial and technical support was provided for a dissertation written by a student of the Department of Economic Studies at the Technical University at Weihenstephan on the effects of genetically modified plants on agricultural insurance.

Goal: **Support environmental activities through innovative products and extensions of cover**			
Measure	**Deadline**	**Status**	**Comment**
Make initial preparations for the introduction of state-funded multi-peril insurance for animal and plant production in Germany and the EU, with a mandatory requirement of site-specific crop management and the application of good professional practice.	Ongoing	In progress	We continue to place our confidence in the concept of a new agricultural insurance system based on a risk partnership between agriculture, the state, and the insurance industry. A pilot project for crop insurance was launched in Luxembourg in collaboration with Vereinigte Hagelversicherung, a hail insurer. Close support for the project is planned. We are also pursuing a pilot project for crop insurance in eastern Germany.

Of the 20 measures specified for the field of reinsurance in Munich Re's first environmental programme for 2001–2003, 14 had been implemented by the end of 2003, while six of the measures originally agreed upon were not pursued any further. This is due, among other things, to changes in processes as a result of the restructuring of Munich Re in this area.

These are some of the environmentally-related tasks that await us in the field of reinsurance (from the environmental programme for 2004–2006):

- Realise Munich Re's environmental guidelines further and firmly establish environmental criteria in the underwriting guidelines for various lines of reinsurance business, e.g. credit and marine business. 03/05
- Examine the correlation between production intensity and vulnerability to insurable hazards in agricultural insurance. 06/04
- Improve the availability of exposure and claims data in connection with weather-related natural hazards. Ongoing
- Firmly establish World Bank standards in our knowledge management. 12/04
- Further develop our didactic material on environmental liability and environmental liability insurance. 12/04
- Produce further publications in the series "Casualty Risk Consulting – Information for Insurers". 12/05
- Modify existing products and develop new products in connection with the Kyoto mechanisms. Ongoing
- Examine the question of morbidity and mortality due to decreasing water quality. 06/06

4.2 Finance

Sustainability and Munich Re shares

The volume of investments in Europe by institutional investors which in the context of Socially Responsible Investment (SRI) do not contravene simple negative criteria (e.g. armaments) or are managed in line with the engagement approach has already reached €336bn (44% of this in the United Kingdom, 54% in the Netherlands). This figure was published by the European Social Investment Forum (Eurosif) in its report "Socially Responsible Investment among European Institutional Investors" at the end of 2003. An investment volume of €34bn passes the test of strict positive and negative criteria. In the United States, the volume was estimated to be US$ 2.16 trillion at the beginning of 2004. This is equivalent to an increase of some 6% over 2002 in spite of what is a difficult market environment. These figures show that the market in sustainable investments is steadily growing in importance.

We have made great efforts to provide investors with an adequate account of Munich Re's activities in terms of sustainability. We are thus increasingly seeking personal contact, which means having talks with investors at our own offices or paying visits on the occasion of specially designed roadshows.

An investigation into the European sustainability funds for which Munich Re shares have qualified made us more familiar with this group of shareholders' demands with regard to information and communication and closed a number of information gaps. The investigation revealed the following: Munich Re can be considered a sustainable investment for two-thirds of the more than 60 funds we questioned (with a volume of approx. €7bn). This positive result is very

pleasing. At the same time, it provides an incentive for us to talk with the managers of the other funds in order to find out why Munich Re has not yet met their selection criteria.

Munich Re shares are still included in the two main sustainability indexes, Dow Jones Sustainability Index (DJSI) and the FTSE4Good Index. As far as our sustainability activities within the insurance industry are concerned, the evaluation and classification by SAM (in connection with the screening for the DJSI) remained the same. We came sixth. The fact that our ranking has not changed in spite of the numerous advances that have been made within the Group indicates to us that the insurance industry as a whole has improved significantly and that sustainability is increasingly becoming an integral part of its business processes.

More information on this subject may be found at these sites:

www.sustainability-indexes.com
www.ftse.com/ftse4good/
www.eurosif.org
www.socialinvest.org

Analysis of the connection between sustainability and financial performance

Since September 2001, Munich Re has been involved in a project called Environmental and Sustainability Transparency for the Stock Markets, which was set up by the Institute for Environmental Management and Business Administration at the European Business School (ebs). One of the aims of this project was to gather more knowledge on the concrete connections between ecological and social aspects on the one hand and the economic success and performance of investments on the other. Sponsored by the Federal Ministry of Education and Research under the patronage of Prof. Klaus Töpfer, this project will be completed in 2004.

We will now present some of the most important findings of this comprehensive research project which were announced in 2003.

In March 2003, the final report was published on the econometric study carried out by the Centre for European Economic Research. It presents and evaluates the results of this study in detail (cf. Perspectives 2002), which were already made public at the end of 2002.

In addition to these valuable results, the project led to a "product" designed to improve the flow of information between companies and the users of company information (with regard to sustainability): the so-called Manual of Sustainability Criteria. This manual will serve as a central tool for the further development of our sustainability reporting. It draws together the requirements set by various standards with reference to sustainability reporting (e.g. GRI) and the questions posed by a wide range of SRI rating agencies. This will enable us to quickly record the aspects that are examined in each topic area. We will then be able to check our reporting for gaps and modify the choice of communication channel accordingly.

In cooperation with the German Share Institute, companies in Germany – including Munich Re – were asked how they assessed the segment of sustainable investment and what experience they had gathered to date. The authors concluded that major significance was attached to this topic particularly by large companies in environmentally sensitive sectors. The resources expended in responding to enquiries from funds and research companies in connection with sustainability are in some cases substantial. One negative aspect of this is that the process of analysis and evaluation is not always fully transparent for the companies – an assessment that is in line with our own experience. The results of the branch analyses announced for 2003 (cf. Perspectives 2002) will not be published until 2004.

Another important outcome of the project besides the studies that were carried out is the internet platform for sustainability funds. It provides comprehensive information on sustainability funds offered in the German-speaking area. Users can also gather information on individual companies and find the sustainability indexes in which a company is represented and the sustainability funds in which a company is among the top ten holdings.

The platform's internet address is:

www.sustainable-investment.org

Implementation of measures specified in our environmental programme

The measures from the environmental programme are performed by Munich Re's two financial units. Financial Management & Consulting is responsible for, among other things, strategic asset allocation and risk management. It is also responsible for the mandate which provides our asset managers with the framework for the management of investments held for trading purposes and real estate. Group Investments is in charge of shareholdings and takes care of Supervisory Board memberships. MEAG MUNICH ERGO AssetManagement GmbH handles the active portfolio management of securities for all investors of the Munich Re Group and manages the large amount of real estate used by third parties.

As to government bonds, we have examined various approaches to establishing their suitability for our specific requirements and discussed them in personal talks with various providers. The main challenge is to bring these methods into line with our principle of currency matching. For technical reasons, capital must be allocated in the currencies in which we have a relatively large volume of insurance business. In the course of 2004, we will also develop a special procedure that will take account of sustainability aspects when investing in government bonds.

