

ANNUAL REPORT 2011

MAKING OUR WORLD SAFER



MAKING OUR WORLD SAFER



QUOTATION

“NOTHING ENDURES
BUT CHANGE.”

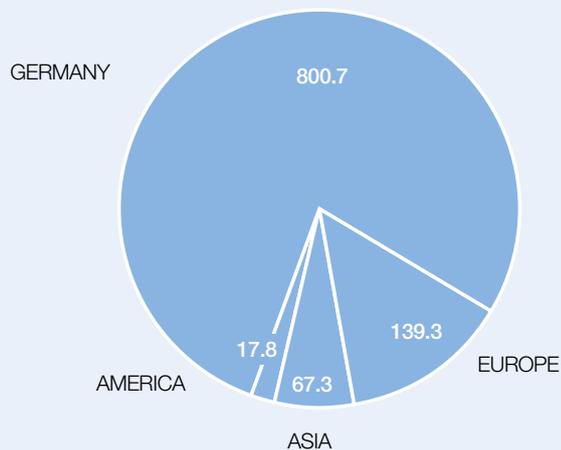
Heraclitus of Ephesus

EMPLOYEES

(including of the parent associations): full-time employees
of TÜV NORD Group, as of 31 December

2011	9,982
2010	9,139

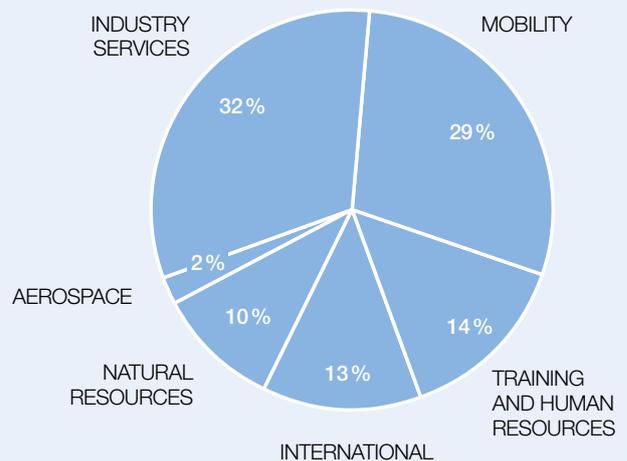
REVENUE BY REGION



KEY FIGURES

	2011 € million	2010 € million
REVENUE	1,025.1	922.6
EBDIT (before non-operating items)	76.3	61.8
EBT	23.7	49.1
EAT	10.7	35.9
Total assets	725.1	653.4
Shareholders' equity	118.2	116.6
Net financial position	11.4	29.4
Pension provisions	235.9	241.0

REVENUE BY BUSINESS UNIT



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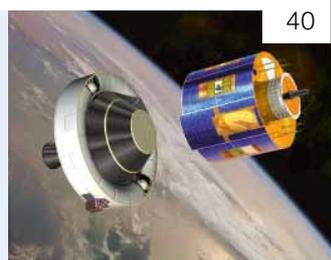
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Ladies and Gentlemen, Clients and Partners,

TÜV NORD Group had yet another successful year in 2011. The business year ended with a record turnover, the Group further strengthened its market position and also held to its clear strategic course.

With growth of 11.1 per cent, turnover climbed to 1,025.1 million euros. This means that TÜV NORD Group has breached the billion euro barrier for the first time. The earnings before interest and tax (EBIT) have risen by 18.3 % to 43.4 million euros. The operating margin, measured in terms of the EBIT, amounted to 4.2 %, after 4.0 % in the previous year.

Our clients in more than 70 countries perceive TÜV NORD Group as one of the leading technical service providers in the world. The figures from last year emphasise this role.

The business dynamic has achieved the level that it enjoyed before the global economic and financial crisis. Without doubt, in the last business year our organisation benefited from the recovery in the world economy and the strong upswing in Germany, which only weakened in the last quarter of 2011. Our core areas of activity, concerned with inspection of power plants, industrial installations and materials, showed further growth. Booming sectors such as the automotive industry have also had a favourable effect on our business.

On the other hand, we have to think about the discussions surrounding the high levels of debt in some EU Member States. As I have already mentioned, we were not able to foresee some of these developments. In particular, two events had a negative effect on the Group results. Firstly, despite the so-called skills shortage, which is forecast to become yet more acute in future years, public funding for training and further training was drastically cut in 2011. These cuts were completely unexpected and placed training and further training institutions throughout Germany in a difficult position through no fault of their own. The restructuring of the company has been supported with considerable investment from the Group's own funds. Today we are able to say that TÜV NORD Bildung again has real opportunities in the markets of the future. And we are also motivated by the fact that we want to open up new ways forward for those who wish to un-



Dr Guido Rettig
Chairman of the
Board of Management
of TÜV NORD Group

dergo training. To this is added the recognition that the strength of companies is increasingly dependent on a well-trained workforce. Within the training area, we work hard on developing learning opportunities for future technologies, and we will work on a more international basis in future.

One other dramatic event had a very powerful effect on us in 2011: the earthquake and tsunami catastrophe in Japan. Following on from the impression left by the events in Fukushima, German policy-makers very rapidly disconnected eight nuclear power plants from the network, and within a few weeks, the decision to undertake staged withdrawal from nuclear energy by 2022 – supported by a consensus throughout society – was taken. We in turn reacted decisively and implemented the necessary restructuring within the Group. Turnover and profits in this sector have fallen, but we intend to remain a reliable partner for the nuclear sector in future.

Nevertheless, many TÜV NORD engineers are now devoting themselves to new tasks within the Group, for example in railway technology or in the area of renewable energies.

Everyone is talking about the energy revolution. Companies of the TÜV NORD Group have already been working in this area for many years, and in 2011 we considerably expanded our activities. The vast majority of wind turbines can most usefully be sited where the wind is strong, and the northern part of Germany is one of our most important regions in this regard. Along the North Sea and Baltic coast, but also inland, our services are much in demand by manufacturers and wind farm operators. And we were also able to defend our leading position in the inspection of biogas plant in 2011. In this area, we offer intensive support to those facing the challenges involved in the conversion, storage and transportation of energy, and also the expansion of the network and the management of the smart grids of the future. With the certification of management systems, we provide companies with effective support in the efficient use of resources, thereby making a contribution to business sustainability. And with the opening of our solar charging station, the eSTATION in Hanover, we have also set a visible marker for the linking of electromobility and renewable energies.

Exactly one year ago, I wrote here that we want to set new trends, and I think we have kept our word. With the acquisition of the Alter Technology Group with top locations in Spain, France and Italy in 2011, we established our Aerospace business unit, which has made us unique within the technical inspection sector.

Alter Technology TÜV NORD (ATN) is one of the leading companies in the world when it comes to the selection, procurement, inspection, certification and modification of highly reliable electronic components for satellites. ATN is involved in spectacular projects such as the ATV automated transfer vehicle, the further development of the Meteosat weather satellites and the European satellite navigation system Galileo.

In 2011 we started to refocus our International business unit. Our aim is to offer and develop as many of our services as possible on a worldwide basis. In order to achieve this, we will continue to adapt our group structures to global markets and will link international locations more strongly with our various business units.

We are sure that this will provide new impetus for the ongoing international development in the Group, enabling us to grow both organically from within and by means of targeted acquisitions.

And so we are looking forward: despite subdued economic prospects throughout the world, and despite current risks – above all for the countries of the Eurozone – we are expecting positive development for the Group as a whole this year. The foundation for this is the extremely solid financial base from which we work. We will continue to pursue our expansion strategy through organic growth, and also through targeted acquisitions at home and abroad.

We are convinced that growth and our ability to compete on world markets result to a large extent from our willingness to think and act in an innovative way. In total, 44 million euros were invested in innovation and new and further development in 2011. For example, we have made a targeted investment in the new Aerospace Division, in new technologies in our food laboratories, in the mobility sector, in engineering and also in new exploration methods. We are linking the many different competences in our business units even more closely and

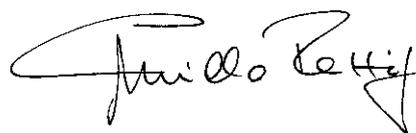
we are creating internal and external synergies. Our experts are supporting more and more ideas, developments and products of our clients. We are in the top group in our sector when it comes to innovation skills.

On behalf of the entire Board of Management, I would like to thank our more than 14,000-strong global workforce for the work they have done during the past year. With their experience, technical competence, commitment, enthusiasm and curiosity and willingness to follow new paths, they have all contributed greatly to the success of our enterprise. We would also like to thank the staff representatives for their work within the Group.

And last but by no means least, we would like to thank our business partners and our clients. As an independent technical service provider, we are concerned with high quality, safety, cost-effectiveness and sustainability, and we are looking forward to working with our stakeholders going forward into the future.

We are living in exciting times, in a world of constantly changing markets, new developments and changing ways of seeing people, technology and the environment. With the companies in its six business units, TÜV NORD Group is playing a constructive role in these changes.

The articles in this report for 2011 tell their own story, and I hope that you enjoy reading them.



Dr Guido Rettig
Chairman of the Board of Management
of TÜV NORD Group



TÜV NORD MANAGEMENT BOARD

Dr Guido Rettig (4)
Chairman and CEO;
International, Natural
Resources and Aero-
space business units

**Dr Klaus
Kleinherbers (7)**
Mobility business unit

Dr Elmar Legge (6)
CFO;
Industry Services
business unit

Harald Reutter (1)
Labour Director;
Training and
Human Resources
business unit
(as from
1 February 2012)

Holger Sievers (3)
Labour Director;
Training and
Human Resources
business unit
(up to 31 January 2012)

TÜV NORD SCHOLARSHIP STUDENTS

Madleen Plich (5)
Karthrin Nülle (2)
Thomas Mönch (8)



WELCOME

to all our readers

An organisation like the TÜV NORD Group is not merely an abstract concept, it consists of people and experts in many fields who contribute their know-how in many different ways. The success of the organisation lies in the teamwork between experts from varying disciplines. Tasks are seen from quite different perspectives and are successfully completed, with each day bringing new challenges. And it is these challenges that make our enterprise so interesting for students of engineering

and the natural sciences. For TÜV NORD Group, the students of today are the assets of tomorrow; a number of all our technical workforce will retire in the next 15 years. These posts will have to be filled – in addition to those created by growth.

We are looking for qualified personnel in order to counteract a possible lack of engineers which may face us in several years time. This is why TÜV NORD Group offers scholarships to promising



students: currently there are twenty students at different universities who are being funded in this way. In addition, in many areas TÜV NORD Group employs student assistants, who can gain an insight into the work of the Group and therefore also into working life which cannot be gained in a similar form in universities. Opportunities for internships and degree diplomas are also offered, and several students are taking advantage of the possibilities of “dual studies”, which combine both theory and practice. TÜV NORD

Group works together with more than 40 universities. Partners include renowned institutions such as RWTH Aachen University, TU Hamburg-Harburg, the Leibniz Universität Hannover, Ruhr-Universität Bochum, the Technische Universität Clausthal and the Forschungszentrum Jülich.

TÜV NORD Group supports and encourages students – and will in turn reap the benefits in the future. ◀

**Prof. Dr. Karl
Friedrich Jakob**
Chairman of the
Supervisory Board



This year as every year, the Supervisory Board fulfilled the supervisory and advisory functions assigned to it by law and by the Statutes with all due diligence. Scheduled meetings were held in 2011 on 8 March, 18 May, 20 September and 6 December. On 21 June, the Board held an extraordinary meeting in order to discuss acquisition of the Alter Technology Group. The main topics of the scheduled meetings were the development of the business, the status of strategic planning and also risk management within the TÜV NORD Group. In addition, the budget for 2012 was discussed and passed in the meeting of 6 December.

The Supervisory Board was informed regularly, punctually and comprehensively by the Board of Management, both verbally and in writing, regarding all matters concerning business development and also the position and strategy of the Group, including the major group companies and the situation as regards risk and risk management. The Chairman of the Supervisory Board and the Chairman of the Board of Management were also in regular contact between the meetings of the Full Board and its committees and exchanged information on important developments.

In order to perform its tasks as effectively as possible, the Supervisory Board has established two committees, which support the work of the Full Board.

The Steering and Appointments Committee held five meetings in the year under discussion here. The main themes under consideration were preparation of the full meetings and also preparation of the decisions of the Supervisory Board regarding personnel and remuneration.

The Finance Committee also met in advance of the Supervisory Board Meetings and concentrated particularly on the development of the Group financial results, and on planning and investment policy – in particular acquisition projects within the various business units.

The Annual Financial Statements of TÜV NORD AG and the Consolidated Financial Statements as of 31 December 2011, together with the associated Management Report and Group Management Report, were prepared by the Board of Management. These were audited by the independent auditors appointed by the Annual General Meeting, BDO AG Wirtschaftsprüfungsgesellschaft in Essen. The auditors approved the accounts without limitation or objection.

The Finance Committee discussed the Annual and Consolidated Financial Statements and also the audit reports with the Management Board and the auditors on 15 May 2012, and these items were also discussed at length at the meeting of the Supervisory Board on 22 May 2012, at which the auditors were also present. They reported on the most important findings of the audit and were available to the

Supervisory Board to provide further information as required. The auditors also established that the Board of Management has installed an appropriate information and monitoring system, whose design and implementation is suitable for recognising any developments that might jeopardise the continued existence of the company at an early stage.

On the basis of its own examination of the Annual and Consolidated Financial Statements, the Management Reports and the proposal for the appropriation of earnings, and also based on the recommendation of the Finance Committee, the Supervisory Board accepted the findings of the auditors. No objections were raised. The Supervisory Board therefore formally adopted the Annual and Consolidated Financial Statements and the proposal of the Board of Management for appropriation of earnings.

Mr Gerd Pflugstaedt retired from the Supervisory Board on 28 February 2011 and was succeeded by Mr Michael Schnoor, acting as a replacement, on 1 March 2011. We would like to thank Mr Pflugstaedt for his contribution to our work. Mr Volker Klosowski withdrew from the Management Board on 16 August 2011 and Mr Holger Sievers retired from the Board on 31 January 2012. On 1 February 2012, Mr Harald Reutter was appointed as Member of the Board of Management and Labour Director of TÜV NORD AG. The Supervisory Board would like to express its thanks and appreciation to

Mr Holger Sievers, who exercised a considerable influence on the Group and its precursor companies over many years as a Member of the Management Board, and also to Mr Volker Klosowski.

The Supervisory Board thanks all the staff within TÜV NORD Group, the managements of the business units and subsidiaries, the Board of Management and the staff representative bodies for their commitment and the successes achieved during the year under review.

The Supervisory Board



Prof. Dr. Karl Friedrich Jakob
Chairman
Hanover, May 2012







PEOPLE

IMPROVING LIVING STANDARDS > What does quality of life really mean? Good quality of life also means having access to high-quality food and healthy working conditions. Simple and safe communication is also important, along with an environment which is as free from pollution as possible. TÜV NORD Group is a service provider with an international reputation in these areas – working for positive change for people all over the world.

Healthy workforce – Healthy company

COMPANIES HAVE TO WORK VERY HARD if they want to win the battle for a qualified workforce. Some employers are attracting the personnel they need by offering occupational health management. The HAWARD Health AWARD is presented for the best initiatives. The winner in 2011 was ThyssenKrupp VDM.

Werdohl in the Sauerland region is a centre for visitors who want to go hiking, fishing or climbing, particularly in the summer. The largest employer in the town, which numbers 18,000 thousand inhabitants, is ThyssenKrupp VDM. Besides the good working atmosphere, the 670 employees at the group headquarters particularly appreciate the occupational health management system, which has been certified by TÜV NORD. ThyssenKrupp VDM, a manufacturer of nickel alloys and semi-finished products, recently received the HAWARD Health AWARD as recognition of the system, which is also to be installed at its other four German locations.

HEALTH AS AN ECONOMIC FACTOR

Matthias Schmoll does not want to be photographed alongside medical equipment. "I am not a doctor, I studied business management", he says. Schmoll is one of two health managers at ThyssenKrupp VDM. For example, he engages the physiotherapist Nanja Brandt. She comes to the factory twice a week to work with the employees, work which is sponsored by the company. "It is not simply a question of reducing the number of days missed through sickness", emphasises Schmoll. "Scientific studies show that the costs for "presenteeism", in other words costs that arise when unfit employees are actually at work, are up to three times higher than those caused by absenteeism through illness. We are much more concerned with implementing an integrated concept." Jörgen Wehrenberg, occupational safety and health expert at TÜV NORD, is convinced that a health management system brings real advantages from the business management point of view (see *interview*). The decisive factor is achievement of a positive corporate culture. This is above all influenced by members of middle and top management, which is why they play a vital role in the health management system. They communicate to the employees that their health is important and they contribute to the further development of the system. "The company management has taken a clear position", says Schmoll. "All managers have to take part in a training course on health-orientated leadership." One part of the corporate culture is, for example, that each

employee can consult an external advisor in case of social problems or problems in everyday working life, and the consultation is anonymous and free of charge. There is also a contact for addiction problems, and certain managers are specially trained in this area. Schmoll explains: "The focus is not only on alcohol and drug addiction, but also on gambling, eating disorders and "workaholic" problems. ThyssenKrupp VDM works according to the principle of qualified help instead of dismissal." The "layers of experience" project lies particularly close to his heart: each year managers spend one day as trainees in a production area of the company. As the Health Manager explains: "The aim is to achieve an exchange of experience close to the practical work of the company. This creates trust, and people think in terms of "we" instead of "I". And this is how we want to increase employee motivation and improve communication between the different areas in the company."

ENCOURAGING SPORT AND A PREVENTIVE APPROACH

Physical health, in particular preventive health measures, also forms an important part of the health management system. ThyssenKrupp VDM makes it possible for employees to take part in regular examinations for skin and bowel cancer, and also to visit the dentist, at the expense of the company. Advice on allergies and also ultrasonic thyroid examinations are also provided. As medical practitioners come into the company in order to perform the examinations, the employees are able to save a considerable amount of time. Those who undergo the examinations receive bonus points that can be exchanged for various types of rewards. A further incentive is the discount offered by a fitness studio for company employees, along with regular back massage. And the company sports club, which now has 450 members, is especially popular. "Managers, workers from the production and administration areas and also former employees take part in the factory football tournaments", reports health manager Schmoll. "Tournaments like these strengthen team spirit, and in fact ThyssenKrupp VDM is like an extended family." And the family also spends leisure time together, even after work has finished. ◀



The health of the workforce is a top priority at ThyssenKrupp VDM. This is communicated in many ways (left).

Health Manager Matthias Schmall works with physiotherapist Nanja Brandt (top right).

Advisory sessions for example after long absence due to illness or paternity and maternity leave are part of occupational health management (below right).



INTERVIEW



JÖRGEN WEHRENBURG

The TÜV NORD specialist for occupational safety and health contributes his expertise to the certification of occupational health management.

Mr Wehrenberg, how have opinions on employee health changed?

JÖRGEN WEHRENBURG: Occupational safety based on pure technology reached its limits long ago. Now the focus is on the human mind and spirit. It is quite simple: people want to work and be challenged. If the mind and spirit are neglected, mistakes and accidents happen – regardless of any technical measures that are taken. It is therefore essential that employees are included in all the processes of the company.

Occupational health management means considering employees as whole people. Can the benefits be measured in financial terms?

JÖRGEN WEHRENBURG: Industry in Germany is competing for the best employees on both the national and international levels. Within this competitive environment, occupational health management is an important factor which companies can use to raise their profiles. Studies also show that investment in occupational health management saves two or three times its cost in other ways.

Where do you see the greatest need for companies to catch up with occupational health systems?

JÖRGEN WEHRENBURG: Many companies basically limit themselves to individual measures for occupational health. But the great potential available from occupational health systems can only be utilised to the full if they are integrated into an overall system with traceable and measurable criteria for success.

And HAWARD – what is the benefit to companies who have their occupational health systems certified and become members of the HAWARD initiative ?

JÖRGEN WEHRENBURG: It's a question of knowledge transfer and synergy effects. Companies can call on an extensive network of cooperation partners who support them in the further development of their own system. The partners are institutions from the areas of health promotion and prevention and also companies who already have well-developed health systems.

HEALTHY INITIATIVE

The HAWARD initiative was established in 2010 by TÜV NORD, Barmer GEK, *impulse* magazine and other companies. The initiative means that TÜV NORD certifies occupational health management according to a specific standard. The company then receives a seal of quality for three years along with membership of HAWARD, and can also take part in the HAWARD Health AWARD scheme. The award was presented for the first time in 2011, to ThyssenKrupp VDM.



Healthy food for millions of people



ALL OVER THE WORLD, DEMAND IS RISING for environmentally-friendly food and agricultural raw materials that comply with high international quality standards. TÜV India, a part of TÜV NORD Group, is one of the best-known institutions in India for control and certification of these products, and its services in the sector are recognised far beyond the borders of India itself.

The largest democracy in the world has been developing dramatically for many years now. India is booming, and last year its gross domestic product grew by around seven per cent, despite the weakening world economy. The urban middle classes are enjoying rising household incomes and are adopting western ways of life.

Modern India, with several cities such as Mumbai, Pune and Bangalore, is well known as a favoured location for global software manufacturers. But other areas of the economy are also undergoing technological and professional transformation. New jobs created as a result improve people's quality of life, and companies with highly-motivated workforces are conquering world markets, with agriculture and food production amongst the industries that are changing most rapidly.

WISH FOR HIGH-QUALITY FOOD

More than 60 per cent of Indians work in agriculture or related sectors. The population is growing, and many people are moving into the towns, hoping for attractive jobs and a secure future. This also means that self-sufficiency as regards food is increasingly being replaced by industrial food production.

A further factor is that both the domestic population and consumers abroad are becoming ever more discriminating. They expect high quality, safe food that is beyond reproach in terms of hygiene. Indian exporters and their customers throughout the world have to respond to these more stringent demands.

Ways of life are also changing. In the same way as in industrialised countries, as average incomes rise in developing and emerging countries like India, so does the number of people who prefer to

buy safe and hygienically controlled food. Added to this is the fact that industrial countries and client companies in developed economies there demand rigorous inspection of imported food according to their own or international standards. These requirements also affect Indian exporters of agricultural products such as for example rice, tea, fruit and oilseeds.

Since 1989, TÜV India has led the field in offering quality inspection and certification in India, including for the food sector. With its headquarters in Mumbai, TÜV India employs a team of 500 experts across 30 locations in India including numerous chemists, technicians and engineers. "TÜV India offers a wide range of technical services in the field of analysis, monitoring and certification for more than 7,000 clients", explains Chief Corporate Officer Kaustubh A. Korde. The clients include large corporations and organisations from the public sector as well as small

In many countries
the conditions for
agricultural production
are still quite simple
(left).

Indian Railways,
one of the largest
employers in the world,
has the hygiene in
its kitchens of station
restaurants and dining
cars checked by
TÜV India (centre).

The laboratory in Pune
is of international
standard (right).





TUV INDIA

TUV India, established in 1989, was one of the first organisations in India to offer qualification services as well as being a pioneer in certification according to ISO 9001.

Now, TUV India is active in various sectors including energy, industry, automotive, product testing, management systems, food safety, information technology and others. The company has its headquarters in Mumbai.

In the new laboratory in Pune, food is examined for pesticide residues (top left, top right).



Kaustubh A. Korde, Chief Corporate Officer of TUV India (left), and **Guy Buysse**, General Manager of TÜV NORD Integra (center).

Thanks to TUV India, many skilled workplaces are being created in the technical and scientific fields (below left).

Training and further training are important areas of activity for TUV India (below right).





TÜV NORD INTEGRA

TÜV NORD Integra is an organisation for certification and monitoring of agriculture and food processing.

The company is part of TÜV NORD Group, has its headquarters in Belgium and is active in many countries throughout the world. Services offered by TÜV NORD Integra cover both governmental and private certification systems for cultivation, manufacture and sale of agricultural products and food – for example for organic farming, fisheries and food processing.

and medium-sized enterprises and agricultural cooperatives in the provinces. One large and important client is the national rail company Indian Railways. With a workforce of more than 1.6 million, Indian Railways is one of the largest employers in the world. The company transports six billion passengers and around 750 million tonnes of goods around the country each year. TÜV India supports Indian Railways and follows them into the most far-flung corners of the subcontinent, conducting hygiene audits in kitchens of station restaurants and dining cars.

“Regulatory requirements for food inspections in India are becoming stricter”, says Korde, adding that this has several causes. “The new Food Safety Standards Act has been in full force since 2011 and has led to stricter requirements. In addition, many international food producers and trading companies are eager to get a foothold in the large Indian market. As a full service provider for inspection, control and certification of food, we have to fulfil their expectations.” This is why, in 2010, TÜV India established a laboratory in Pune which is equipped to the latest international technical standards. The laboratory has the most modern scientific equipment available in the world today, such as coupled mass spectrometers. These can be used to discover very low levels of pesticide residues, for example.

ANALYSES ACCORDING TO INTERNATIONAL STANDARDS

“Our facilities correspond to those of similar laboratories in Europe and the USA”, says Korde. “Among other things, the new laboratory specialises in trace analysis, which we carry out using internationally-accepted methods.” The TÜV India laboratory is accredited according to ISO Standard 17025 and has also been approved for testing of agricultural and food products by the

“Our facilities correspond to those of similar laboratories in Europe and the USA.”

Kaustubh A. Korde, Chief Corporate Officer TÜV India

Indian Agricultural Process & Export Development Authority (APEDA), and it also takes part in “round robin” tests together with laboratories from different countries including Germany, UK and other EU nations. However, the success of TÜV India is not based on its technical facilities alone.

“Our employees regularly take part in training courses, conferences and seminars, and also practice job rotation”, emphasises Korde. “TÜV India is also a member of the TÜV NORD Group network of companies, supported by TÜV NORD Integra in Belgium, which work internationally in the field of food and feedstuff safety, certifying companies and projects and also undertaking laboratory testing of food. Because we are at the forefront of technology and have such a highly-trained and professional workforce, TÜV India has established itself as an independent and neutral organisation in the fields of certification, inspection and as one of the leading providers of quality control services in many different sectors.” TÜV India is now active not only in India, but in the whole of Asia. ◀

Training to save energy

ECONOMIC CONSTRAINTS MEAN THAT SAVING ENERGY is becoming more and more important for industry as a whole. The Energy Management courses offered by TÜV NORD Akademie provide the regulatory, legal and technical knowledge needed to optimise energy consumption.

When white clouds of steam rise from the chimney of the boiler house at ContiTech in Hanover on sunny days, it can look picturesque. But for Lars Küchler, quality representative of the company, the steam is not a matter of aesthetics. It shows him that energy is escaping into thin air. As a mechanical engineer at ContiTech, Küchler is responsible for energy management, along with his team. His target: as little energy as possible should be used for production. And this is no easy task at this particular industrial company, based in Hanover since its establishment in 1871. "We used to generate a lot of steam here", says Küchler.

HIGHER ENERGY CHARGES MEAN HIGHER COSTS

Around eight to nine million euros are spent each year on energy at ContiTech. The most important raw material that is used in production is rubber. This rubber is vulcanised by means of high-pressure steam, a process which consumes a huge amount of energy. Operating the machines and motors, moving goods around the site and even operation of the buildings are also very energy-intensive. In fact, 85,000 MWh are consumed each year. This is as much as 19,000 four-person households use on average over the same period.

In other sectors too, such as in the paper and metalworking industries, energy often accounts for the lion's share of the manufacturing costs. "The proportion of network charges, taxes and other charges associated with energy costs is constantly increasing", says Axel Dreckschmidt, General Manager of TÜV NORD Akademie. "These costs are to a large extent politically motivated, and cannot be influenced by consumers." A large number of standards and regulations also exist at the national and international levels. The complex legislative framework includes the German Energy Management Act and the German Renewable Energy Resources Act (EEG). For reasons of cost and also because of increasingly stringent environmental protection requirements,

"We save 260,000 euros per year in lighting costs with time switches in the stairwells."

Lars Küchler, Energy Management Representative at ContiTech

neither private citizens nor companies can avoid the necessity to save energy.

Certificate training courses provided by TÜV NORD Akademie inform those responsible in companies of the opportunities for reducing energy consumption. The modular training concept focuses, among other things, on the optimisation of production processes and the resulting increase in energy efficiency. Lars Küchler was immediately convinced of the benefits of this concept, and was one of the first course participants at TÜV NORD Akademie to qualify as an energy management representative.

This qualification has long paid for itself at ContiTech. Küchler is now in an even better position to recognise weaknesses in the energy generation and distribution system. Now, the expansion steam, which paints such picturesque white clouds in the blue sky, is to a large extent captured and used for heating and hot water supply. Even the stairwell lighting in the eight stories above and below ground has been optimised. Here it has been demonstrated that even simple measures can yield substantial results. Energy management representative Küchler is certainly pleased. "We save 260,000 euros per year in lightning costs with time switches in the stairwells." ◀



The training course manual has become an important tool for Lars K uchler (left).

Vulcanisation of raw rubber for drive belts consumes a great deal of energy (above right).

The steam pressure during energy generation in the boiler house is measured continuously (below right).



INTERVIEW

Was there a particular reason for developing the energy management certificate course?

AXEL DRECKSCHMIDT, T UV NORD AKADEMIE: We generally develop our courses for several reasons. This is also true in the case of energy management. In this case, political developments, especially at the European level, along with the observation of our market, played a large part. Customers were also making enquiries about training opportunities.

What are the aims of this training course, what does energy management really mean?

DRECKSCHMIDT: The aim of the training is to qualify those responsible for energy matters in companies with regard to the policy and fiscal framework conditions and also to communicate possibilities for energy saving based on technical developments. An energy management system forms the organisational framework for implementation of certain standards such as ISO 50001 and laws such as the Energy Management Act. Course participants learn how to create an analysis of the actual situation and to introduce certain processes and procedures which help to reduce energy consumption on a continuous basis.

For which participants is the energy management certificate course suitable, and what qualifications must they already have?

DRECKSCHMIDT: The participants generally come from medium-sized and large companies from the electrical engineering, metalworking and food industries. No special prior knowledge is required.

General Manager

AXEL DRECKSCHMIDT

is General Manager of T UV NORD Akademie, and has a degree in electrical engineering. He has been with T UV NORD since 1993. T UV NORD Akademie has been active in the marketplace since 1985 and has many years of experience in training and further training. Today, the company has more than 100 employees at 20 locations. The training courses on offer support clients in the qualification of employees in the areas of corporate and quality management, technical safety, environmental protection, occupational health and safety as well as logistics.



E-Postbrief: Trusted and secure

NEW COMMUNICATION requires new security standards. TÜVIT has awarded the E-Postbrief the *Trusted Site Privacy* certificate. An important seal of quality, which above all benefits users.

One click and the holiday is booked, the computer purchased, the latest music downloaded. Life today is digital. The online world makes us independent – from opening times, endless queues, bothersome paperwork. The E-Postbrief from Deutsche Post contributes to digital freedom and data protection. Normal e-mails are often not well protected against unauthorised access by third parties. The E-Postbrief is extremely suitable for sending confidential documents, as the information is transmitted between the sender and the recipient in coded form.

GUARANTEED SECURITY

“Security is the central promise of the E-Postbrief”, says Ralph Wiegand, Chief Executive Officer E-Postbrief at Deutsche Post. This security has been carefully examined by TÜVIT and the E-Postbrief has been awarded the *Trusted Site Privacy* certificate. “The certificate demonstrates the use of this very high privacy and data protection standard, which final users can really trust”, says Antonius Sommer, General Manager of TÜVIT. Five experts from TÜVIT examined the E-Postbrief and its platform for more than one year. In addition to legal compliance, data protection and quality management, user friendliness was a very important criterion. “The certificate is valid for two years. A new inspection is due after that. However, if there are changes which are relevant to data protection, the inspection may need to take place earlier”, says Sommer.

FUTURE-PROOF COMMUNICATION

More than one million private clients, around 4,000 small and medium-sized enterprises and also more than 100 large-scale companies and administrations now use the E-Postbrief. They include the Zurich Insurance Group and also the German credit rating agency Schutzgemeinschaft für allgemeine Kreditsicherung (Schufa), which allows its customers to obtain their own personal credit rating by E-Postbrief. A further large client is Bayer 04 Leverkusen. Fans of the premier league football club can order their tickets by E-Postbrief.