It was decided in 2002 that 80% of our investments in shares and corporate bonds should meet sustainability requirements in the long term. This was an important step in the right direction. The re-examination of the portfolio as at 31 December 2003 revealed that this figure had dropped slightly to around 78%, the main reason being that we had cut back on important shareholdings, particularly in Allianz. This examination again showed that such an annual investigation requires a considerable amount of effort and expense, the reduction of which will certainly require a good deal more experience.

One of the most important milestones in the area of asset management was the launching of the MEAG Nachhaltigkeit fund. It is MEAG's first retail fund to take account of sustainability criteria alongside the conventional, strict investment process. Assets are primarily invested in shares included in the Dow Jones Sustainability World Index (thus excluding tobacco, alcohol, gambling, and armaments and firearms). More information on this can be found in the article in the magazine entitled "Profit and a clear conscience".

Measure	Deadline	Status	Comment
Add sustainability and environmental criteria to Munich Re's in-house catalogue of criteria for investments.	03/01	Completed	In addition to the sustainability criteria specified in the mandate, a set of criteria for investments was adopted.
Measure	**Deadline**	**Status**	**Comment**
Examine the potential for investing in shares and funds with particular focus on sustainability.	03/01	Completed	The retail fund MEAG Nachhaltigkeit (ISIN DE0001619997) was launched in October 2003. The starting capital of €15m was provided in equal shares from the assets of the reinsurance group and the ERGO Insurance Group
Measure	**Deadline**	**Status**	**Comment**
Gather information on an ongoing basis regarding environmental aspects at companies in which we have shareholdings. Discuss questions that emerge in Supervisory Board meetings.	03/01	Completed	The catalogue of questions based on the type of industrial companies in which we have shareholdings was adopted.
Measure	**Deadline**	**Status**	**Comment**
Broaden the information basis for our asset management and intensify research in the area of sustainability.	Ongoing	–	–
Measure	**Deadline**	**Status**	**Comment**
Draw up a concept for the implementation of environmental protection measures in real estate used by third parties.	06/03	Completed	A set of ecological criteria for building, refurbishing, and purchasing real estate was drafted in conjunction with MEAG. We also decided on a procedure for screening energy efficiency. On the basis of the results of the screening, investment plans for measures are to be developed with the aim of reducing the energy consumption in buildings and hence the emission of CO_2 by real estate used by third parties. Further procedures were laid down in the environmental programme for 2004–2006.

The fund was set up with the aim of closing the gap in the range of products offered by MEAG, because its portfolio of retail funds did not contain an international equity fund. The fact that a sustainability approach was chosen for this – coupled with the fact that a starting capital of €15m was injected into the fund with equal shares from the assets of the reinsurance group and the ERGO Insurance Group – underlines our confidence in the success of such an approach for investments. This was confirmed by the performance of 5.94% in the first three months alone from the launch until 31 December 2003.

How far risks evolving from global climate change could affect our investments is a question that naturally remains at the centre of focus. Those who followed the reports in the press last year will have read that the shares of a few American insurers were under pressure for a short time as a result of Hurricane Isabel. But there were benefits for DIY centres. And in Europe, last year's extremely hot summer was a boon to mineral water producers.

The Challenge of Climate Change Project calls for climate risks to be considered in investments, and that presupposes adequate data resources. This is one of the reasons why we have been supporting the Carbon Disclosure Project (CDP) since 2002. The CDP requires the 500 largest companies to publish their emissions of the most important greenhouse gases. Information is also requested on their targets for reducing these emissions. The CDP compiled the responses in a report first published in February 2003 (www.cdproject.net). Munich Re is in an excellent position in this respect with its activities within the framework of its Challenge of Climate Change Project (cf. Perspectives 2002).

In the first round (published in 2003) the initiative was supported by investment companies with managed assets of approx. €4,000bn. In the second round, which will be published in 2004, managed assets of €10,000bn will be involved, which is an indication of the increasing relevance of this topic.

We will continue to concern ourselves with the subject of climate change and asset management in the future. Besides making our own assessment of the risks that face asset management as a result of climate change, we will do this not least through our work in the Climate Change Working Group of the UNEP Finance Initiative and in the Extreme Events Working Group of the Intergovernmental Panel on Climate Change (IPCC) and the close ongoing exchange with organisations like Germanwatch and the UK's Institutional Investors' Group on Climate Change.

All six of the measures in the financial sector specified in Munich Re's first environmental programme for the years 2001–2003 had been implemented by the end of 2003. If we include the other measures that have been carried out in recent years, we can say that the targets specified in the environmental programme for this area have been far surpassed.

These are some of the tasks that await us in the financial sector (from the environmental programme for 2004–2006):

– Check the proportion of investments in companies that are included in one of the most important sustainability indexes, with the aim of keeping this proportion at around 80% in the long term.	Annually
– Develop sustainability criteria for German state bonds; plan and perform screening of German states using suitable sustainability criteria.	06/04
– Analyse Munich Re's investment risks in terms of climate change; analyse the influencing factors. Repeat this risk analysis and the respective documentation on a regular basis.	Annually
– Improve the data situation with a view to attaining greater accuracy in the assessment of the effects that developments linked with climate change will have on the management of investments.	06/04
– Analyse the most important European sustainability funds with a view to their relevance for Munich Re.	12/04
– Plan and perform a screening of real estate used by third parties with the aid of suitable sustainability criteria, including in particular energy efficiency.	12/05
– Draft investment plans for measures that are necessary to reduce the CO_2 emissions of real estate used by third parties.	12/05
– Update sustainability criteria for the acquisition of shareholdings.	06/05

05 Operational ecology

Our Munich site embraces twelve office buildings and the grounds between Leopoldstrasse and the English Garden. Eight rented buildings in the immediate and surrounding vicinity of the Main Building in Königinstrasse are also occupied by Munich Re staff.

A further building was added at the end of 2003 – at MünchnerTor. It is located almost two kilometres north of the Main Building. Perspectives 2002 contained a detailed report on this construction project. The plan is to eventually accommodate around a third of all the staff in these new offices. The building was commissioned and the staff moved in during the first quarter of 2004. For this reason, the office building at MünchnerTor does not come into the environmental review for 2003 or this environmental report. We will have more to say on the new building in next year's environmental report.

The old locations used to accommodate some 3,200 staff. Besides offices and meeting rooms, these buildings also house the necessary infrastructural installations: kitchens and dining rooms, cafeterias, the computer centre, the international training centre, and underground car parks, all linked by underground passages.

The following areas are of particular relevance in environmental terms:
– the hydraulically-operated conveying equipment (e.g. passenger/goods lifts),
– the emergency generators (storage of diesel fuel),
– the refrigerating plants (use of refrigerants),
– the rainwater utilisation plant (water treatment),
– the garage,
– nursery and gardening.