“Security is the central promise of the E-Postbrief.”

Ralph Wiegand, Chief Executive Officer
E-Postbrief, Deutsche Post

It is also possible to send registered letters by E-Postbrief. Users then receive a confirmation that the letter has been sent and received. This means that contractual and insurance matters can also be settled electronically. Communication between citizens and official bodies is also made easier. “Using the E-Postbrief, applications and inquiries can be made with the assurance of legal compliance without the need to appear personally at the premises of the official body, although in some cases it is still necessary to attend personally. Identity documents still have to be collected by the individual concerned”, says Wiegand.

In 2012 Deutsche Post established its own development company in Berlin, which is intended to raise the profile of the E-Postbrief still more going forward. Two new products are to be added to the E-Postbrief in 2012: E-Post-ident makes it possible to check identities on the Internet simply and securely. E-Postpay integrates a payment function into the E-Postbrief portal. Invoices which are sent electronically by E-Postbrief can be paid in future with a click of a mouse. The future of the letter is electronic. The E-Postbrief could become the means of communication of future generations. If it remains secure. Currently a continuous certification process by TÜVIT, in other words quality assurance in real time, is under discussion. ◀



The **Trusted Site Privacy certificate** was presented to the Chief Executive Officer E-Postbrief, Ralph Wiegand, by Antonius Sommer, General Manager of TÜVIT.

INTERVIEW

The E-Postbrief has been on the market for two years now. How has acceptance of the product grown since then?

RALPH WIEGAND: We are very satisfied: more than one million private customers, over 100 large-scale companies and administrations and also 4,000 SMEs already use the E-Postbrief. And the trend is upwards. This large market interest shows us that the E-Postbrief is already firmly established as an instrument of communication in Germany.

How do you want to further increase acceptance?

WIEGAND: We are currently experiencing the typical development of new networks: ever more senders and recipients are coming into contact with this new medium, and are learning to appreciate and make active use of it. We are now continuously establishing new contact points in order to include further private and institutional clients into the network. And we are cooperating with highly-respected partners such as DATEV, SAP, VHV Versicherung and public data centers.

TÜVIT has awarded the *Trusted Site Privacy* certificate to the E-Postbrief. How important is the aspect of security for the E-Postbrief?

WIEGAND: Security is the central promise of the E-Postbrief. It is the only online medium suitable for mass use which guarantees the genuine identity of those who use it along with

confidential transference of content. TÜVIT testifies to the enormously high security level with the *Trusted Site Privacy* certificate.

How should the security standard be further optimised?

WIEGAND: We are in discussion with TÜVIT regarding a continuous certification process. This means that the E-Postbrief would be subject to direct security and data auditing by TÜVIT at each stage of its development.

What will be the significance of the E-Postbrief in 2030?

WIEGAND: The Internet and the real world will be even more closely interlinked. And the subjects of security and data protection will have an even greater significance – in communication, in E-Business and in E-Government. Deutsche Post will guarantee security and reliability in all these areas.

Chief Executive

RALPH WIEGAND

Ralf Wiegand has been a member of the Divisional Board MAIL since 2010 (marketing and sales E-Postbrief) and Chief Executive Officer E-Postbrief at Deutsche Post AG since the beginning of 2012.







TECHNOLOGY

IMPROVING THE WORLD OF TECHNOLOGY > How can people's lives be made better, in particular with regard to safety? Many technical developments are aimed at achieving this. TÜV NORD Group is a recognised expert service provider, both in the field of technological innovation and also for testing of technical equipment. The examples described here show a cross-section from the extensive Group portfolio in the areas of renewable energies, management and building safety.

The cars of tomorrow – today

THE AIM IS CLEAR: Pollution-free road traffic. Electric vehicles could be the solution. But this form of mobility is still reserved for idealists. TÜV NORD supports vehicle manufacturers and component suppliers in making e-mobility truly competitive.

“TÜV NORD uses practical experience to find out how electric vehicles can be made more suitable for practical everyday use.”

Christian Förster,
Electromobility Project Manager at TÜV NORD

Around 125 years after the invention of the automobile, road traffic is about to step into a new era: it is intended that emission-free vehicles should replace current models with internal combustion engines. And this is also the policy of the Federal Government. In order to achieve its climate protection objectives, official funding programmes should smooth the path for electric vehicles. In 2020, a million of these should be driving on German roads. An ambitious project. In 2011, just 2,307 electric vehicles were registered with the German vehicle licensing authority. Hybrids are making more rapid progress on the market, with their combination of traditional internal combustion engine and electric motor (*see diagram*). Pure electric vehicles are today still the preserve of idealists. And one such is Christian Förster, Electromobility Project Manager at the TÜV NORD Institute for Vehicle Technology and Mobility. Trained as a mechanical engineer, Förster originally came from the field of combustion technology. “We are involved, for example, with exhaust gas pollutant reduction and emissions certification for all the large vehicle manufacturers, and are leaders in this sector in Germany.” The company now advises automotive manufacturers on the development and approval of hybrid and electric vehicles. “Working with vehicles that do not need an exhaust system is a great motivator”, says Förster.

In order to find out how the new technology can be made attractive for as many motorists as possible, the TÜV NORD experts drive electric vehicles themselves, using the company’s own A Class Mercedes E-Cell, Mitsubishi iMiEV and Citroën C-Zero for training courses on safe handling of high-voltage technology in workshops or during periodic vehicle inspection. And they also lend out the vehicles within the in-house car sharing scheme. The drivers document energy consumption, charging time and range – precisely the factors which present the greatest hurdles to mass introduction of electric vehicles at the present time.

CLEAN MOBILITY AT ALL TIMES OF YEAR

One of the results of the practical tests: “The actual consumption is much higher than stated by the manufacturers”, says Förster. The charging time, too, is still not convincing. “At the moment drivers have to reckon with one hour of charging time per 100 kilometres, even at a rapid charging station.” This means that pure electric vehicles are most suitable for town driving over short distances. And there is also a need for improvement when it comes to absolute range. Today, a battery charge can last for up to 150 kilometres with an output of 30 kilowatt hours. Such a battery costs 18,000 euros – as much as a compact-class car with internal combustion engine. “To make electric vehicles suitable for everyday use, battery capacity has to be more than doubled”, says Förster. And in the end, this is not a question of price only.

However, TÜV NORD is able to save electricity costs having invested 150,000 euros. Since 2011, the eSTATION, a 26-point charging station, has stood at the company site in Hanover. The photovoltaic installation on the roof generates solar energy for 30,000 kilometres of travel each year. In winter, at night and at peak usage times at the charging points, additional power supply is provided via the in-house network, which in turn originates from renewable sources. So the TÜV NORD electric vehicles really are emission-free.



The photovoltaic installation on the roof of the TÜV NORD eStation in Hanover generates electricity for 30,000 kilometres per year (left).

A special feature of the eSTATION is that it provides connections for all vehicle types for cost-free charging.

TÜV NORD trains workshop mechanics in handling of high-voltage technology (below right).



THE FUTURE IS CABLE-FREE

Automotive developers have a great deal of work to do before a large number of people decide to go electric when buying a new car. The experts from TÜV NORD contribute their know-how of e-mobility, working alongside vehicle manufacturers. For example when prolonging battery lifetime is on the agenda. For in future vehicles can play a part in storing energy within the smart grid system. They would then take up electric power when wind and sun are producing a great deal of energy, and would feed it into the grid again at times of peak loading. This means that batteries have to work twice as hard.

“Batteries would have to provide a longer lifetime than the 100,000 kilometres guaranteed today“, says Förster. A further innovation is already further down the road to maturity: inductive charging. In this system, the vehicle is charged without the need for physical contact with a charging device. It simply has to park at a changing point, and electrical energy is transferred with the help of induction coils in the charging station and in the car. Installation of an inductive charging station is planned at the TÜV NORD site in Hanover at the end of 2012, which will provide new information for the next steps towards a new era of mobility. ◀

DEVELOPMENT OF ELECTROMOBILITY IN GERMANY

	Hybrids (including plug-in hybrids)	Electric
2006	5,971	1,931
2007	11,275	1,790
2008	17,307	1,436
2009	22,330	1,452
2010	28,862	1,588
2011	37,256	2,307
2020*	Plug-in hybrids 550,000	Electric 450,000



Ambitious target: In 2011, 2,307 vehicles with pure electric drive were registered in Germany. The Federal Government would like the number of electric cars on the roads to grow to one million by 2020. More than one half of these will probably be so-called plug-in hybrids, which combine traditional internal combustion engines with electric motors that can be charged from the mains.

Sources: Federal Motor Transport Authority; *Forecast: Second report of the national electromobility platform

Where the lights are always on

A NEW EMERGENCY POWER SUPPLY HAS BEEN INSTALLED AT HANOVER AIRPORT

to ensure continued power supply in case of mains network failure. In a spectacular test situation, the system had to prove itself even before its final inspection.

Passengers of the Air Berlin plane from Palma de Mallorca on 13 July 2011 during the approach to Hannover-Langenhagen airport around 22:30 witnessed an astonishing spectacle when they looked out of the window. First the city beneath them was brightly lit, and then all of a sudden everything went dark. Almost as if someone had touched a giant light switch and plunged the entire area into darkness. What was actually happening in front of the passengers' eyes was a large-scale power cut due to technical faults in a transformer substation and a power station. Traffic lights, escalators, cash machines and urban trains – during the blackout, everything came to a halt in Lower Saxony's capital city and several outlying districts.

With one exception: Hannover-Langenhagen Airport formed a pool of light. When the luggage of the holiday makers from Mallorca appeared on the belt, everything was normal. "Nobody noticed that we also had a power cut", says Stefan Schirmer from the airport electrotechnical service department. The airport has an emergency power supply which springs into action if the main power supply fails. Fortunately Terminals A and B had been connected to the new equipment shortly beforehand. When the new technology had to show what it was capable of when called upon for the first time, the final inspection had not even taken place. Instead of a dress rehearsal, there was a real premier performance. And the equipment passed with flying colours.

FIRST A BATTERY, THEN A POWERFUL DIESEL GENERATOR UNIT

"If the mains power supply fails, a large uninterruptible generator plant steps in", explains Thomas Jürgensmeyer, who, as expert from TÜV NORD, supported the planning and building of the emergency power supply system from the very beginning. "The safety

"The emergency power supply at Hanover Airport is in a class of its own."

Thomas Jürgensmeyer, independent expert at TÜV NORD

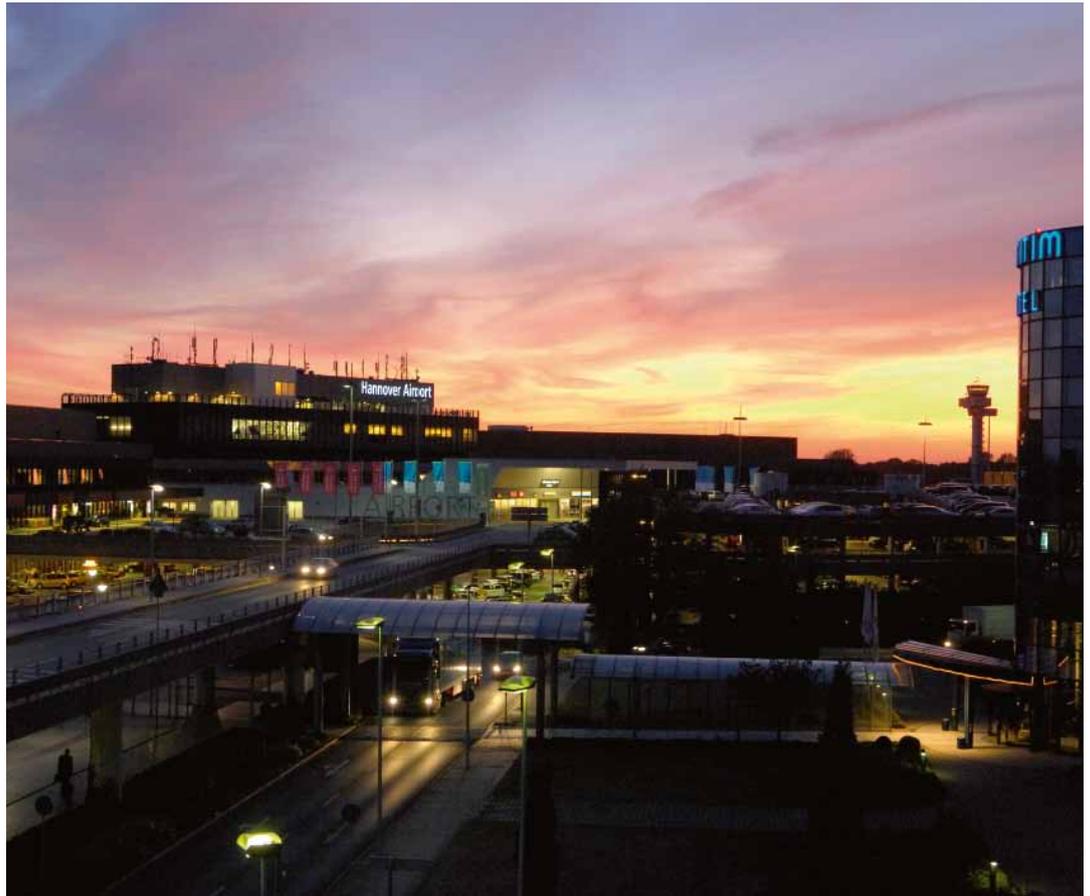
lighting comes into operation immediately. Passengers don't even notice that anything has happened." The huge sealed battery installation provides extremely high voltage stability and long lifetime. However, the battery can only cover the power cut for 20 to 30 seconds at the most. Then the heart of the equipment has to start up", says Jürgensmeyer. "And here this means a large diesel unit producing 3,400 horsepower. Step by step it takes over supply of the individual areas such as lighting, terminal and flight plan computers. This process takes place completely automatically."

Whilst in Hanover all its forces had to be mobilized in order to resume normal operation, the employees in the airport control room could be quite relaxed. They noticed when the emergency power supply stepped in, but did not have to take any action themselves. After a mere one and half hours the airport was again on line to the regular power supply. "We weren't at all surprised that everything went so smoothly. We had already tested out similar situations several times at night", said Schirmer.

Stefan Schirmer from Hanover Airport (left) and Thomas Jürgensmeyer from TÜV NORD rehearse for an emergency (top left).

The huge diesel unit has 20 cylinders and produces 3,400 HP (below left).

The terminals of the airport at Hannover-Langenhagen were brightly lit during the power cuts (below centre).



During the major power cut in 2011, the airport was a brightly-lit island in a sea of darkness (top).

The luggage of more than 5.3 million passengers passes through Hannover-Langenhagen Airport each year (below right).

EXCEEDING LEGAL REQUIREMENTS

Electrical engineer Jürgensmeyer was often called in at short notice during the installation work, went to the construction site and assessed the progress that was being made. This phase extended over several months. Then came the acute phase with the test runs. "We could only do the runs at night, because at that stage we still had to reckon with total failures", explains Jürgensmeyer. And he was also often expected to show real physical commitment. For example, he had to crawl through narrow cable ducts above the ceiling of Terminal A. There is a hollow space here, which is home to innumerable cables. But the work and the common striving towards perfection on the part of the client and TÜV NORD proved absolutely worthwhile. "For example, the emergency power supply of the airport exceeds the requirements as regards fire protection", explains Jürgensmeyer, who is justifiably proud of what has been achieved. "The installation here really is in a class of its own." He is convinced: night will also not fall in the airport in future. ◀

THE EMERGENCY POWER SUPPLY FACTS AND FIGURES

15 SECONDS

After a power cut, the diesel unit supplies all areas with electricity.

900 LITRES

pass through the unit each hour at maximum output.

12 HOURS

is the maximum time that the diesel can cover a power cut.

30 KILOMETERS OF CABLE

were laid for the emergency power supply.

Smarter grids mean secure supply



SMART GRIDS: The energy revolution means new rules for the energy network. Intelligent components enable flexible and rapid exchange of information between producers, consumers and storage.

Norderstedt, a town at the gates of Hamburg, presented a residential project with an alternative energy concept at the start of February 2012. What is special: electric cars are to be used as mobile energy storage units for the very first time. The power generated by the building, for example by a photovoltaic installation, is stored temporarily in the vehicle battery and returned to the building as needed. So when mum wants to do the washing, dad should plug in the car!

CONVERSION OF THE ENERGY SYSTEM AS WHOLE

It still sounds a bit like science fiction, but this is one of many pieces in the jigsaw that will form the electricity network of the future – and which has already been tested at many locations. The energy revolution, which is wished for and supported by government policy, is in full swing: the share of renewable energies should rise to 80 per cent by 2050. Such a conversion presents a completely new challenge – not only for production, but still more for electricity storage and distribution.

The experts all agree: The grid has to be upgraded, and it has to be “smart”. Without the use of information and communication technology, neither terminal equipment nor networks will be able to handle the demands of future-proof operation and planning.

“We are talking about a complete redesign of the whole energy system”, says Professor Hans-Jörg Bullinger of the tasks to be faced in the energy economy. The President of the Fraunhofer-Gesellschaft was one of the main speakers at the TÜV NORD Dialogue last autumn in Berlin on the subject of smart grids and the rules of the energy Internet.

Members of the German Parliament, representatives from industry and commerce, federations and environmental organisations: more than one hundred guests were there to discuss future scenarios for energy supplies in Germany. “Smart Grids” was the watchword in the TÜV NORD Dialogue; for, according to Professor Bullinger: “We have to look after our networks if we want to make progress.” Green energies present challenges to the electricity network operators. The sun and the wind do not work according to plan. If all 22,000 wind turbines and the more than 2.3 million solar installations in Germany were running at full power, the grid would be overloaded and would collapse. And at the other extreme, in overcast weather with no wind, it would also break down, this time because of lack of energy. ▶

The smart grid

brings all those involved in electricity supply together and is also able to store energy (left).

New suppliers

such as biogas plants add a new dimension to the network and are integrated into it (left).

Offshore wind turbines

require additional networks in order to transport electricity (centre).

The sun only shines

during the day, but innovative storage systems mean that the night need not be dark (right).





The attentive audience during the TÜV NORD Dialogue in Berlin (first row, centre): Dr Guido Rettig, Chairman of the Board of Management of TÜV NORD Group (left).

TÜV NORD as initiator for forward-looking themes such as rules of the game for the smart grids of the future (right).

But it is not only the extreme fluctuations in electricity generation from renewable energies that make life difficult for suppliers. The large number of producers of small volumes of electricity also place the stability of the network at risk. Many new buildings today already have a small power plant in the cellar or a photovoltaic installation on the roof. A glance at the number of those feeding in shows how rapidly the network is changing: in 1990 there were around one thousand generators, and 20 years later there are nearly one million. The current distribution networks are not designed for this new situation. For a long time, the system only worked in one direction, in other words, the current flowed from central power

plants to consumers. But those times are over. "Consumer behaviour has changed fundamentally", says Maik Bäumer, responsible for the strategic *Infrastructure business sector* at TÜV NORD. "The direction within the network is being reversed; many consumers are becoming prosumers, who use, generate and also feed in electricity."

A grid can only handle producers who feed in such different amounts of electricity by making use of intelligent technology. The aim is to reverse what used to happen: we will no longer produce as much electricity as we consume, but we will consume just as much as we produce. This means that household appliances will

INTERVIEW

WHAT IS "SMART" ABOUT "SMART GRIDS"?

What do you think is important during conversion of the electricity network?

RUDOLF WIELAND: We have to integrate the different types of energy generation into one network. This is a demanding task from the technical point of view: in future, energy will be generated much more often on a decentralised basis and from renewable energies such as solar power, wind or biogas. And what is more, turbines only function when the wind is blowing and not necessarily when we need electricity. This leads to fluctuations in supply that have to be compensated for.

Does the consumer really have to worry about how much electricity comes into the house?

WIELAND: Basic conditions are changing. More and more consumers are now also producers, as they have a small power plant in the cellar or solar panels on the roofs of their houses. The challenges regarding network management are also changing, as in future consumers will want to know when they can purchase electricity cheaply.

What is "smart" about "smart grids"?

WIELAND: Information technology makes the decisive difference here. Electrical devices provide us with enormous volumes of data which we need in order to control energy flow. This allows us to achieve hitherto unknown transparency as regards energy, which serves as a basis for our decisionmaking. Data security is also extremely important. Consumers are entitled to ask what it has to do with anyone else when they use their washing machine or have the television on, use the heating or charge their electric car.

TÜV NORD is working to ensure that in future. Security of supply and data security will go hand in hand.

General Manager of TÜV NORD Systems

RUDOLF WIELAND

Rudolf Wieland has been General Manager of TÜV NORD Systems, a subsidiary of TÜV NORD Group, since January 2007. He therefore heads a company which plays a leading role in the testing of technical plant and equipment. Electrical engineering and control technology is a major area of activity for TÜV NORD Systems.





“We have to look
after our networks
if we want to make
progress.”

Professor Hans-Jörg Bullinger,
President of the Fraunhofer Gesellschaft

switch on when the network provides surplus and therefore cheap current – and vice versa; if sufficient electricity is not available, devices that are not urgently needed will be temporarily switched off.

INTELLIGENT DEVICES WILL CONTROL CONSUMPTION

Control of domestic energy supply will in future be carried out by so-called smart meters, intelligent devices for measuring electricity consumption which process information from and for the network. Washing machines will switch on at the most favourable moment and deep freezers will pause during the time when power is costly.

Electric vehicles in garages and carports will also be charged at the cheapest tariff, and their high-performance batteries will at the same time act as energy storage devices which are able to provide a buffer at peak times.

Fluctuating supplies from renewable energies need new storage technology. There will not be a lack of green electricity in future, but there will be a problem as to consistent availability. This is where the focus moves to storage technology. A study by TÜV NORD examined the available solutions, and four possibilities emerged as the most viable: tried-and-tested accumulator batteries and pumped storage power stations, as well as forward-looking processes such as compressed air storage and hydrogen-based storage, which feed energy from renewable sources into the natural gas network.

And those who buy and use electricity must not be forgotten in the midst of all the technical conversion work: It is true that they

POWER TO GAS

In Falkenhagen in Brandenburg, energy supplier E.ON will produce hydrogen from wind starting from 2013. The research installation, inspected by TÜV NORD, will produce around 360 cubic metres of hydrogen from electrolysis of water using energy generated by wind turbines.

This will be fed into the remote gas network and used like normal natural gas. Today it is already possible to mix up to five per cent hydrogen with the gas, and in the medium term this should increase to 15 per cent. This means that natural gas pipelines will be opened up as an extensive storage facility for weather-dependent energies.

will benefit from most of the measures through lower costs and transparency, but they are also being confronted with the new and the unknown.

For example, intelligent measuring devices provide data that can also be misused. Therefore TÜVIT, on behalf of the Federal Office for Information Security, worked on data security profiles within a pilot project for so-called smart metering systems, in other words several measuring devices cooperating with each other. For in the same way as the Internet, smart grids are not proof against attack by hackers. The general population will only accept smart grids when efficiency, performance and security are guaranteed in connection with transfer of data. Producers who supply fluctuating volumes of electricity can only be managed by a network based on intelligent technology. ◀

CORNERSTONES FOR A NEW ELECTRICAL ERA THE INTELLIGENT ENERGY REVOLUTION

ELECTRICITY AS THE MOST IMPORTANT SOURCE OF POWER: Updating of the network based on an increasing share of renewables in the supply system, which are difficult to plan

THE ENERGY TRIANGLE: Protecting the environment, security of supply, cost-effectiveness

BROADLY-BASED ENERGY MIX with renewable energies

INCREASING INTERACTION BETWEEN ELECTRICITY AND GAS NETWORKS: Power-to-Gas, Smart Gas Grids

THE NETWORK AS STORAGE FACILITY: Increasing storage capacity and further development of storage technologies

CONSUMPTION FOLLOWS PRODUCTION: Development of smart grids, centralised and decentralised electricity supply

Source: Prof. Dr.-Ing. H.-J. Bullinger, Fraunhofer Gesellschaft

The future of nuclear engineering

GOOD PROSPECTS DESPITE THE PHASING OUT OF NUCLEAR POWER: The TÜV NORD Group companies in the nuclear sector are involved in dismantling and decommissioning in Germany, whilst their expertise is in demand internationally for construction and expansion of new plants.

The day of 11 March 2011 will be remembered for many years. This was the day when an earthquake occurred in the North-East of Japan and the catastrophe in the Fukushima nuclear power station ran its course. Following this, the German government decided to exit use of nuclear energy by 2022. However, in many other countries reactors continue to be built or re-equipped. Wherever there is a question of new construction or decommissioning, nuclear technology companies TÜV NORD EnSys Hannover and TÜV NORD SysTec are ready to help with their wide-ranging experience and competence.

MANY YEARS OF EXPERIENCE

“We had more work than ever from public bodies in 2011, despite the power stations being switched off”, says Bernward Hartje, General Manager of TÜV NORD EnSys Hannover.

Immediately following the incident in Fukushima, the Federal Government decided that German nuclear power stations had to be inspected to establish how robust they would be in case of natural catastrophes and terrorist attacks. TÜV NORD EnSys Hannover and TÜV NORD SysTec were involved in this process and prepared tests, assessed documents and evaluated the actions that resulted. And the nuclear experts from TÜV NORD Group were also the right contacts for stress tests at the European level: “We are the assessors for the plants in Northern Germany, says Hartje, “so we have the best-possible overview.”

Because of both immediate and staged switch-off of the German reactors, the working focus of both companies will change. TÜV NORD Group continues to offer the entire range of expertise of a full-service nuclear service provider, but in Germany the emphasis will increasingly be on tasks concerned with decommissioning and disposal of nuclear waste. Already today, TÜV NORD EnSys Hannover is working on the secure sealing of the THTR (Hamm-

“Our competence will be maintained.”

Bernward Hartje, General Manager of TÜV NORD EnSys Hannover

Uentrop) and Lingen power plants and decommissioning of the plant in Würgassen. Sister company TÜV NORD SysTec has been entrusted with support of the decommissioning of the Lubmin near Greifswald and Stade plants. A good twelve years lie between shutdown of a nuclear power station and its final decommissioning. As TÜV NORD Group is concerned with the plants that will continue to supply power until 2022, the relevant expertise will be very much in demand over the next 25 years. However, activities such as surveillance and periodic inspection will decrease. “The skills and the people will be retained within TÜV NORD Group”, says Hartje. “Our nuclear competence will be maintained to the full extent.” At the present time, the two companies in the TÜV NORD Group that work in the nuclear sector employ a workforce that is 585 strong, of whom around 20 per cent are women.

INTERNATIONAL DEVELOPMENT

In contrast to the situation in Germany, dismantling and decommissioning of power plants are hardly of significance when it comes to international markets. On the contrary: many nations intend to build new reactors. The US nuclear agency NRC recently approved construction of two 1,100 Megawatt blocks in Georgia – the first new reactors in the USA for more than 30 years.



During a nuclide-specific examination, an engineer from TÜV NORD EnSys Hannover measures gamma rays (left).

Reactors 1 and 2 of the Angra nuclear power plant in Brazil currently cover around 30 per cent of energy consumption in the State of Rio de Janeiro (top).

Dismantling of the reactor in Lubmin is being mainly supported by TÜV NORD SysTec (below).

Some countries want to make use of nuclear energy for the first time, for example Poland, Saudi Arabia and Vietnam. TÜV NORD Group, with its expert companies working in this field, can also act as official assessors and can advise governmental authorities within the projects, as they possess in-depth expertise in the establishment of nuclear plants. This includes knowledge of the regulations that have to be applied, and also the authorities and agencies that have to be involved. Many years before the catastrophe in Fukushima, TÜV NORD Group began to offer its nuclear expertise on the international market, and has subsidiaries in Sweden, Finland, Argentina and South Africa whose work in this areas is well advanced. TÜV NORD also works with strategic partners on projects in the nuclear sector.

TASK: OWNER'S ENGINEERING

One large project is the nuclear power plant in Angra in Brazil, where two pressurised-water reactors have supplied the population between São Paulo and Rio de Janeiro with electric power for around 30 years. A third reactor, Angra 3, will be completed by 2016 and TÜV NORD Group will play a major part in examination of the design documents and components. So-called Owner's Engineering is a further aspect within the international nuclear

sector. Here, an experienced project team supports the complete build of the nuclear power plant from the tendering process through approvals, scheduling and surveillance, including ongoing quality assurance. Up to 20 per cent of the cost for a new nuclear power plant is attributable to technical services, says Hartje. At up to six billion euros total cost per reactor, this can be quite a substantial sum.

EXPERTS ALL OVER THE WORLD

Good contacts exist with international operators and erectors such as Eskom (South Africa), Eletronuclear (Brazil) and AREVA – of which the last two are building the Angra 3 reactor. Despite the large orders involved, the international side of the nuclear business does not have a negative impact on work in Germany. "We are still available to our German clients – both now and over the long term", says Hartje. Nuclear engineering and the challenges it presents will continue to change in future, even without further catastrophes. With its well-trained and highly-motivated workforce, TÜV NORD Group is accepting the challenges and creating positive and long-term prospects for its clients at home and abroad. ◀

Fair truck assessment

RETURNING LEASING VEHICLES requires clever logistics. TÜV NORD Mobilität organises the return and assessment of thousands of trucks each year for MAN Truck & Bus. Regular exchanges of experience perfect the process.

This truck has already been through quite a lot, and the traces left after several hundred thousand kilometres on Europe's roads are immediately obvious to the experts: hastily-removed plastic film with the remains of the company name, for example, a damaged driver's seat, torn upholstery. Other defects, such as for example dents in the underneath of the tank, are less obvious. But nothing escapes the men in the blue pullovers and anoraks bearing the TÜV NORD logo who are examining the truck in a MAN Truck and Bus workshop on this cold afternoon. They are intermediaries between leasing clients and MAN Truck and Bus. They assess the state of the vehicle at the end of the leasing period. It is in the interest of both parties to make sure that wear and damage are correctly recorded – neither side wishes to feel that it has been unfairly treated. That is why the inspectors from TÜV NORD work through their checklists so carefully. Around 80 truck professionals from the whole of Germany have come to Quickborn near Hamburg for further training and to exchange their practical experiences as TÜV NORD independent experts.

Assessors from TÜV NORD examine the vehicles returned by leasing clients from top to bottom in order to discover any possible defects.



SOFTWARE FOR DOCUMENTED ORGANISATION

The morning was dedicated to theory: the participants in the training session discussed the latest improvements in a software program from *AutoDo!* in whose development TÜV NORD was involved. This software has been in use for the management of used utility vehicles since 2008. "The software makes the process of returning leasing vehicles much simpler", explains Andreas Köhl, Key Account Manager in the area of used vehicle management at TÜV NORD Mobilität, and TÜV NORD uses it to return MAN leasing vehicles all over Germany. Before its introduction, the work was more difficult, as it was only possible to exchange information and coordinate dates by telephone and e-mail. Now, all those involved have online access at all times to all the current data and documents for each leasing vehicle that the MAN client has to return at the end of the leasing period. "Thanks to the software

from *AutoDo!* the process of returning the leasing vehicle is now less complicated and the whole process is much better for the client", says Dietgar Völzke, Head of TopUsed Business Management at MAN Truck & Bus. At the return location, a TÜV NORD assessor examines the vehicle and completes an assessment protocol which forms the basis for a report on its current value. The experts from TÜV NORD write more than 6,000 of such return protocols and reports each year for the company. Both documents record the damage that has occurred to the leasing vehicle in the course of its use, and the loss of value that results.

DEMONSTRATING CUSTOMER AWARENESS

This is a particularly sensitive area in the relationship between the leasing company and its clients. "If clients feel annoyed when returning one of our vehicles because they have the impression that they have been charged for too much damage, it can have a



Checklists and descriptions of defects help in assessing the condition of the vehicle at the time it is returned (top).

All the important vehicle documents are stored using the *AutoDo!* software and can be accessed by all those involved (below left).

Sketches of individual vehicle components make the examination easier for the TÜV NORD assessors (second from left).

How many kilometres have been covered by the truck? This information is an important part of the report (second from right).

Climbing onto and kneeling under the vehicle are essentials during the detailed work of the assessors (right).



very negative effect”, explains Völzke, drawing on his experience. “This is why we work together with TÜV NORD, an independent assessor trusted by everyone.” But large dents, such as are found in the sample vehicle under investigation in Quickborn today, are certainly defects which reduce the value of the vehicle.