Input and output balance sheet 2003

Input	Fixed assets	As at 31.12.2003		Output
0 m^2	Land	39,590 m^2	Land	0 m^2
0 m^2	Building area (net)	136,857 m^2	Building area (net)	0 m^2
0 pcs.	Building facilities and fixtures*	444 pcs.	Building facilities and fixtures	0 pcs.
730 pcs.	Technical facilities and vehicles	2,294 pcs.	Technical facilities and vehicles	129 pcs.
10,789 pcs.	Office equipment	71,597 pcs.	Office equipment	6,411 pcs.
Input	**Current assets**	**As at 31.12.2003**		**Output**
31,457,200 sheets	Copying paper	12,581,900 sheets	Printed office paper, forms, envelopes	445,305 pcs.
18,800,000 sheets	*of which recycled paper*			
22,455 pcs.	Sheet pads	17,547 pcs.		
5,513 pcs.	*of which recycled paper*			
424,833 pcs.	Envelopes, padded envelopes	48,990 pcs.		
122,987 kg	Paper for printed advertising material/publications	0 kg	Printed advertising material (MR publications)	536,183 pcs.
617,539 units	Office articles	104,574 units	Refill articles	3,553 pcs.
7,673 units	Advertising gifts	14,863 units	Advertising gifts	8,326 units
6,063 pcs.	Electronic data media	22,885 pcs.	Electronic data media	11,219 pcs.
81,000 kg (P)	Incoming mail		Letters	33,240 kg (H)
			Packages	83,342 kg (H)
366,172 pcs.	Packaging	1,030 pcs.	Packaging	16,172 pcs.
863,550 kg (P)	Food, beverages, tobacco	20,392 kg	Food portions	559,784 serv.
Input	**Water**	**As at 31.12.2003**		**Output**
79,317 m^3	Drinking water	0 m^3	Waste water	79,782 m^3
465 m^3	Rain water	n. r.		
n. r.	Groundwater and surface water	0 m^3		
Input	**Energy**	**As at 31.12.2003**		**Output**
16,705,620 kWh	Electricity	–	Supplied electricity (in-house generation of electrical energy)	50,000 kWh
10,163,464 kWh	District heating		Energy output (collectible energy, waste heat from technical installations)	n. r.
199,881 kWh	Gas			
4,000 l	Emergency diesel (not for heating)			

(P) = projection; n.r. = not recorded
"Building facilities and fixtures" only includes the technical facilities listed in the facility register.

Some examples of environmental protection in the operations at the Munich site

Procurement

When purchasing materials and services, it is becoming increasingly important to consider not only economic and technical aspects but also environmental ones. Considerations relating to the consumption of resources, production methods, service life, and recyclability or environmentally sound disposal options can often be brought into line with economic considerations.

The focus last year was on the following:

– Office supplies
There are ecological alternatives for many of our office materials: solvent-free adhesives, refills for adhesive sticks, registration and filing articles made of cardboard, flipchart pads made of recycled paper, or fluorescent markers with water-based ink, to name but a few. Our electronic materials procurement system, eCOS, went online last year. The staff responsible for ordering office supplies in the individual divisions can use this system to order electronically all the office supplies available at Munich Re. The materials for which there are ecological alternatives are marked accordingly.

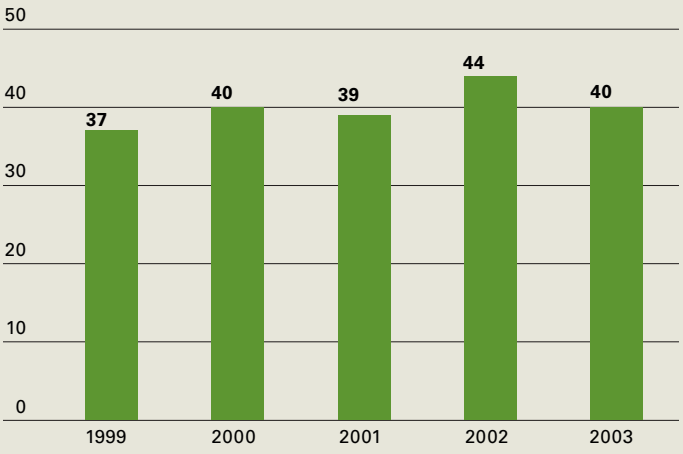
– Office paper
The amount of printing and copying paper used by each staff member has remained almost constant in the course of recent years (approx. 40 sheets per person per day). As in the previous year, paper was an item to which we attached particular importance. After all, every year sees a few tonnes of it passing through our printers, copying equipment, and fax machines or being used for writing on. Besides a bright white TCF paper, a high-quality recycled paper has also been available for printing and copying since 2002. Each staff member can choose whether to use bright white or recycled paper. For external purposes – in our correspondence with clients – bright white paper is still largely preferred. For internal purposes, however, we are striving to cover our entire needs with environmentally sound recycled paper. By standardising the sheet pads we use for various purposes (A4, A5, A6 – squared, lined, etc.) we now have alternatives made of recycled paper.

Of the approx. 31.5 million sheets of copying paper we purchased in 2003 (equivalent to approx. 157 t), 18.8 million were recycled paper. The proportion of recycled paper has thus increased to almost 60%.

For the production of Munich Re's high-quality publications, a further 123 tonnes of paper was printed. Of this total, 8.8 tonnes was for in-house publications. Last year, Munich Re decided that in the future it would use nothing but recycled paper for its in-house publications, i.e. Munich Re publications printed with its own staff as the target group. Apart from its known ecological advantages (protection of resources, lower consumption of energy, water, and chemicals in the manufacturing process), recycled paper also saves about 25% on the cost of paper for our internal publications compared with the paper we have used in the past.

There was a large increase in the number of parcels and small packages dispatched in 2003 because of the very extensive Annual Report 2002. The information that had to be published in the report was supplemented with numerous articles on various topics from the reinsurance sector – which set new standards, also with regard to the physical weight of the publication itself.

Copying paper (sheets per person per day)



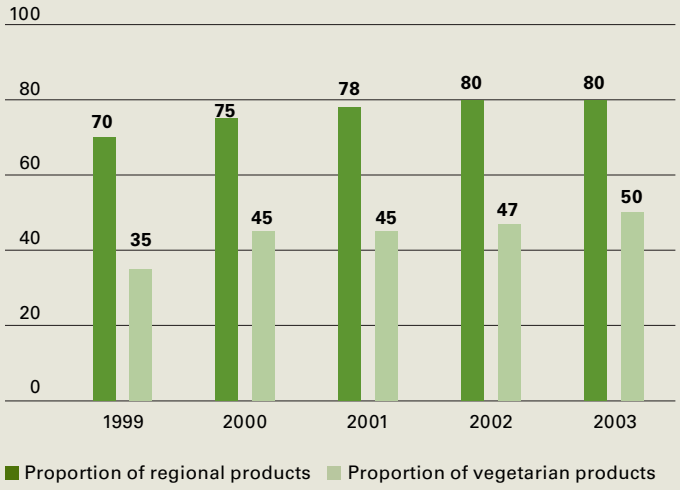
Measure	Deadline	Status	Comment
Ongoing maintenance and further development of the list of criteria for office supplies.	Ongoing	Completed	Introduction of the eCOS system with an indication of ecological alternatives.

– IT hardware
In 2002, we developed a catalogue of ecological criteria for various types of IT hardware (laptops, printers, screens, PDAs, etc.). This catalogue, which leans very heavily on the strict requirements of Germany's Blue Angel environmental label system, has now passed its first test in practice. In 2003, following our purchase of new PCs the previous year, we asked five manufacturers of notebooks to provide evidence that their products were in line with our ecological requirements. All the manufacturers we approached were very cooperative and they all responded to the wide-ranging questions we posed. Using these results as a basis, we will work together with our IT colleagues to improve our evaluation and consideration of the environmental information we receive so that this information can flow even better into the process of selecting the equipment to be bought.

Another continuing source of satisfaction is the arrangement we have with an external service provider for the proper disposal and recycling of redundant equipment (cf. Disposal).

– Staff catering
We still favour regional products, not least because of the greater confidence we place in them. At 80%, the proportion of local products remained almost constant last year. At least one vegetarian meal is always on offer at the staff dining room. There is also a salad bar with a different selection every day . The share of vegetarian products was thus boosted again in 2003 and has now reached a level of 50%.

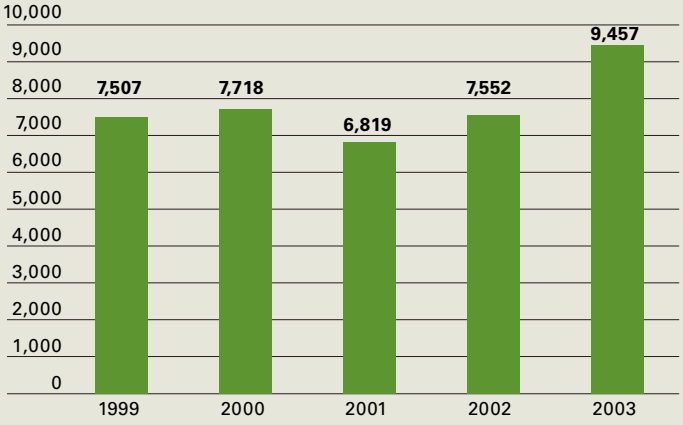
Staff catering (in %)



In February 2003, the staff had an opportunity to find out about ecological catering at a stand set up at the entrance to the staff dining room by the Landfrau Fleisch- und Wurst GmbH.

Transport

Business trips (km per person per year)



Business travel went up significantly, by almost 2,000 km per person (car journeys accounting for the largest proportion of the increase). It was an even larger increase than in 2002. There were about 1,000 more journeys in 2003 than in the previous year. Short-distance travel increased by 61%, long-distance travel by 35%. This was due above all to a number of major projects and the greater need for our staff to attend external seminars as a result of restructuring in 2001.

Increased travelling also raised the level of CO_2 emissions. The main reason for the rise being so distinct compared with the previous year, however, was the current adjustment of the conversion factors to calculate CO_2 emissions.

– There was a comparatively small adjustment for business trips by rail. This mainly involved long-distance travel within Germany. According to German Rail, long-distance rail travel accounts for an emission of 0.048 kg of CO_2 per passenger/km (the conversion factor previously used was 0.045 kg).
– There was a larger adjustment for air travel. The emission of CO_2 per passenger/km in air travel has fallen from 0.432 to 0.253 kg for distances below 500 km and from 0.175 to 0.168 kg for distances above 500 km [according to UBA, DLH]). This is due among other things to the technological progress made in aircraft construction and a higher utilisation of capacity. Nevertheless, specialist circles are unanimous that air travel makes a much greater contribution to

the greenhouse effect than its CO_2 emissions would lead one to expect. It is no longer sufficient to concentrate on CO_2 emissions when assessing the environmental effects of air travel. The yardstick used to determine its impact on the greenhouse effect over and beyond the emission of CO_2 is the Radiative Forcing Index (RFI). Currently, CO_2 emissions must be multiplied by an RFI of 2.7. We used this yardstick for the first time in our environmental review for 2003. It enables us to provide a more accurate picture of the effects of our air travel.

CO_2 emissions per person per year increased substantially from 18.9 to 31.1 kg (not including the RFI: 20.8 kg). This updated calculation method also reveals that CO_2 emissions from business trips are much more significant than those from the consumption of energy in our office operations (cf. graph on page 72).

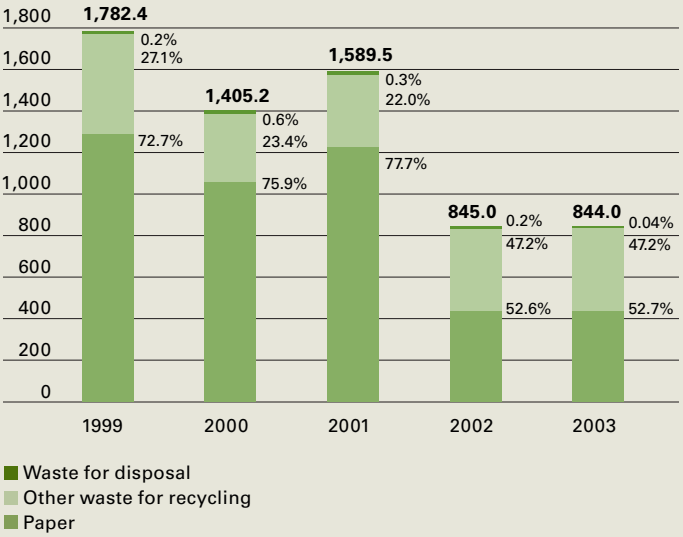
Waste disposal

The critical success factor for the proper disposal of all the waste that mounts up in our business operations continues to be the strict separation of waste by the staff. All waste must be separated into paper, residual waste, and biological waste at the workplace because separation at a later stage involves an unreasonable amount of time and effort. And it is a particular challenge to keep this up when there are so many relocations taking place in our office buildings involving extensive clean-up operations.

In 2003, we continued the contract signed with recycle it GmbH in 2001 governing the reconditioning and reselling of IT hardware on the basis of ecological principles. Last year, for instance, functional notebooks that were no longer to be used within the company were offered to our staff for purchase at recycle it's internet marketplace. All equipment to be sold in this way undergoes a technical inspection beforehand. In giving preference to re-use as opposed to materials recycling, we prolong the service life of the equipment and help to reduce the volume of electronic scrap (more information may be found at www.recycle-it.de).

The possibility of re-using other technical equipment is also being examined. The reusable parts of the 66 mobile phones that were taken out of service, for example, were kept as spares. Parts that could not be reused were disposed of as electronic scrap, while the accumulators were disposed of separately in the waste battery collection system.

Composition of waste from business operations (t)*



*Our waste inventories for 2002 and 2003 were adjusted in accordance with the current breakdown of waste types specified in Waste Management Law (AWG). This has a slight influence on how waste is distributed for the purposes of disposal and recovery. The total amount of waste is not affected. Paper is one of the waste materials that can be recovered. It is the most important type of waste in terms of volume, which is why it is referred to separately here.

The overall volume of waste from our business activities remained more or less constant compared with the previous year.

There was less waste from construction projects in 2003. And almost half of this waste came from the demolition of our ecological model building. Erected at the time we had our South 1 building refurbished, it was intended to show how the South 1 building would fit into the existing ensemble.