MEETING FOR TRAINING AND EXCHANGE OF EXPERIENCE

The TÜV NORD assessor, as an objective third party, decides upon the seriousness of a particular defect and its consequences. He is aided in this by a damage price list which is continuously updated and also by his own many years of experience, and by exchanging information with colleagues. “Our meetings and the fact that we examine sample vehicles together are indispensable for maintaining a uniform standard”, says Köhl. As the afternoon of practical work performed by the assessors convincingly shows. ◀

TÜV NORD – SUPPORTING MOBILITY

TÜV NORD has continuously expanded its mobility services over recent decades. The traditional area is that of periodic vehicle testing and driving tests. To this have been added further services, such as for example vehicle valuations and advisory services for the automotive industry and its suppliers, as well as consulting and marketing services for customer service of dealerships and workshops.

A further important area is vehicle management for rental and leasing companies, where TÜV NORD organises returns and writes reports. Driving schools, insurance companies, vehicle importers and last but not least private individuals who wish for support when buying a car, are also clients of TÜV NORD Mobilität.

Full steam ahead for Starlight Express

NEVER BEFORE HAS A MUSICAL ATTRACTED MORE VISITORS AT A SINGLE LOCATION. And in no theatre has the same entertainment been performed over such a long period as in the Starlight Halle in Bochum. TÜV NORD inspects the equipment at the venue to ensure that it is safe.

The 1,750 visitors to the Starlight Express Musical hold their breath when 26 roller skaters race to become “The fastest engine in the world”. The 250-meter long race track runs in loops on three levels, over several bridges and twice even directly through the public. “When the trains rush through the auditorium you automatically get goose bumps” says Stefan Mölleken, TÜV NORD engineer from Oberhausen, who visited the musical together with his family. And he is also involved with Starlight Express at the professional level.

When the old steam train “Rusty” enters the fray against the spark-throwing “Elektra” locomotive, it is not only the show, with its complicated stage machinery, that has to succeed. The electrical equipment, emergency lighting, ventilation, lighting and fire protection in the theatre building also have to function perfectly. In order for this to happen, Mölleken has recently tested the safety equipment of the building in accordance with the test regulations for special buildings in North Rhine-Westphalia. The musical has been running in Bochum since 1988, produced by Mehr! Entertainment. The theatre, which was specially built for this production, belongs to the City of Bochum, who rent it to the private theatre company, and every three years engineers are commissioned from TÜV NORD to put the entire safety equipment of the building under the microscope.

60 CUBIC METRES OF AIR PER VISITOR

“When we inspect the ventilation equipment, it is not primarily the comfort of the audience that we are thinking of. It’s a question of fire safety”, explains Mölleken. “If a fire breaks out, the ventilation has to stop immediately, so that fire and smoke do not spread in the hall itself or to other rooms.” The system transports 125,000 cubic metres of fresh air per hour into the Starlight Halle, which, including the audience, performers and support staff, accommodates 2,000 people. The regulations specify 20 cubic metres of fresh air per person and hour, and the “Starlight” equipment handles more than three times that volume. But even if it should un-

“We not only consider the comfort of the audience but also their safety.”

Stefan Mölleken, Engineer at TÜV NORD

expectedly fail, there is sufficient air to breathe for all the members of the audience, the performers and the other personnel in the service area, backstage and orchestra pit.

ESSENTIAL EQUIPMENT

The hygiene standards of the ventilation system must also be checked on a regular basis. “If a filter is blocked or condensate has collected within the equipment, mould can form”, says the engineer. This does not present a risk to most people’s immune system. “But those with allergies can react to microorganisms and moulds in the room air with sore eyes or even shortage of breath”, he says. Since pyrotechnics have been used in the show, for example in the case of the “Elektra” locomotive with its shower of sparks, the filters have had to be cleaned four times per year. The central ventilation unit is in the cellar, fire dampers to protect against fire and smoke are distributed over the entire building. “We check these for correct function and damage”, explains Stefan Mölleken. “In addition, we test the smoke extraction system, which uses the ventilation exhaust air system and has to be triggered by the fire brigade after the fire has been extinguished. Here, faults can occur in the control system, or the bearings or motors may be defective.” Starlight Express is literally a musical of superlatives (see box). No other musical in the world has been performed for such a long period at the same venue. In the past 24 years, however, some things have changed.



In Andrew Lloyd Webber's musical, 26 trains come together to compete in the train world championship (left).

850 neon tubes let into the floor and 8,000 LEDs mark the tracks and the starry heaven (below left).

Since pyrotechnics have been used in Starlight Express, such as for example in the "Elektra" locomotive, the air filters have had to be cleaned four times a year (below centre).

The city of Bochum and State of NRW had the venue specially erected for Starlight Express at a cost of twelve million euros (below right).



The entire heating and ventilation systems have been successively renewed and adapted to modern sustainability requirements. Such a modernisation is due again soon: the ventilation equipment is to be optimised: the more cold fresh air enters into the building, the more heating or cooling is required.

Möllerken knows the benefits of the technology planned for the future: "The new installation measures the current carbon dioxide content of the air and then determines the amount of fresh air that is needed. If consumption of fresh air is low, heating energy is saved automatically." The new control system will above all be used during training and rehearsals; during the show itself, fresh air will continue to be supplied at full volume. Even if the exact time when the new system will be installed has not yet been decided, it is certain that it is coming; the city councillors in Bochum are sure that the musical will continue its successful run for many years. And if the audience catches their breath when the locomotives carry out their daring manoeuvres, it has nothing to do with the ventilation. ◀

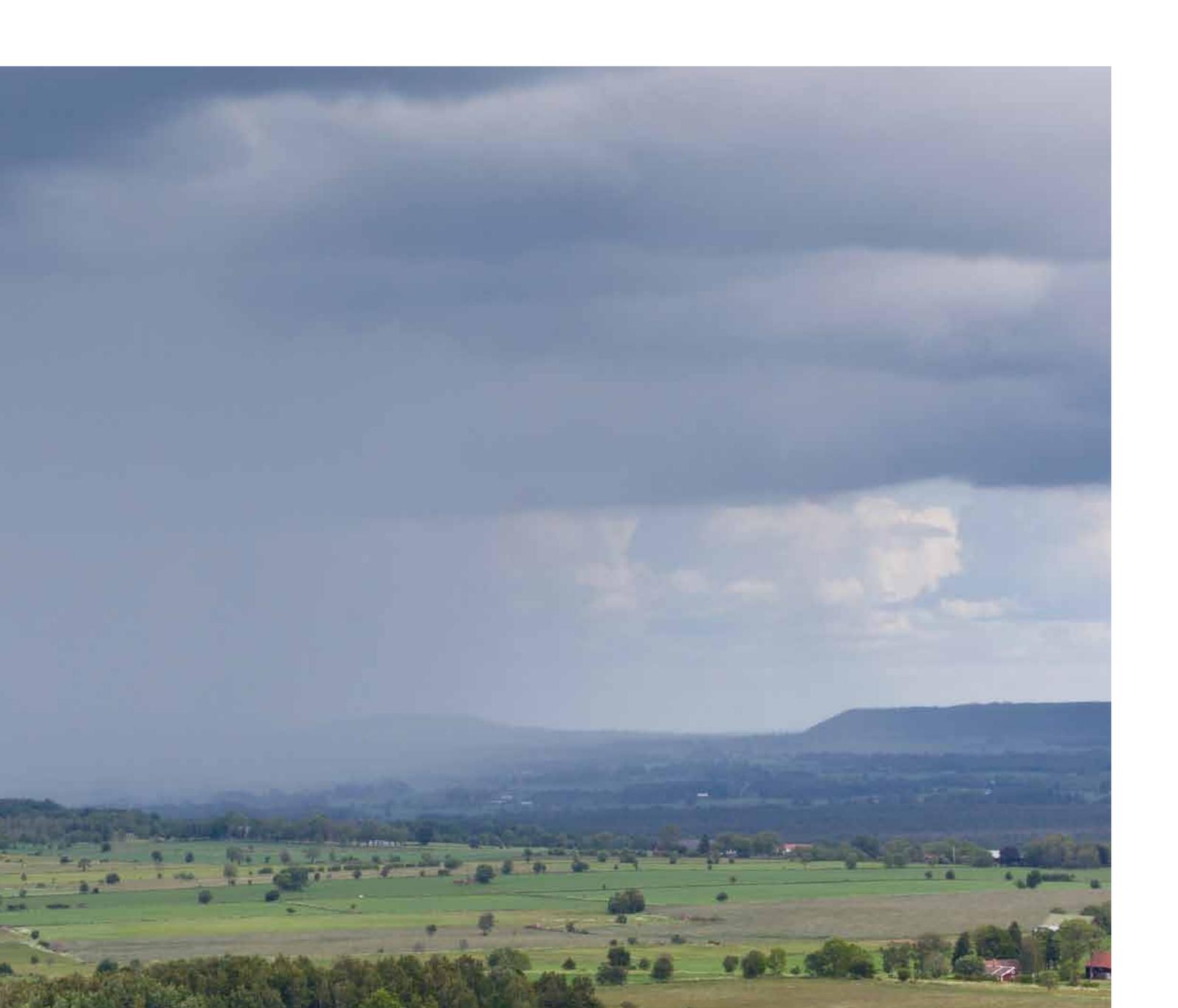
MUSICAL OF SUPERLATIVES

When the musical Starlight Express had its premier in New York in 1987, it was the most expensive stage show that Broadway had ever seen. The producers in New York spent the equivalent of six million euros on the roller skating spectacular.

When Starlight Express went onto the stage in 1988 in Germany, the city of Bochum and the State of North-Rhine Westphalia also dug deeply into their wallets: they had a tailor-made venue erected especially for the musical, which was completed in the record time of only 14 months. It is the only theatre to have been built exclusively for one single production.

And it holds yet a further world record: With over 14 million visitors it is the most popular musical of all time.

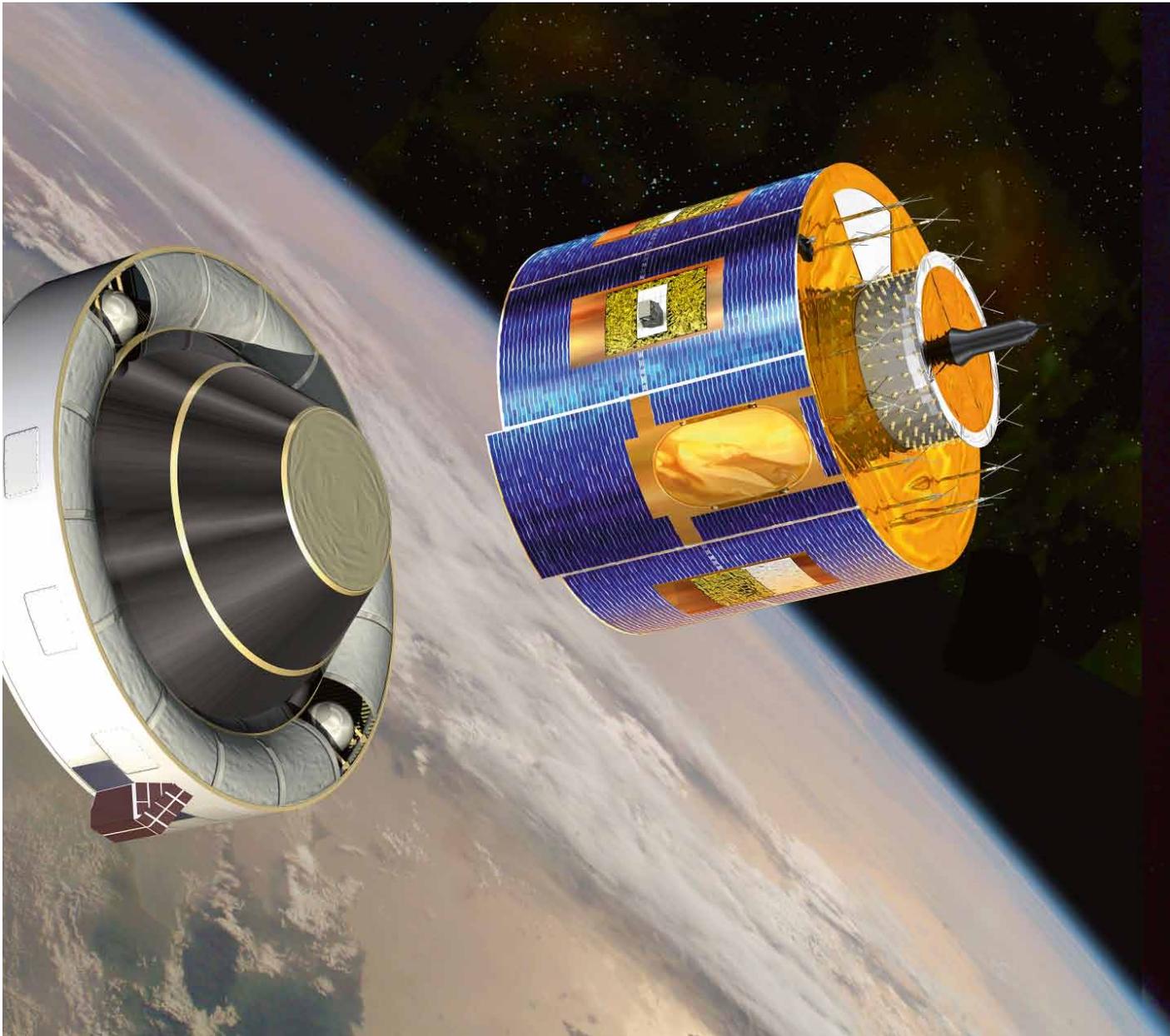




NATURE

OBSERVING AND FINDING OUT ABOUT NATURE > In nature, everything is in a constant state of flux, its most important feature is change. A typical example of this is the weather. Human beings have very little influence on the weather, but they can forecast it reliably thanks to the latest satellite technology. Further examples of interaction between people and nature are use of solar energy and storage of natural resources previously won from the earth deep below the earth's surface.

Reliable electronics – for the lifetime of the satellite



WEATHER SATELLITES ARE INDISPENSABLE TODAY, they supply important data for weather forecasts and climate research. For many years, Alter Technology TÜV NORD (ATN) has been supporting the European Space Agency (ESA) on the Meteosat Constellation programme for European climate monitoring.



Meteosat satellites

fly at a height of 35,800 km above the equator (left).

On board an Ariane launcher,

Meteosat 9 is propelled into space (left).

Each satellite

is a highly complex technical system (centre).

Satellite data

help to recognise and forecast the weather (right).

The Meteosat-9 is a success. For seven years now, the weather satellite has been transmitting its data to the earth – very precisely, every quarter of an hour. It circles the earth at a height of 35,800 kilometres in a geostationary orbit directly over the absolute zero point, the intersection of the zero meridian and the equator. This weather satellite jointly developed by ESA and Eumetsat (European Organisation for the Exploitation of Meteorological Satellites) is one of the second generation of Meteosat satellites, known as MSG for short. The primary measuring instrument provides high-resolution of Europe, the North-Atlantic and Africa. What happens if something goes wrong? The answer is that nothing must go wrong – over the entire lifetime of the satellite.

EXTREME ENVIRONMENTAL CONDITIONS

It is no longer possible to imagine weather forecasts without satellite pictures. For 25 years, Alter Technology TÜV NORD (ATN) has been supporting all the important missions, and clients including all the national space agencies, satellite manufacturers and their subcontractors. ATN is a leading player in the selection, procurement, testing and certification of electronic components for satellites, with a workforce of around 200 at its five locations

in Madrid, Seville, Toulouse, Rome and Portsmouth. “Each satellite is a very complex array of mechanical and electrical systems”, explains Walter Fischer, head of the EEE Component Division of ATN. “The electronic measuring systems are subjected to extreme environmental conditions but still have to function reliably.” Whether vibration, extremely low temperatures or radiation – the experts from ATN select reliable components inspecting and testing them; for reliable energy supply, error-free control software and interference-free communications essential for the success of every mission. It is ATN’s job to ensure that all the components are tested and ready for the challenge – from laboratory to the manufacturer into space.