Waste*

	2003	2002
Waste from business operations	**844.0 t**	**845.0 t**
Other waste for recycling	**843.6 t**	**843.5 t**
Waste not requiring monitoring (recycling)	**619.7 t**	**622.9 t**
Glass	46.0 t	44.9 t
Metal	5.2 t	4.6 t
Plastics	2.0 t	2.3 t
Polystyrene	0.0 t	0.0 t
Biowaste (compostable waste)	78.0 t	81.1 t
Paper for recycling	445.0 t	444.5 t
Food scraps	41.0 t	39.5 t
Wood	0.0 t	0.0 t
Electronic scrap, mixed	0.0 t	3.5 t
Contents of grease traps	2.5 t	2.5 t
Waste requiring monitoring (recycling)	**219.0 t**	**217.6 t**
Mixed household waste	219.0 t	217.6 t
Waste requiring special monitoring (recycling)	**4.9 t**	**3.0 t**
Electronic scrap (IT equipment)	4.4 t	2.7 t
Developing agents	0.0 t	0.2 t
Fixing agents	0.0 t	0.1 t
Mixtures of solvents	0.5 t	0.0 t
Waste for disposal	**0.4 t**	**1.5 t**
Waste requiring monitoring (disposal)	**0.0 t**	**0.0 t**
Waste requiring special monitoring (disposal)	**0.4 t**	**1.5 t**
Contents of sludge trap in car-wash	0.0 t	0.5 t
Operating resources containing oil	< 0.1 t	< 0.1 t
Used oil	0.0 t	0.5 t
Laboratory chemicals	0.2 t	0.4 t
Fluorescent tubes	3,209 pcs.	4,190 pcs.
Energy-saving bulbs	1,460 pcs.	2,504 pcs.
Batteries	0.1 t	< 0.1 t
Waste from building projects	**546.6 t**	**715.5 t**
Mineral construction materials	486.7 t	599.6 t
Metal construction materials	18.4 t	13.1 t
Insulating and sealing materials	4.3 t	7.5 t
Wooden materials	21.6 t	49.0 t
Plastics	9.9 t	6.4 t
Charge materials and fuels	< 0.1 t	0.0 t
Biological materials	0.0 t	23.0 t
Mixed forms	5.7 t	16.8 t

*The waste inventory in our environmental report for 2003 has been adjusted to the current breakdown of waste types in the German law on waste management (AWG). This has had a slight influence on the distribution of waste for the purposes of disposal and recovery.

Use and upkeep of our property

A distinct drop in the demand for heating per square metre was observed in 2002. The main reason for this was the more accurate categorisation of the respective areas. A further influential factor was the use of our South 1 office building, the physical characteristics of which have reduced the specific consumption of heat. Furthermore, all the kitchen equipment (cooking pots and dishwashers) for the Munich Re staff dining room was switched over from steam to electricity. The overall demand for heating in 2003 increased slightly compared with 2002. This is mainly due to the fact that South 1 was in full operation for the first time. However, the figure for 2003 is still much lower than the figures for the years prior to 2002.

Altogether water consumption increased by approx. 2,000 m^3 in 2003. This is due above all to the extremely hot summer. A further cause was again South 1 being in full operation. It has a cooling tower and a new sprinkler irrigation system, which result in additional water consumption. But staff numbers increased at a faster rate than water consumption. Water consumption per person thus fell in 2003, which is an indication that investments in water-saving measures are worthwhile.

Power consumption both overall and per person again increased in 2003, in the latter case by no less than 12%. The largest power consumers are Munich Re's IT equipment (computer centre and PC workstations) and the cooling generation systems (again primarily for air conditioning in the process areas of the computer centre). Then there is the power consumption for lighting. The rise in power consumption (in all buildings taken together) is also attributable to the most varied of influences.

– We only had estimates of power consumption in the property rented by Munich Re. Even after the refurbishment and utilisation of South 1, we still keep some rented property as a buffer and operate it accordingly.
– The new South 1 building offers the staff better working conditions – with its cooling system, for example. This requires a higher degree of technology and hence more power consumption.

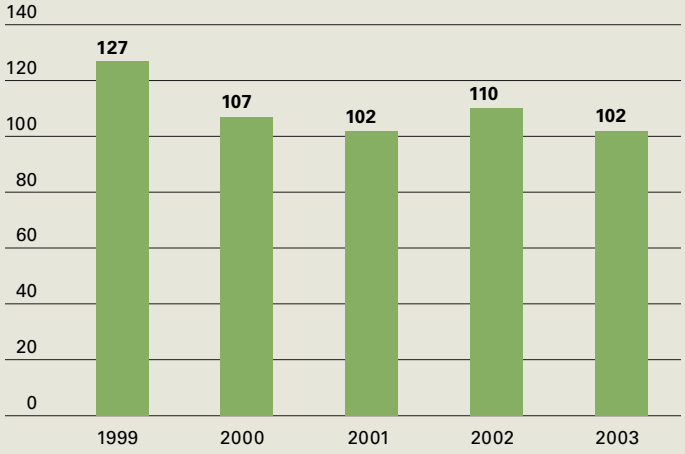
The increase in power consumption is again attributable to the extremely hot summer and to South 1 being in operation for the first full year (as it did not go into operation until February 2002). Last year, the solar panels installed on the roof of this building also went into operation. They fed 50 MWh into the public grid. This is very small amount compared with overall power consumption, but nevertheless it avoided the emission of about 24 tonnes of CO_2.

All the operational ecology targets specified in Munich Re's environmental programme for 2001–2003 (a total of 16 measures) were met in full by the end of 2003. A few other measures that had not been included in the environmental programme for 2001 were also carried out.

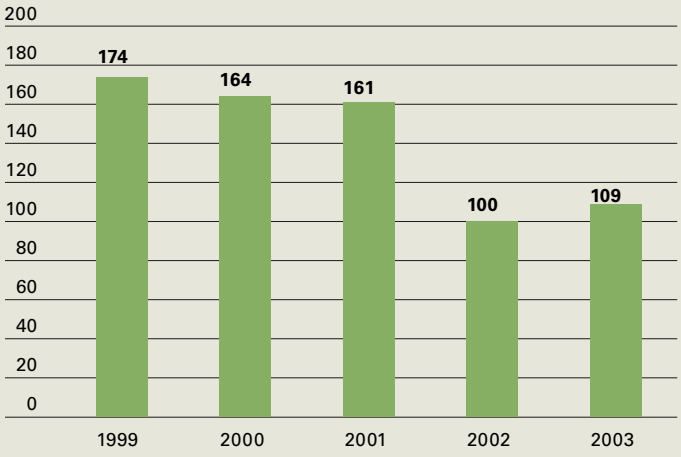
These are some of the tasks that await us in connection with operational ecology (from the environmental programme for 2004–2006):

– Develop a management system for outside firms which prescribes, among other things, the observance of ecological criteria, principles, and regulations.	12/04
– Step up the use of recycled packing material for transportation and shipments.	03/04
– Examine the degree to which ecology-oriented incentive systems can be created.	12/04
– Examine whether environmentally sound energy systems (e.g. natural gas propulsion, eco-diesel, electric vehicles) can be used for regular logistical journeys commissioned by Munich Re.	06/04
– Save energy by modernising the kitchen equipment.	06/04
– Examine offers for the supply of electricity from renewable sources.	Annually
– Perform cost/benefit analyses for the reconditioning of old heating systems.	12/05
– Existing buildings: analyse the current situation with regard to key building parameters and develop appropriate energy-saving concepts.	12/06
– New buildings: within the framework of the specifications to be defined for construction project management, define primary energy indicators (best practice) for energy management depending on user requirements.	12/05

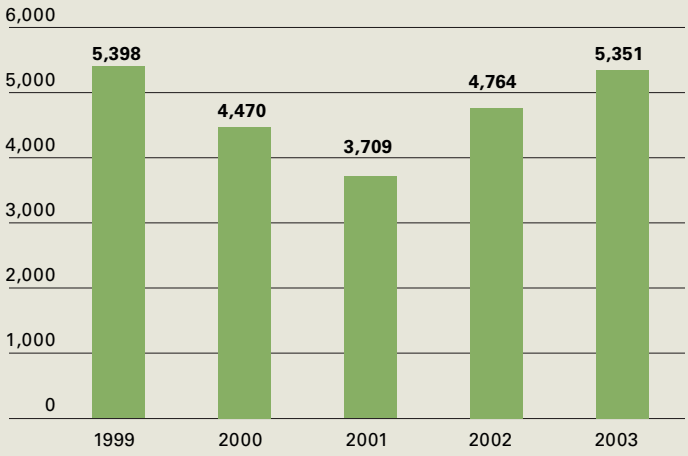
Water consumption (litres per person per day)



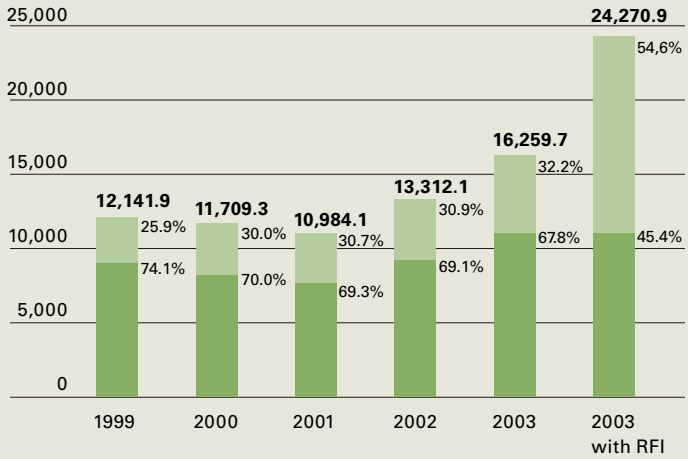
District heating and gas requirements (kWh/m² per year)



Power consumption (kWh per person per year)



CO_2 emissions, total (t)*



The RFI factor was applied to air travel for the first time in 2003. For the sake of comparison, the year 2003 is shown excluding and including the RFI factor (cf. Transport).

The Munich Reinsurance Company's key environmental figures 2001–2003 at a glance

	2003	2002	2001
Staff at the Munich site	3,122	2,821	2,545
Power consumption kWh per person per year	5,351	4,769	3,709
Heating kWh/m² per year	109	100	161
Water consumption litres per person per day	102	111	102
Copying paper sheets per person per day	40	44	39
– of which recycled paper %	*59*	*50*	
Business trips km per person	9,457	7,552	6,819
CO_2 emissions including RFI kg per person per day	31.1*	–	–
CO_2 emissions excluding RFI kg per person per day	20.8	18.9	17.3
Waste from business operations kg per person per day	1.1	1.2	2.5
Staff catering *– Proportion of regional products %*	*80*	*80*	*78*
– Proportion of vegetarian products %	*50*	*47*	*45*

*The RFI factor was applied to air travel for the first time in 2003. For the sake of comparison, the year 2003 is shown excluding and including the RFI factor (cf. Transport).

06 Environmental management

Last year, we further pursued our long-term commitment to promoting the numerous projects and initiatives towards implementing our environmental guidelines and our environmental programme. 2003 was also marked by a number of special events.

As of 1 April 2003, the environmental unit, which used to be part of Corporate Communications, moved to a different part of Munich Re's organisational structure. With the object of achieving greater proximity to our business operations and because of its interfaces to Munich Re's geoscientists, the Environmental Management Unit was attached to the Geo Risks Research Department within Corporate Underwriting/Global Clients (CUGC).

Responsibility also changed at Board level last year. As of 23 June 2003, Stefan Heyd (the Board Member responsible for CUGC) was appointed the Board Member responsible for environmental questions by the full Board of Management and assumed the functions previously performed by Christian Kluge (the Board Member responsible for Europe 1 and Corporate Communications). At the beginning of 2004, the responsibility for acting as Munich Re's Environmental Officer also changed. As of 1 April 2004, Prof. Dr. Dr. Peter Höppe, designated head of the Geo Risks Research Dept. took over this job from Dr. Dirk Johannsen, Head of Corporate Communications.

We would like to take this opportunity to thank Mr. Kluge and Dr. Johannsen again for their stimulating ideas, their intense involvement, and their committed support in building up the Environmental Management Unit and firmly establishing the guiding principles of sustainable development at Munich Re.

At the end of last year, our environmental management system was due for revalidation by an external accredited environmental verifier. This involved the examination and verification of its conformity with European Regulation (EC) No. 761/2001 issued by the European Parliament and the Council on 19 March 2001 on the voluntary participation of organisations in a joint system for environmental management and eco-auditing (EMAS – Eco-Management and Audit Scheme). We were also certified to the international standard DIN EN ISO 14 001 – an important precondition for extending our environmental management system within Munich Re's international organisation.

The successful revalidation was preceded by a process of intense preparation. We completely revised the documentation relating to our environmental management system (EMS). We naturally included in this documentation all the experience we have gathered in recent years with the aim of further improving our environmental management system as a stimulus and monitor for numerous environmentally related activities. After the many internal audits that were performed, it again emerged that one of the main areas for potential improvement in the future was the need to achieve a more visible integration – also in formal terms – of the ideas and content of the EMS in the operative processes and their instruments and to communicate them more forcefully. We have already been quite successful in this respect, e.g. by incorporating environmental aspects in Munich Re's central directive on project management (PRIMA – managing projects intelligently), in the guidelines on hardware purchasing, in the development of our Topic Network "Environmental Liability" on our knowledge management platform, and in the mandate for MEAG, our asset manager.

Environmental aspects must become an integral part of our daily work in all facets of our business activities. We will continue to work with great commitment on the development and promotion of appropriate instruments, so that they are seen as a form of support and service for Munich Re staff rather than as an additional regulatory tool.

Prior to revalidation, of course, we also looked back on what we had achieved up until then. On the very positive side, the environmental targets and the environmental programme from the first validation cycle (the period after Munich Re's first validation in 2000) have largely been attained or implemented. Besides being the product of the staff's exceptional commitment and expertise, this achievement has definitely also been made possible by the decentralised "architecture" of the EMS. The responsibility for achieving the goals that are set lies with the respective divisional units or central divisions, while the Environmental Management Unit performs a steering function and provides specialist support. At the end of the validation and certification process, the accredited environmental verifier issued us with an excellent certificate for our environmental management. This is a boost for us and an encouragement to further orient ourselves towards target-based and value-based environmental management that takes account of the variety, complexity, and dynamism of our business.