Meteosat-9 is intended to observe physical and chemical processes in the earth’s atmosphere. It provides a multi-spectral image of the same section of the earth every 15 minutes. This allows weather events and water vapour content to be determined in different atmospheric layers. Meteosat-9 sends 20 times more data to earth than its predecessors. ►

“From laboratory to manufacturer into space.”

Alter Technology TÜV NORD (ATN)

Wind direction and speed can be forecast very precisely because the satellite takes a high number of images. The data sent to earth also allows accurate definition of the different types of clouds, including ice clouds. Areas of snow are also clearly visible.

A further measuring instrument is in use for studies of the climate. The four MSG satellites provide a complete picture of the earth from space, and this data is used for climate research. With the help of the data that is gathered, the meteorologists can forecast dangerous weather conditions providing early warnings to help save lives. This applies, for example, to dense fog, sudden occurrence of storm force winds and also heavy rains. When images are viewed in rapid succession, the progress of weather fronts can also be clearly seen. Those satellite images very often feature in television weather forecasts.

THIRD GENERATION OF SATELLITES

This success story is set to continue. In the Meteosat programme (MTG), ATN has already checked around 500,000 components for 41 subcontractors. These in turn were procured from 39 different manufacturers throughout the world. “ATN has a special close relationship with the component manufacturers, as they

are responsible for the production of the high reliability components”, says Eva Diaz, Project Manager at ATN. Currently, ATN is supporting the mission of the third generation of satellites: MTG.

This constellation consists of six satellites and will supply weather and climate data for Europe for the next thirty years, starting from 2017. Thanks to technological advances, MTG will offer even higher performance than the second-generation satellites (MSG), and will provide a basis for even more accurate weather forecasting. Improved imaging and more sophisticated measuring instruments for investigating and determining possible lightning strikes will further enhance existing services. In addition more rapid forecasting of serious storms causing heavy rains and possible flooding. Aerosols, dust clouds from volcanoes and air quality can be monitored more easily. The total cost of the programme: around 2.35 billion Euro.

GLOBAL MARKET OF THE FUTURE

Electronic components tested by ATN, however, do not only orbit in space. They can also be found in the medical, safety, aviation and nuclear industries, whose extremely reliable components are required in order to operate safely and effectively. Two themes of increasing significance in the component industry are safeguarding against counterfeits and security of supply over longer periods (obsolescence), in particular because of the long development times. The use of so-called standard commercial “off the shelf” components are also in the spotlight. “Today, safe and reliable components are of vital importance in the market”, says Luis Gomez, CEO of ATN. “We are part of the global markets of the future.”

www.altertechnology.com

THE METEOSAT STORY FACTS AND FIGURES

1977

The first European weather satellite, Meteosat, is launched from Cape Canaveral in the USA on 23 November.

1986

Eumetsat becomes responsible for data processing.

2002

MSG-1 (now Meteosat-8), the first satellite of the second generation, is launched on 28 August.

2005

MSG-2 (now Meteosat-9), is launched on 22 December.

2017

Launch of the first satellite of the third Meteosat generation, MTG; there will be six satellites in total.

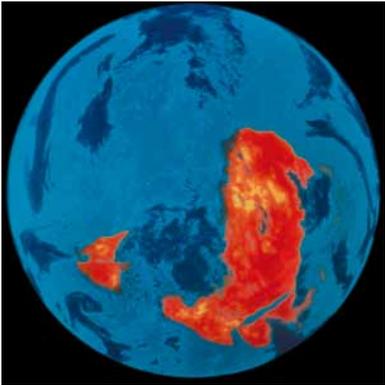
Testing and certification
of satellite components is performed in ATN's laboratory.



ATN clients include international space agencies such as ESA (right).

The image from a weather satellite provides data for weather forecasting and climate research (left).

Safe and extremely reliable electronic components are vital nowadays (below).



Solar power from sunny Spain

TODAY, THE FOCUS IS ON SUN, WIND AND WATER as renewable energy sources. The Andasol 3 solar thermal power plant in the south of Spain generates electricity from sunlight on an industrial scale – even after the sun has gone down.

The old Castillo La Calahorra, with its medieval grandeur, dominates the landscape of the Sierra Nevada, and because of its picturesque silhouette, this corner of Andalusia has often been the backdrop for dramatic wild west films. But this area is far from dissolving into a land of fairy tales. Modern life has been well established here for many years now, and clean energy is generated using the most modern technology.

ELECTRICITY FOR HALF A MILLION PEOPLE

Sunny landscapes such as can be found in the south of the Iberian peninsula are very well suited to generation of solar energy, and this is how the La Calahorra region in the Province of Granada became the site of the unique “Andasol” power plant, up to now the largest solar thermal power plant in Europe. Andasol consists of three installations, Andasol 1, 2 and 3, which in normal operation can together supply around half a million people with electricity from solar energy. Differently than for example in Germany, these solar power plants are not photovoltaic installations where electricity is won directly from light. The Andasol technology generates heat from solar energy, which in turn drives a steam turbine.

Since the middle of 2011, Dr Christoph Wasserfuhr has flown to La Calahorra every two weeks. The power plant engineering specialist coordinates the work of the engineers from TÜV NORD who are looking after Andasol 3, the latest of the three installations. The technology used in the plant, also called CSP (*Concentrated Solar Power*) functions in principle like a burning glass.

In the case of Andasol 3 there are around 205,000 parabolic mirrors which bundle the light and transfer the energy to absorber tubes containing a special synthetic oil as a heat storage medium.

This oil, heated up to 400 degrees, transports the energy on to a conventional downstream steam power plant and at the same time

The old castle
La Calahorra watches over the landscape and is still a tourist attraction today.



supplies a heat storage facility. This means that a solar thermal power plant like Andasol 3 even generates electricity when the sun has long disappeared below the horizon.

Andasol 3 has been on line since October 2011 and in normal operation will produce around 165 million kilowatt hours of electricity each year. In comparison with a modern hard coal-fired power station, this power plant saves around 150,000 tonnes of carbon dioxide per year at the same output.

GREEN ENERGY FROM EUROPEAN COOPERATION

Such installations are very complex and must be continuously monitored from the technical point of view.

Dr Wasserfuhr checks the safety of the tubes, the functioning of the measuring technology and above all is concerned with fire and explosion protection. Solar thermal power plants such as Andasol 3 are one of the alternatives to conventional power generation, and



In the south of Spain the Andasol 3 solar thermal power plant supplies large quantities of clean electricity, also for clients in Germany.



The safety of the plant is guaranteed by well-functioning fire extinguishing equipment (left).

High pressure – measuring devices check that everything is as it should be (centre).

The sun heats the oil in the tubes up to 400 degrees. Are they in perfect condition? (right).

they are an indispensable element within the energy revolution. Of course, power plants like the one in Calahorra must be built and operated in accordance with the rules of the country in which they are situated.

GERMAN OPERATORS AND SPANISH SUN

Andasol 3 is operated by the companies Stadtwerke München, RWE Innogy and RheinEnergie, who have come together in Granada in the Spanish project company Marquesado Solar for the purposes of energy generation.

The Andasol 3 solar thermal power plant is an example of how energy generation is increasingly a matter of cross-border cooperation. Thanks to the international nature of its work, TÜV NORD offers an ideal interface between operators from Germany and the actual location of the plant. The contacts on site are engineers from Cualicontrol-ACI, a Spanish subsidiary of TÜV NORD Group. And they know all about sunny Spain. ◀

The expert at work

DR CHRISTOPH WASSERFUHR

A challenge such as the Andasol 3 solar thermal power station in the south of Spain is made for Dr Christoph Wasserfuhr. His experience and knowledge are particularly useful there. His doctoral thesis was already on the subject of “Corrosion phenomena in turbine materials at 1,000 degrees Centigrade” and throughout his career, he has been concerned with large-scale installations and power plants throughout the world.

What makes him so special? He knows what is important when power plants are not sited in Germany and German rules and regulations do not apply. Many projects in Saudi Arabia, Turkey and Jordan have contributed to his knowledge.



Farsighted



OIL AND GAS ARE ESSENTIAL. And they must be available to us at all times – even if supply bottlenecks occur. Emergency supplies are now stored all over the world in caverns within salt deposits. The geophysicists from DMT in Essen specialise in assessing such deposits.

Whether due to an increase in demand for vehicle fuel at holiday times, discussions about oil supplies from the Gulf region or temporary failure of the gas pipeline between Russia and Germany: for at least three decades people have been talking about secure fuel supply but have not really needed to take dramatic action. The petrol pumps were always open, and there was no lack of heating oil or gas.

And there is a reason for this. As early as the 1970s, experts developed models of how to make Germany independent of supply bottlenecks and embargos. The most obvious solution was deemed to be the best: storage of emergency supplies. In 1978 Germany began to build up oil reserves, and it has only been necessary to tap into them three times. The first was in 1990 following Iraq's attack on Kuwait; later, when hurricane Katrina put an end to oil from the Gulf of Mexico. The last time was in June 2011, when deliveries from the Near East ceased because of the crisis in Libya.

CAVERNS ARE IDEAL STORAGE LOCATIONS FOR OIL AND GAS

The question is of course, how and where these large volumes of oil can be kept in order to keep Germany supplied for months at a time. One possibility is to create storage facilities above ground, but storage tanks, costs and environmental aspects mean that this is not an easy solution. Which leaves underground storage. This is where so-called caverns have proven to be the ideal and environmentally-friendly alternative. Caverns are vertical tubes within a layer of salt, created through rinsing through with water. There are around 250 such caverns in Germany, and some of them are close to the most important oil port of Wilhelmshaven. These caverns are more than 1,000 metres underground and are used to store the oil reserves that have to be kept by law.

Nevertheless: "The requirements that have to be fulfilled by a cavern to be used for oil or gas storage are very strict", says Dr Dirk Orłowski, Head of Exploration and geophysics engineer at DMT in Essen. DMT is an internationally active, independent provider of engineering and consulting services. It works in many areas, one of which is raw material discovery and exploration.

A cavern can have a diameter of up to 80 metres and can be between 50 and 500 metres high. One challenge is not to rinse out the salt too far, so that neighbouring rock strata are reached. The cavern then becomes like a conventional oil tank whose walls

are too thin. "The cavern begins to fragment and is no longer suitable for oil or gas storage", explains geophysicist Dr Orłowski. Impurities in the salt can also mean that it cannot be used.

Establishing the structure of the salt deposit and finding out if it is suitable as a storage facility for oil and gas – those are the questions that concern the experts from DMT. In cooperation with the Federal Institute for Geosciences and Natural Resources (BGR) and Wuppertal University, DMT has developed a measuring system which can establish the nature of the salt deposit before a cavern is formed and identify any residual risks. The name of the measuring system: Directional Downhole Radar. ▶

A DMT geophysicist introduces a transmitter and receiver unit into the borehole (left).

Cavern fields serve as storage facilities for emergency crude oil supplies (below).





A tubular probe up to 20 metres long is fed into the downhole, with the transmitter and receiver unit of the downhole radar (top left).

Before its use in the cavern, the downhole radar is mounted. Introduction of the probe requires a high degree of accuracy when guiding and then observing the results (bottom left).

The mobile downhole equipment is used for examination of the selected cavern (right).

The downhole radar is prepared at the site. Working at the winch – this is where the measurements are controlled by radar (right).





LARGEST CAVERN FIELD

Caverns are used to buffer fluctuations in consumption of crude oil and natural gas. The Epe cavern field in the northern Münsterland in North Rhine-Westphalia is the largest facility of its type in Europe. It consists of five oil caverns and 63 gas caverns. Ten further gas caverns have been approved, and nine are at the planning stage. In total, around 4.7 billion standard cubic metres (cubic metres under specified pressure and humidity conditions) of natural gas are stored in the Epe cavern field. To this are added a maximum of three million cubic metres of crude oil.

QUANTUM LEAP: DIRECTIONAL DOWNHOLE RADAR

“Radar methods are used in many ways in geophysics, generally for examination of near-surface structures”, says Dr Orłowsky. However, traditional surface radar only allows the earth’s crust to be examined down a distance of several metres.

In contrast, Directional Downhole Radar from DMT represents a quantum leap in radar techniques and is used above all when developing new caverns in salt strata. “Salt conducts X-rays particularly well”, explains the geophysicist from DMT and adds: “In Poland we have reached a range greater than 900 metres in one case using our new system. An area of around one kilometre around the downhole was explored in detail. Seismic methods starting from the earth’s surface cannot achieve distances like that – nor can any other method that is in use internationally. Directional Downhole Radar is simple but also a stroke of genius: a 20-metre long tubular probe – which contains the transmitter and receiver units – is

“We have achieved exploration ranges of over 900 metres.”

Dr. Dirk Orłowsky, Geophysicist at DMT

inserted into a downhole already drilled by the cavern operator. The length of the probe is dependent on the type of transmitter and receiver unit. Dr Orłowsky: “We always take two measurements. The first is taken at a frequency of around 50 Megahertz. This measurement is extremely accurate, and we can see every detail of the structure and constitution of the salt around the hole. However, the range that can be achieved using this method is limited. The second measurement is taken in the 10 Megahertz range,

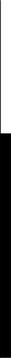
where the resolution, in other words the level of detail, is less – but the signal range is greater.”

And what do the geophysicists learn from their measurements? “Each transition to a different type of rock reflects radar waves in a different way. From the images, we can recognise the geological structure of an area”, explains Dr Dirk Orłowsky. This means that we can also recognise hollow spaces, so that experts from DMT can measure the distances to existing caverns and ensure that there is no breakthrough between caverns at a later stage.

DOWNHOLE RADAR IS CONTINUOUSLY UNDER DEVELOPMENT

Important and interesting at the same time: Directional Downhole Radar from DMT is not a one-off invention, but has been subject to continuous further development and optimisation since the original concept around fifteen years ago, and first use a good ten years ago. The DMT radar technology is not only for occasional use. “Up to now we have used it for 60 measuring procedures”, summarises Dr Orłowsky. And demand continues to be high. “In Europe, for example, up to now it has been above all cavern operators from Germany, Poland and the Netherlands who have taken advantage of what we have to offer. Now the Spanish and Portuguese are also thinking about storage of emergency oil and gas supplies and are enquiring about our services”, adds the geophysicist. Further orders, for example in France, will also certainly follow, because security of supply has become a top priority all over the world.

And of course the engineers and geophysicists are always on the lookout for new ways of using their downhole radar. After a little gentle pressure, Dr Dirk Orłowsky reveals a hitherto well-kept secret: “In mid-2012 we will test a modified downhole radar system to be used in tunnel construction.” Current methods only explore a few centimetres around the hole, but the DMT method allows a far-reaching view with only one drilling. What will the DMT experts think of next? ◀



CONSOLIDATED FINANCIAL STATEMENTS 2011

Group Management Report for the 2011 fiscal year

BUSINESS ACTIVITY

TÜV NORD Group is a technical service provider with worldwide activities; founded more than 140 years ago, it represents experience and competence in Germany and abroad. With its more than 14,000 employees, TÜV NORD Group offers a broad spectrum of high-quality and future-driven services in more than 70 countries of Europe, Asia, America and Africa.

In order to be able to offer the greatest possible customer value, the Group is divided into the *Industry Services*, *Mobility*, *Training and Human Resources*, *International* and *Natural Resources* business units, together with the new *Aerospace* business unit created upon the acquisition of ALTER Group in the course of 2011. All these six business units offer services across all sectors of the economy and worldwide, while maintaining close proximity to their customers.

The *Industry Services business unit* helps its customers to operate production plant, buildings and infrastructure facilities safely and economically. The *Mobility business unit* embraces all activities relating to the approval, development or safe operation of motor vehicles. The *Training and Human Resources business unit* focuses its activities on the areas of initial and in-service training. The companies of the *International business unit* provide services in the fields of certification, technical inspection and engineering. The activities of the *Natural Resources business unit* range from exploration for natural resources to cokemaking technology, from mining consultancy to engineering. The new *Aerospace business unit* is involved in the selection, procurement and testing and also the inspection and certification of electronic components for the space and satellite sector.

In order to further enhance the competencies of its individual business units, the Group once again undertook a number of carefully targeted acquisitions in the 2011 fiscal year. Consolidation was extended to cover a total of seven additional companies for the first time. As of 31 December 2011, the Group with its management company TÜV NORD AG embraces a total of 84 fully consolidated companies, 44 of them domiciled in Germany and 40 abroad.