Goal: **Enhancement of Munich Re's environmental management system**			
Measure	**Deadline**	**Status**	**Comment**
Include other areas at the Munich site	12/03	Completed	See the example of bond insurance in Section 4.1.
Measure	**Deadline**	**Status**	**Comment**
Implement the environmental management system in our international organisation too.	12/03	Post-poned	

Of the four measures specified for the field of environmental management in Munich Re's first environmental programme for 2001–2003, three had been implemented by the end of 2003, whilst the start of one was postponed (cf. above table).

These are some of the tasks that await us in connection with environmental management (from the environmental programme for 2004–2006):

– Maintain and further develop our environmental management system.	Ongoing
– Perform monitoring audits.	Annually
– Adapt our environmental review to relevant units and parameters.	12/04

Responsibility for environmental protection at Munich Re is divided up as follows:

The full Board of Management

– decides on Munich Re's strategic position in the field of environmental protection and sustainable development,
– passes the environmental guidelines,
– names the Board Member responsible for environmental issues.

The Board Member responsible for environmental issues

– is the person to contact at Board level regarding environmental protection and sustainable development,
– is responsible for environmental protection goals being in line with the company's overall strategy.

The Environmental Officer

– coordinates Munich Re's presence in the topic area of environmental protection and sustainable development with all target groups,
– represents Munich Re on international committees and vis-à-vis the general public on all facets of environmental protection and sustainable development,
– reports to the Board of Management regularly on our environmental protection performance and the application and effectiveness of the environmental management system.

The divisional units and central divisions

– set environmental goals and decide on the measures that are appropriate for their respective area of responsibility and are responsible for their implementation,
– are responsible for the observance of statutory and administrative environmental protection regulations and laws.

The Environmental Management Unit

- shapes and implements Munich Re's environmental management system and develops it further,
- supports the Board of Management and the divisional units and central divisions with a view to attaining the goals relating to environmental protection and sustainable development,
- encourages an open dialogue with the staff and external target groups on aspects of environmental protection and sustainable development,
- coordinates and monitors the attainment of goals relating to environmental protection and sustainable development.

If you have any questions or suggestions, please contact us:

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07 Communication, training courses, motivation

Munich Re seeks dialogue with its stakeholders throughout the world. As their preferred partner in risk, we have made the long-term creation of value for our clients one of our central company objectives. In order to attain this objective, we share our international expertise and experience with our clients, staff, investors, and the public. This applies especially to the subjects of environmental protection and sustainable development. Some examples of this from 2003.

External communication measures and training courses

The subject chosen in 2003 for the annual Meeting of Reinsurance Managers, an event arranged for our clients in the German market, was "Climate change – A serious phenomenon". At this two-day event, some 40 climate specialists and insurance experts discussed the repercussions of climate change for the insurance industry. The meeting has developed into what is now a traditional forum for important and current topics and has been given a firm place in our clients' diaries.

For decision-makers in engineering insurance, there was a market event in May 2003 with the title "Renewable energies – now and in the future: Aspects from technology and insurance". The aim of this event was to present renewable energy technologies from unusual angles and thus create a discussion forum for the various underwriting and technical risks and opportunities.

Not surprisingly, Munich Re's expertise is in constant demand and is highly appreciated at events arranged by other organisations, e.g. within the framework of this year's Expert Days at the Allianz Centre for Technology (AZT) which focused on the technological and underwriting aspects of wind power plants.

In the numerous seminars of our client seminar programme "Knowledge in dialogue", we provide our clients with up-to-the-minute knowledge – mostly free of charge. Many of these seminars deal with environmental protection, environmental risks, and preventive strategies.

The special exhibition "Climate. The Experiment with Planet Earth", which opened at the Deutsche Museum in Munich on 7 November 2002 (see Perspectives 2002) was a complete success. It was therefore extended beyond the original closing date to 30 November 2003. 17 guided tours were organised for Munich Re staff. The exhibition was supplemented by a series of four dialogue-type events under the title of "Positions", which was supported by Munich Re and was aimed at the interested public:

– Climate protection: What is the economy doing?
– Earth management: Megalomania or necessity?
– Climate change: Normality or catastrophe?
– Climate protocols and world conferences: Milestones or blind alleys?

The Geo Risks Research Dept. has been working intensely in the field of natural hazards around the globe for almost 30 years and, with its know-how and the results of comprehensive statistical analyses, is closely involved in the scientific and political dialogue. An audience of millions has become familiar with its findings and its professional competence through numerous reports in the press, interviews with the media, and appearances on television. In 2003, for example, our experts provided answers to more than 250 enquiries in the spheres of television, radio, and print media. Our statistics on the number of natural catastrophes and the associated losses were quoted particularly often.

Altogether, 128 presentations were given by members of the Geo Risks Research Dept. at external events. This goes to show once again the importance that is attached in particular to the subject of climate change. It was only due to the limited amount of time available that many more requests had to be turned down; the number of presentations held could have been very much higher.

In 2003, these presentations, attendance at conferences, and work in various bodies, steering committees and working parties (cf. Memberships and dialogue) accounted for some 250 person-days on the part of our colleagues in Geo Risks Research alone.

Additional copies of "World of Natural Hazards", Munich Re's successful CD-ROM, were again produced in 2003. A total of 57,000 have already been distributed among interested parties.

Support for scientific work also plays an important role. In 2003, six dissertations and four theses were completed under the guidance of Geo Risks Research. Five more theses are being written at present.

At the UNEP FI (UNEP Finance Initiative) Roundtable in Tokyo, Munich Re gave a presentation entitled "Climate change – Threats and opportunities for the insurance industry". With more than 460 participants attending, many of them clients of ours, this Roundtable was one of the most successful UNEP FI events in recent years. The keen interest displayed by companies from the Asian region shows that sustainability in the financial services sector is no longer a topic that is primarily shaped by European companies.

In December 2003, Munich Re was also involved at COP9, the ninth climate conference in Milan, where it led the UNEP FI's Climate Change Working Group. At a press conference and a podium discussion in which UNEP's current Executive Director, Prof. Klaus Töpfer, took part, the Climate Change Working Group presented its new CEO Briefing "Emissions Trading".

The annual publication of our environmental report is a major step towards advancing the dialogue in the area of environmental protection. It is distributed to all the staff at our Munich office, the chief executives of our international organisation, our clients, and the interested public. We are very pleased about the repeatedly positive and attentive response to this publication. In order to do justice to the rapidly changing demands on reporting, we have decided to review the concept of the environmental report soon. Suggestions from our readers are an important yardstick in this respect.

Internal communication measures and training courses

As far as in-house communication is concerned, in which the staff are the target group, we continue to concentrate on providing information that is related to specific occasions and activities. Concrete examples help the staff to get a feel for the maxims of the environmental guidelines and above all to shape them. Besides the information channels that have now become part of everyday corporate life, e.g.

– the regular appearance of our staff magazine go ahead_>> and the online magazine on the intranet in Munich,
– regular presentations with environmental content in MR Forum,
– Munich Re colloquia,
– hints on environmental liability during the specialist training for underwriters,

there were numerous occasions in the run-up to revalidation at the end of 2003 to bring the subjects of environmental protection and sustainable development to the attention of the entire workforce.