GENERAL ECONOMIC FUNDAMENTALS

Economic growth and the business climate in the services sector have been influenced by the expiry of economic stimulation programmes and by weak domestic demand in the European Union. In addition, the financial problems in certain European countries have led to uncertainty regarding future economic performance.

The German economy, on the other hand, enjoyed a further period of growth in 2011, in addition to which the Asian region was a driving force in the world economy. TÜV NORD Group is well positioned in economic growth regions throughout the world.

The Group is able to report the following key performance figures in the 2011 fiscal year, as compared to the previous year:

- Revenue rose by 11.1% from €922.6 million to €1,025.1 million;
- EBIT (operating profit) increased by 18.3% to €43.4 million;
- The return on revenue, measured in terms of EBIT, was 4.2% as against 4.0% in the previous year;
- Earnings before tax (EBT) fell by €25.4 million to €23.7 million, due to the high one-off costs of restructuring measures in the *Training and Human Resources business unit*.

By comparison both with other sectors and with its competitors it can be seen that TÜV NORD Group has remained stable and has achieved a sound performance. This is thanks to the broadly-based portfolio of service products that is offered by TÜV NORD Group companies in almost all the major countries of the world. Although the overall economic situation in the principal markets of Europe and Asia is of significance to TÜV NORD Group, thanks to the Group's sectoral and regional diversification it is not the sole determining factor. Thus the Group is not directly dependent on developments in any individual segments of the economy.

MARKET FUNDAMENTALS

The markets for technical services were impacted by changes in statutory provisions (e.g. the redrafting of the Atomic Energy Act) and by further moves in the direction of liberalisation and deregulation. This is creating new opportunities, but at the same time means more competition and increasing pressure on prices.

The market for technical services will continue to undergo consolidation throughout the world. In view of this, TÜV NORD Group will exploit its economic strength to make strategic investments that will enhance its own long-term competitive position.

EARNINGS, ASSETS AND FINANCIAL POSITION

TÜV NORD Group continued to pursue its growth strategy successfully in 2011. In addition to achieving organic growth, the Group was able to boost its revenue by undertaking some well-targeted corporate acquisitions. The following purchases were made in the individual business units:

Industry Services business unit

The company ENCOS GmbH Engineering + Construction + Service of Hamburg (ENCOS) was acquired with effect from 1 June 2011. ENCOS gives TÜV NORD Group better access to the market segment of chemistry for engineering services and strengthens its existing value chain.

Natural resources business unit

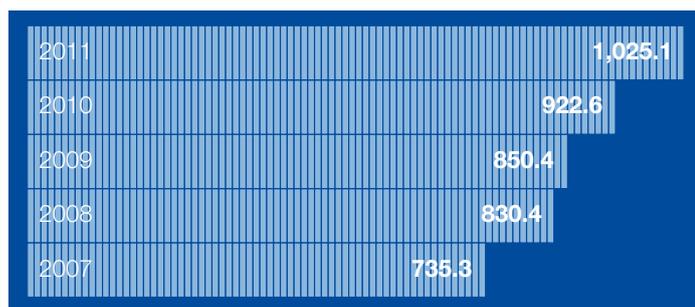
TÜV NORD Group acquired the company Petrologic Geophysical Services GmbH of Hanover (Petrologic) with effect from 1 January 2011. The purchase of this well-established seismic processing business represents a further boost to TÜV NORD Group's accelerating internationalisation in the field of exploration, in particular in the oil and gas market.

Aerospace business unit

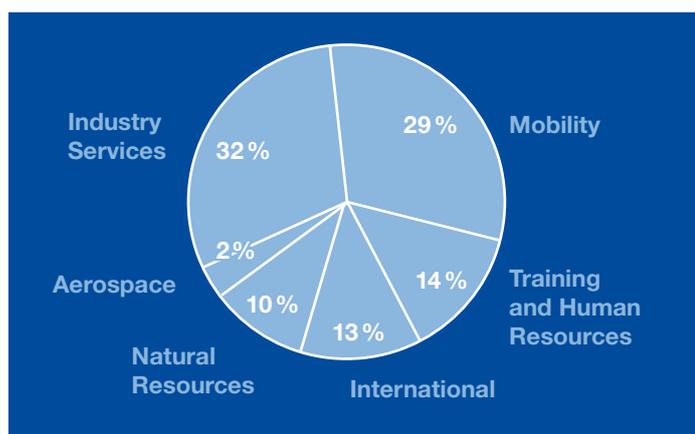
With effect from 1 July 2011 TÜV NORD Group acquired the companies ALTER TECHNOLOGY TÜV NORD S.A.U. of Seville, Spain (ATN), TOP REL S.R.L. of Rome, Italy (TOPREL) and HIREX ENGINEERING SAS of Toulouse, France (HIREX). With this acquisition, TÜV NORD has expanded its range of services by the addition of activities for the aerospace industry.

EARNINGS

The Group concluded the 2011 fiscal year with revenue of €1,025.1 million as against €922.6 million in 2010. Over the past five years, it has succeeded in boosting revenue by 39.4%. This development is illustrated by the following diagram (figures in € million):

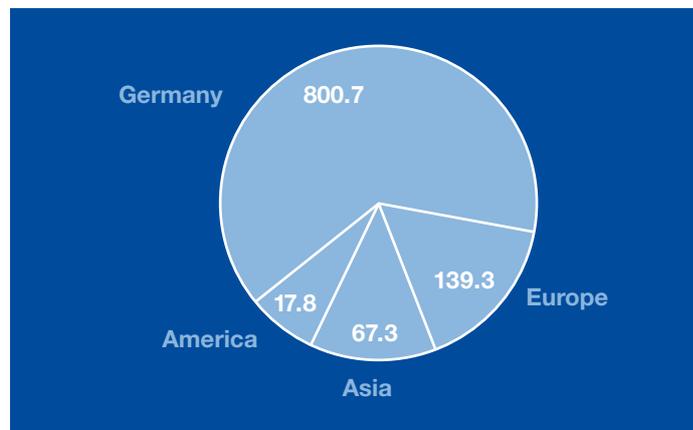


Broken down by business units, revenue in 2011 was as shown below:



In its domestic business, TÜV NORD Group ended the year 2011 with revenue totalling €800.7 million (2010: €725.6 million). International business contributed €224.4 million (2010: €197.0 million) to consolidated revenue a share of 21.9%.

The breakdown of revenue by region is shown below (figures in € million):



Owing to the Group's heterogeneous market presence and the orientation of its various activities towards different geographical regions, the levels of performance achieved by the individual business units varied in the year under review.

The revenue of the *Industry Services business unit* amounted to €332.2 million (2010: €328.1 million). The revenue of the *Systems business area* rose by €2.0 million to €198.6 million. The *Energy and Systems Engineering business area* generated revenue of €83.7 million, € -1.5 million down on the previous year's figure, while the *Certification business area* achieved an increase of 7.8% to €49.9 million. The *Mobility business unit* achieved revenue of €294.1 million, 2.3% above the previous year's figure of €287.6 million. In the *Training and Human Resources business unit*, revenue increased to €139.3 million (2010: €94.2 million). This rise in revenues results essentially from the consolidation of TÜV NORD Bildung Group for a complete fiscal year. The revenue of the *International business unit* amounted to €134.8 million, as against €121.0 million in 2010. In the *Natural Resources business unit*, DMT Group achieved revenue of €102.5 million, after €91.7 million in 2010. Revenues in the newly established *Aerospace business unit*, arising from the pro rata initial consolidation of three newly acquired companies, amounted to €22.2 million.

Group expenses increased by 12.4% to €1,070.3 million during the year under review. The cost of materials rose to €166.2 million, from €139.4 million in the previous year. Personnel expense increased by €70.5 million to €655.4 million. Further information on expenses can be found in the Notes to the Consolidated Financial Statements, under No. 3, *Consolidated Income Statement disclosures*.

TÜV NORD Group's performance in the 2011 fiscal year was satisfactory. EBIT (operating profit) amounted to €43.4 million, as against €36.7 million in 2010.

Non-operating items amounting to € -20.6 million mainly represent provisions for the earnings enhancement programme at

TÜV NORD Bildung and liquidations and impairment losses in the field of equity investments. In 2010, the positive figure of €11.6 million for non-operating items represented for the most part the accounting effects of the initial consolidation of TÜV NORD Bildung GmbH & Co. KG and its subsidiaries and of TÜV NORD Sweden AB.

Earnings before tax (EBT) amounted to €23.7 million (2010: €49.1 million), and consolidated earnings after tax (EAT) to €10.7 million (2010: €35.9 million).

ASSETS

TÜV NORD Group's balance sheet displays a sound structure.

Total assets rose to €725.1 million during the year under review, as against €653.4 million in 2010.

Non-current assets rose from €431.5 million to €444.2 million. The rate of coverage of non-current assets (equity plus pension provisions divided by non-current assets) amounted to 79.7% (2010: 82.9%).

Current assets, which make up 38.7% of total assets, are recognised at €280.8 million (2010: €221.9 million). Cash and cash equivalents increased to €60.6 million (2010: €40.1 million).

The Group also has hidden reserves, mainly in property and equity investments.

Shareholders' equity increased to €118.2 million, as against €116.6 million in the previous year. The equity ratio amounts to 16.3% (2010: 17.8%).

In the 2011 fiscal year, €647.6 million (2010: €629.4 million) of plan assets were netted against pension provisions. The proportion of the provisions for current and future pension obligations that is not covered by plan assets amounted to €235.9 million (2010: €241.0 million). The provision for obligations arising out of pre-retirement part-time working amounts to €33.2 million (2010: €35.1 million).

Reinsurance coverage of pension provisions increased by €16.4 million to €684.9 million. Through this allocation of funds, the degree of coverage was once again enhanced as compared with the previous year.

Further information on the assets situation can be found in the Notes to the Consolidated Financial Statements, under No. 4, *Consolidated Balance Sheet disclosures*.

FINANCIAL SITUATION, CASH FLOW

TÜV NORD Group continued to pursue its conservative financial policy in 2011. The most important objectives remain the further maintenance of the Group's good rating, the safeguarding of an adequate level of liquidity and the centralised financing of the subsidiary companies by the Group on a level that meets their needs. In addition, it is fundamental to the Group's financial policy to ensure a wide measure of financial flexibility and transparent risk and opportunity management.

TÜV NORD Group is categorised by Deutsche Bundesbank as possessing *central bank eligibility*. This gives TÜV NORD Group an advantageous position as compared to its competitors where access to financial resources is concerned.

The cash flow (see *Consolidated Cash Flow Statement*) amounted to €52.9 million, and was essentially applied to the reinsurance of pension liabilities, to investments in intangible assets and in property, plant and equipment, and to equity investments. TÜV NORD Group's net financial position declined to €11.4 million, as against €29.4 million in the previous year; this was due to the very high level of capital expenditure, which stood at €72.1 million in 2011 (2010: €58.2 million).

CAPITAL EXPENDITURE

Capital expenditure excluding corporate acquisitions amounted to €35.6 million in the year under review, as against €35.6 million in 2010. Of this, €31.7 million was invested by the German companies, and €3.9 million abroad. The focus was on investment in testing equipment.

No material capital expenditure obligations existed as of the reporting date.

TÜV NORD Group spent a total of €36.5 million (2010: €22.6 million) on the acquisition of companies and equity holdings during the year under review.

All projects were assessed by value creation criteria; every potential acquisition or capital investment project was scrutinised and analysed both with regard to the return it would bring, and also from the point of view of its impact on the consolidated balance sheet.

INNOVATION

Innovation promotes growth and competitiveness in the companies of TÜV NORD Group, and is thus a strategic tool for generating sustainable corporate success. At the same time, it is a way of meeting the growing need of both business and private customers for quality, safety and security. Furthermore, research and development (R&D) enjoys high priority.

Of particular importance is the fact that TÜV NORD staff sit on all the relevant committees involved in developing rules and regulations at both the national and the international level. As a result, the Group is able to inform its customers promptly of any changes or new developments.

Innovation expense and capital expenditure in 2011 amounted to a total of some €44 million, breaking down as follows:

Innovation expense € million	2011
Setting up of the new Aerospace business unit	27
Further development in the Engineering business area	6
Further development of exploration techniques and exploration seismics	3
Process development at the Institute for Vehicle Technology	3
Development of services in the subsidiary companies	3
Further development of the food laboratories	2
Total	44

Some 300 members of staff were engaged in R&D activities, either exclusively or for part of their time.

The structures and framework for promoting innovation and technology at TÜV NORD Group can be seen as focusing on the following areas:

Promotion of a culture of innovation: The Board of Management promotes innovation and a culture of innovation, thereby empowering the Group's engineers to pursue their own ideas in this respect. It is no coincidence that the title of *Top Employer Engineers* was once again bestowed on TÜV NORD in 2011.

Cooperation agreements and partnerships: Existing relationships with universities, research establishments and companies and organisations that pursue research have once again been actively pursued and expanded in 2011.

Innovation management: Methods, processes and structures are subject to constant improvement in TÜV NORD Group companies, and this is supplemented by the application of best practices identified by comparisons made between the companies.

Concentration of competences: Exchange is promoted between the companies and business units. Experts are deliberately brought into contact with each other in order to pursue discussions and networking. The topic of innovation and growth is a major focus at management events.

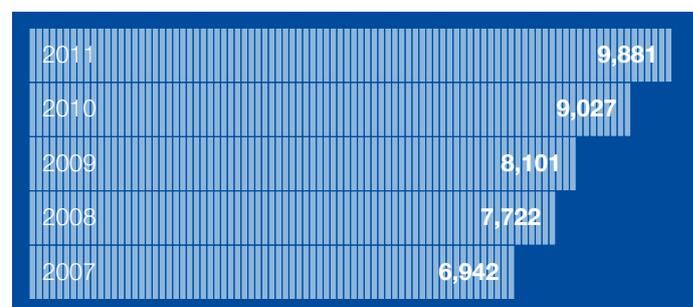
Definition and further development of the technology strategy: The business units identify global trends – e.g. in the fields of materials, energy, the environment and natural resources – and then develop activities that focus on them. They are advised on how to go about this by leading strategy consultants.

In implementing its strategy, TÜV NORD is pursuing the objective of developing from a pure provider of inspection services into a technical consultant able to assist and advise its customers all over the world in respect of their innovation projects. The Group's capital investment and its expenditure on innovation are both substantially higher than the average for the sector. In this way, TÜV NORD is further increasing its technological lead over its competitors.

EMPLOYEES

The average number of persons employed by the German and foreign companies as of 31 December 2011, expressed as full-time equivalents pursuant to Art. 285 No. 7 of the German Commercial Code (HGB), amounted to 9,881, as against 9,027 in the previous year. This represents an increase of 9.5% within a year and 42.3% within five years.

The following chart depicts the development of average employee capacity:



Of the 9,881 full-time employees, 7,733 worked in Germany and 2,148 abroad. Thus the employees working outside Germany represented 21.7% of the total.

Including the technical experts made available by the parent associations, the average number of people working full-time for the Group amounted to 9,982 (2010: 9,139). As of the reporting date 31 December 2011 the headcount of employees was 14,232.

A particular role in securing the future and guaranteeing a high level of quality is played by the carefully targeted measures of initial and in-service training that TÜV NORD Group employees are able to take part in.

€6.7 million was spent on internal and external training measures in 2011 (2010: €5.6 million). The success of these in-service training measures is confirmed by the recognition TÜV NORD has received as an attractive employer: as in the previous year, so once again in 2011 the Group was awarded the *Top Employer Engineers* seal of quality.

The Board of Management would like to thank all employees and the managements of the subsidiary companies both in Germany and abroad for their commitment, their initiative and the new ideas and knowledge they have contributed. We would also like to thank the members of the employees' representative bodies for their constructive cooperation in an atmosphere of trust.

CORPORATE GOVERNANCE

Corporate governance at TÜV NORD Group stands for responsible management and control, orientated towards long-term value creation in all Group companies in Germany and abroad. Appropriately conceived and clearly formulated policies and regulations, accessible to all staff at all times via the intranet, are fundamental factors in ensuring good corporate governance. The adoption of a corporate philosophy and a binding code of conduct has given employees a concrete framework of guidelines for their actions, thus reinforcing business practices in compliance with the law. The corporate philosophy and the code of conduct are regularly reviewed and updated. Information events and training sessions are organised in order to enhance staff awareness of the theme of compliance.