In-depth workshops, for instance, were arranged for all the staff confronted with internal audits in order to discuss the degree of fulfilment of the agreed measures and targets for the future and to inform the staff of the current situation regarding Munich Re's environmental management system. The full Board of Management was also given a status report during a short presentation last summer. In order to sensitise the staff in Munich again to the many aspects involved and to prepare them for the external audit, we organised the Munich Re Environment Days at the end of November with the motto "Environmental protection in action". On three consecutive days, stands were set up outside the staff dining room, so that the staff could meet the experts face-to-face and find out about such environmental issues as the following:

– Reinsurance and environment: What can underwriters do?
– Munich Re's part in the geothermal project in Unterhaching
– Sustainable management of our investments: Presentation of the new equity fund "MEAG Nachhaltigkeit"
– Paper: Potential savings in purchasing and in daily use
– Energy4you: Energy management at Munich Re

Measure	Deadline	Status	Comment
Plan and perform a competition for ideas on environmental protection and sustainability.	12/01	Completed	Integration in the company suggestion scheme

The programme was rounded off by an ecological menu served at our staff dining room and a visit by the agricultural manager of the Eichethof, which belongs to Schloss Hohenkammer, our conference centre. The Echtelhof is one of the largest producers of ecologically produced seed in Germany. The staff had the opportunity to literally "feel" the difference between conventionally produced seed and ecological products. As part of the Environment Days, there was a presentation about our environmental management and a competition in which our Munich staff could test their knowledge of environmental protection.

The subject of environmental protection is now a regular feature in the three-day introduction course for new staff. Geo Risks Research gives a presentation on natural catastrophes, the implications for underwriting, and the services provided by the department, after which the Environmental Management Unit introduces itself. At a small in-house fair, we describe the areas of work covered by environmental management and answer the questions posed by interested staff. The response to these three events last year was exceptionally positive.

One particular highlight was the visit that Prof. Klaus Töpfer, Executive Director of the UN Environment Programme (UNEP), paid to our offices at the beginning of December 2003 (you can read an in-depth article on his visit in the magazine section). Prof. Töpfer's paper on the subject of environment-related risks met with great interest from Munich Re staff. Around 200 gathered in the South 1 entrance hall and a further 120 followed the talk in a live transmission. Prof. Töpfer spoke for a good hour on sustainable environment and climate policies. Before giving his talk, he discussed current environment topics with members of the Board of Management and managers from various divisions.

The motto for the measures specified in the environmental programme for internal communications was "Improve staff qualifications, provide motivation, and enhance identification with the subject of environment and sustainability".

Of the eleven measures specified for this sector in Munich Re's environmental programme for 2001–2003, six had been implemented by the end of 2003. Two of the measures were deferred, three were no longer pursued. If we include the additional measures that have been carried out in recent years, we can say that the targets set in our environmental programme have been far surpassed.

These are some of the tasks that await us in connection with communication, training, and heightening awareness (from the environmental programme for 2004–2006):

– Incorporate the subject of environmental protection and sustainable development in the training of insurance specialists.	12/05
– Publish communications regularly on environmental protection and sustainability with the following aims: · internal marketing · motivation of staff to adopt a personal attitude towards environmental protection and sustainability · actions with striking visual information	As the occasion arises
– Make a contribution to the international conference on renewable energies in Bonn in June 2004.	06/04
– Further develop the environmental report and the reporting process in the direction of sustainability.	12/05
– Systematically examine the contents of seminars for which the departments are responsible in terms of the relevance of environment- and sustainability-related topics.	12/04

Memberships and dialogue

The constructive dialogue on environmental protection with the interested public and professionals from the fields of science, economics, and politics is a matter of course for Munich Re's experts

As planned, the results of the Renewable Energies Working Group set up by the German Insurance Association (GDV) within its Underwriting Commission for Engineering Insurances were presented to the public in the spring of 2003. Munich Re had contributed its specialist knowledge in this area to the working group.

Munich Re is one of the main partners in the Dialogue on Water and Climate (DWC) and represents the global insurance industry in this initiative, which was launched at the end of 2001. Prior to the 3rd World Water Forum in March 2003, Munich Re's hydrology and climate experts and representatives of the DWC secretariat published a joint report discussing the financial sector's options for promoting risk prevention measures against climate-related and weather-related natural catastrophes. It contained an analysis of highly-developed countries and proposals for possible solutions for Third World countries. The report was presented at an event put on jointly by the DWC and Munich Re at the 3rd World Water Forum. Our cooperation with the DWC continues. The next activities are linked to this year's International Conference on Climate Change in Amsterdam and the World Conference for Disaster Reduction in Kobe in 2005.

Staff of the Geo Risks Research Dept., the Environmental Management Unit, and our environmental liability insurance experts are also active on numerous committees and working groups. These are a few examples:

- German Committee for Disaster Reduction: Board and Scientific Advisory Board
- German Research Network Natural Disasters
- Permanent Conference for Disaster Reduction and Disaster Management
- German Society of Earthquake Engineering and Structural Dynamics: Board
- GMES – Global Monitoring on Environment and Security
- European Climate Forum
- UN International Strategy for Disaster Reduction (ISDR): Task Force
- UNEP Finance Initiative: Steering Committee and Treasurer
- UNEP Finance Initiative Climate Change Working Group: Head
- International Early Warning Conference: Steering Committee
- United Nations University Bonn
- World Bank Disaster Management Facility, Natural Catastrophe Databases Working Group
- The DECHEMA – Society for Chemical Engineering and Biotechnology: Technical Committee for Plant Safety

The Finance Initiative set up by the United Nations Environment Programme (UNEP FI), of which Munich Re has been a member since 1999, plays an important role in terms of involvement within associations and organisations. More than 250 companies are represented in this initiative, with the result that UNEP FI is surely one of the most important drivers and catalysts of the integration of sustainability in the business processes of the financial sector.

Munich Re has been leading the UNEP FI's Climate Change Working Group since 2003. The main results of this working group are presented in the CEO Briefing, a series of publications launched in 2002. This series gives a brief summary of the working group's positions on various topics relevant to our business. It is now available in various languages including English, French, and Japanese.

Munich Re's work as the treasurer of the UNEP FI came to an end following the merger of the banking and insurance initiatives at the end of 2003, so that the emphasis is now on our work in the Climate Change Working Group. More information may be found at www.unepfi.net.

Munich Re publications in 2003 on the subjects of environment, environmental impairment, climate, and natural catastrophes:

	Order no.
Genetic engineering – A guide for the liability underwriter	302-03511
Genetic engineering: Knowledge lead for insurers – the Centre of Competence for Biosciences (available only in German)	302-03651
NatCatService®	302-03901
Perspectives – Munich Re's environmental magazine 2002	302-03777
Schadenspiegel 1/2003	302-03451
topics – Annual Review of Natural Catastrophes 2002	302-03631
topics 2/2003	302-03842
Two further brochures in the series Casualty Risk Consulting – Information for Insurers: Hazard zones	302-03701
Environmental management systems	302-03711

Environmental verifier

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