An ombudsman system has been set up with the aim of combating corruption. In this way, TÜV NORD Group has created a protected space for staff, customers and business partners, in which any indications that a law or directive may possibly have been contravened, e.g. by a case of corruption, can be passed on to a solicitor of repute. Compliance with the corporate governance rules and regulations is continually monitored by the Group Internal Audit Department through its risk-orientated audit planning. Enforcement measures, the imposition of sanctions and the analysis and documentation of breaches of compliance are essential elements in the process of continuous improvement.

The compliance organisation is examined by the Group's auditors in the course of the auditing of the Annual Financial Statements. In addition, in the course of the 2011 fiscal year an external legal firm and a firm of auditors were requested to evaluate the compliance structures and processes on the basis of the currently valid Standard PS 980 of the Institute of Public Auditors in Germany (IDW), in order to identify further areas for improvement. In both the resulting audit reports, compliance culture in TÜV NORD Group was described as "good" and the effectiveness of the compliance management system was confirmed. The compliance structures have proved themselves, are accepted as being binding and are lived out as a permanent feature of everyday life in the Group.

RISK AND OPPORTUNITY MANAGEMENT SYSTEM

For a business group with international operations such as TÜV NORD Group, comprehensive risk and opportunity management is an essential management tool. Risk and Opportunity Management, as an integral part of the internal control system, is not only an information and management instrument for handling identified risks within TÜV NORD Group, but also serves to enable opportunities to be identified and taken advantage of.

External and internal risks are regularly and systematically identified at all companies in which TÜV NORD Group holds a majority interest, and levels of potential loss or damage are evaluated in a uniform manner throughout the Group. Identified risks are then classified into different risk categories in accordance with the estimated probability of their occurrence, and appropriate countermeasures are planned and implemented.

Wherever necessary, provisions are formed to cover risks emanating from the various segments of the Group's activities. The Group has taken out adequate insurance in order to limit or completely eliminate the financial impact of any losses or liabilities arising. The level of this insurance cover is constantly being optimised.

In line with the strategy of constantly enhancing the value of the company, the reduction of risk is a priority objective within TÜV NORD Group. Concrete and timely forms of action are therefore initiated in the operating companies in order to minimise risks and to enhance and exploit opportunities.

Strict quality assurance and the optimisation of the use of resources at all levels of the organisation contribute to the mitigation of identified risks and the better exploitation of opportunities, and thus to the strengthening of the Group's competitive position.

A quarterly risk and opportunity report is presented to the Board of Management and the Supervisory Board. In addition, Group companies are required to submit ad hoc reports whenever necessary.

The Group's risk and opportunity management is constantly being further developed in order to take account of current requirements. The efficiency and effectiveness of the system are regularly monitored by the internal and external auditors.

RISK AND OPPORTUNITY REPORT – REPORT ON EXPECTED DEVELOPMENTS AND THE ESSENTIAL RISKS AND OPPORTUNITIES THEY REPRESENT

The leading economic research institutes expect world economic growth to slow down in 2012, though not by as much as it did in the previous year. In Europe in particular, the difficulties in the field of state finances may cause problems. A decline in the willingness to invest may also lead to a weakening in the demand for technical services.

TÜV NORD Group will continue to pursue its growth strategy on a sound economic basis. The plan for the period 2012 – 2014 provides for the Group to achieve profitable growth in revenue, while at the same time overcoming the challenges arising from market conditions. The breadth of the Group's portfolio in its six business units will exert a stabilising effect. A further objective is to achieve a level of Group operating profit that exceeds that of the past year. However, it is expressly pointed out that actual performance in the coming three fiscal years may not be in line with expectations.

RISKS AND OPPORTUNITIES FOR TÜV NORD GROUP

As a business group with international operations, TÜV NORD Group is confronted with countless opportunities and risks that are inseparable from the pursuit of entrepreneurial activity. Opportunities arise out of the Group's presence in growth sectors and dynamic markets. Investment in innovative business areas in Germany and abroad gives the Group the opportunity to react to the intensifying pressure of competition and to strengthen the company's market position.

No risks became apparent during the 2011 fiscal year which individually or cumulatively might jeopardise the continued existence of TÜV NORD Group or materially impair its financial position, financial performance or earnings. Nor is there any threat for the foreseeable future of any risks arising that might jeopardise the company's continued existence.

The Group is not exposed to any material price, credit loss or liquidity risks, nor to risks arising from fluctuations in cash flow. The Group's financial assets are invested in such a way that as far as can be seen at present, no material risks exist.

The individual business units report the following risks, opportunities and developments in their business activities:

The *Industry Services business unit* expects its business to continue to show a positive development in the coming years. The risks and opportunities that are likely to exert a material influence on the way business proceeds may be summed up as follows. The business unit is exposed to risks above all in its core market, Europe. Intense price competition, but also equally intense competition with regard to the recruiting of staff, especially engineers, may have a negative impact on the achievement of objectives in the *Systems business area*. There are opportunities for the expansion of business through the introduction of new services and the extension of existing ones (e.g. in the field of railway engineering) as well as through the geographical expansion of activities throughout the world. Moreover, there is still room for measures to be implemented that will further enhance the efficiency with which services can be provided. In the coming years the *Energy and Systems Engineering business area* will face the risk of a shrinking order book as a result of the new 2011 Atomic Energy Act. There are opportunities arising from the Group's involvement in the field of nuclear waste disposal in Germany and from the expansion of nuclear power abroad. There is more intensive demand for services in the non-nuclear field, leading to their expansion. In the *Certification business area* an intensification of competition is to be felt in some segments. There are opportunities that can be exploited: on the one hand by process optimisation, and on the other hand by investment in the fields of environmental and climate protection and of consumer protection.

The *Mobility business unit* is subject to a situation of ever fiercer competition in the fields of both statutory inspections and the provision of services on the free market. Other risks may arise as a result of a dependence on political decisions and from technological developments. However, the business unit has the opportunity to take a share of the growing market for vehicle inspections, on the one hand by establishing a nationwide presence on the market with its existing services, and on the other hand by exploiting the regional growth potential that still exists in its present core territory. In addition, further growth potential can be exploited by optimising and further developing the portfolio of services in existing and new markets, both in Germany and abroad. Further process optimisation measures are to be introduced in order to maintain steady growth in the business.

For the companies of the *Training and Human Resources business unit*, falling unemployment could give rise to risks in the coming years, as it may lead to a substantial reduction in the number of contracts for training measures supported from public funds. The companies will continue to add to their portfolios of services for the free market, e.g. for the health and nursing services sector. There are opportunities for the business unit to improve its market position by expanding its free-market activities both regionally and internationally.

The *International business unit* expects to continue to grow in 2012. China, India and Spain have been identified as regions of particularly high growth. Both organic growth and acquisitions are planned as contributors to the expansion of business. The positive development that is expected may however be impacted by risks arising out of changes in the political, social and economic fundamentals in certain countries. In some regions, especially in some parts of Europe, the economic crisis is making itself felt. However, the crisis also offers opportunities: the business unit is intending to exploit the tendency towards consolidation that has been triggered in some markets by the economic crisis in order to actively expand its market share.

In the *Natural Resources business unit*, project business is subject to specific complexity risks and to risks arising out of the growing pressure of competition. Opportunities for medium-term growth are to be found in the expansion of foreign business in particular. Such growth is to be achieved both by organic growth and by further carefully targeted corporate acquisitions in the future.

The companies of the *Aerospace business unit* are dependent upon successful partnership with the component manufacturers. In the growing market of satellite construction in particular there is a risk that the component manufacturers may enter into direct business relationships with the builders of satellites or systems. Opportunities to expand the business are to be found in a deeper penetration of the markets in the BRIC countries and the establishment of new services in the field of electrical testing.

ADDITIONAL INFORMATION

In view of the fact that their Boards of Management and Supervisory Boards are in part composed of identical persons, TÜV NORD AG is deemed to be directly dependent within the meaning of Sec. 17 of the Stock Corporations Act (*Aktiengesetz – AktG*) upon TÜV Nord Holding GmbH & Co. KG of Hamburg and TÜV HSA Holding GmbH & Co. KG of Hanover, and indirectly dependent upon TÜV Nord e.V. and TÜV Hannover/Sachsen-Anhalt e.V. For the period from 1 January to 31 December 2011 and in respect of relevant special transactions during the 2011 fiscal year, the Board of Management of TÜV NORD AG has drawn up a report pursuant to Sec. 312 of the AktG regarding relations between the company on the one hand and TÜV Nord Holding GmbH & Co. KG, TÜV HSA Holding GmbH & Co. KG, TÜV Nord e.V., TÜV Hannover/Sachsen-Anhalt e.V. and the affiliated companies on the other.

This report ends with the following declaration:

“We hereby declare that in respect of every legal transaction with affiliates, TÜV NORD AG received consideration that was appropriate in the light of the circumstances known to us at the time when such transactions were performed.

Beyond the activities reported on herein, there were no further reportable transactions, measures or omissions.”

SUBSEQUENT EVENTS

No events of particular significance which materially affect the Group's business performance have occurred since the end of the fiscal year.

Hanover, 2 March 2012

TÜV NORD AG
The Board of Management

CONSOLIDATED INCOME STATEMENT

€ k	Note	2011	2010
Revenue	3.1.	1,025,114	922,589
Change in inventories of finished goods and work in progress		9,734	1,900
Other internally generated additions to assets		112	0
Other operating income	3.2.	58,262	76,023
Cost of materials	3.3.	-166,150	-139,449
Personnel expense	3.4.		
a) Wages and salaries		-501,007	-443,533
b) Social security contributions, post-employment and welfare benefits		-154,397	-141,367
Depreciation, amortisation and impairment losses	3.5.	-32,935	-25,126
Other operating expense	3.6.	-215,806	-202,701
Operating profit		22,927	48,336
Income from investments in associates		849	1,528
Income from other equity investments		249	204
Interest income		1,877	1,137
Interest expense		-2,017	-1,649
Other financial items		-223	-465
Financial items	3.7.	735	755
EBT (earnings before tax)		23,662	49,091
Taxes on income	3.8.		
a) Current tax expense		-9,336	-14,642
b) Deferred tax income		-3,634	1,426
Consolidated earnings after tax		10,692	35,875
The consolidated earnings after tax are attributable to:			
owners of TÜV NORD AG		8,526	34,005
non-controlling interests		2,166	1,870

CONSOLIDATED BALANCE SHEET

ASSETS € k	Note	31.12.2011	31.12.2010
A. NON-CURRENT ASSETS			
Intangible assets	4.1.	81,730	64,954
Property, plant and equipment	4.2.	200,276	193,522
Equity-accounted investments	4.3.	2,593	2,472
Other financial assets	4.4.	79,868	87,290
Trade and other receivables	4.6.	116	523
Other assets	4.7.	2,685	3,704
Deferred tax assets	3.8.	76,981	79,012
TOTAL NON-CURRENT ASSETS		444,249	431,477
B. CURRENT ASSETS			
Inventories	4.5.	54,943	36,719
Trade and other receivables	4.6.	142,157	127,064
Other assets	4.7.	14,103	9,754
Current tax assets		8,918	8,159
Cash and cash equivalents	4.8.	60,623	40,063
TOTAL CURRENT ASSETS		280,744	221,759
C. ASSETS HELD FOR SALE	4.9.	97	116
TOTAL ASSETS		725,090	653,352

EQUITY AND LIABILITIES € k	Note	31.12.2011	31.12.2010
A. EQUITY			
Subscribed capital	4.10.	10,000	10,000
Capital reserves	4.10.	115,332	115,332
Retained earnings	4.10.	-13,355	-17,620
Other equity items	4.10.	-17	3,371
Non-controlling interests	4.10.	6,201	5,507
TOTAL EQUITY		118,161	116,590
B. NON-CURRENT LIABILITIES AND PROVISIONS			
Provisions for pensions and other post-employment benefits	4.11.	235,945	241,041
Other provisions	4.12.	59,006	57,096
Financial liabilities	4.13.	1,134	698
Trade and other payables	4.13.	34,410	36,390
Deferred tax liabilities	3.8.	9,168	7,158
Other liabilities	4.13.	106	25
TOTAL NON-CURRENT LIABILITIES AND PROVISIONS		339,769	342,408
C. CURRENT LIABILITIES AND PROVISIONS			
Provisions	4.12.	41,509	38,701
Financial liabilities	4.13.	49,337	10,163
Trade and other payables	4.13.	114,202	92,170
Current tax liabilities		6,768	9,328
Other liabilities	4.13.	55,344	43,992
TOTAL CURRENT LIABILITIES AND PROVISIONS		267,160	194,354
TOTAL EQUITY AND LIABILITIES		725,090	653,352

CONSOLIDATED CASH FLOW STATEMENT

€ k	Note	2011	2010
Consolidated earnings after tax		10,692	35,875
Adjustments to take account of non-cash transactions			
Purchase of TN Bildung Group		0	-13,883
Change from equity method accounting to consolidation, TN Sweden		0	-3,711
Depreciation of property, plant and equipment and amortisation of intangible assets		32,935	25,126
Amortisation of financial assets		223	465
Pension expense		9,054	11,710
Cash flow		52,904	55,582
Appropriation of profits of associates		-342	108
Interest expense/income		248	512
Changes in deferred tax assets and liabilities recognised as income or expense		3,669	-46
Gains from disposals of assets		-757	-345
Changes in inventories, receivables and other assets		-16,753	-3,513
Changes in payables, other provisions and other liabilities		33,239	16,012
Income taxes paid		-9,880	-14,664
Cash flow from operating activities	5.	62,328	53,646
Receipts from disposals of intangible assets		0	0
Receipts from disposals of property, plant and equipment		2,557	700
Receipts from disposals of other financial assets		37,091	37,593
Payments for investments in intangible assets		-2,328	-2,187
Payments for investments in property, plant and equipment		-33,604	-33,475
Payments for investments in other financial assets		-53,912	-68,050
Acquisitions of consolidated companies		-23,999	17,385
Interest received		1,542	972
Cash flow from investing activities	5.	-72,653	-47,062
Receipts from new loans		40,238	5,013
Dividends to owners and non-controlling shareholders		-4,913	-7,120
Payments for the amortisation of loans		-2,601	-2,311
Interest paid		-1,535	-1,366
Cash flow from financing activities	5.	31,189	-5,784
Net change in cash and cash equivalents through payments made and received		20,864	800
Net change in cash and cash equivalents through changes in exchange rates and in the basis of consolidation		-304	1,080
Cash and cash equivalents at the beginning of the period		40,063	38,183
Cash and cash equivalents at the end of the period		60,623	40,063
Supplementary information:			
Receipts from dividends included in cash flow from operating activities		755	1,086

STATEMENT OF COMPREHENSIVE INCOME

€ k	2011	2010
Consolidated earnings after tax	10,692	35,875
Change in actuarial gains and losses*	-4,354	-58,087
Tax effect	953	18,478
Total actuarial gains and losses	-3,401	-39,609
Financial assets (securities) available for sale	881	-56
Currency translation differences	-1,281	2,086
Other income and expense recognised in comprehensive income	-3,801	-37,579
Comprehensive income	6,891	-1,704
Of which attributable to		
owners of TÜV NORD AG	5,138	-3,273
non-controlling interests	1,753	1,569

* Including non-controlling interests amounting to € -66k (2010: € -1.021k).

STATEMENT OF CHANGES IN CONSOLIDATED EQUITY

€ k	Subscribed capital	Capital reserves	Retained earnings	Accumulated	
				Currency translation differences	
Carrying amounts as of 1 January 2010	10,000	115,332	-43,943	-1,643	
Comprehensive income	0	0	34,003	1,684	
Dividend payment	0	0	-6,375	0	
Changes in basis of consolidation	0	0	-176	0	
Other changes	0	0	-1,129	0	
Carrying amounts as of 31 December 2010	10,000	115,332	-17,620	41	
Carrying amounts as of 1 January 2011	10,000	115,332	-17,620	41	
Comprehensive income	0	0	8,526	-917	
Dividend payment	0	0	-4,275	0	
Changes in basis of consolidation	0	0	14	0	
Other changes	0	0	0	0	
Carrying amounts as of 31 December 2011	10,000	115,332	-13,355	-876	

Other Comprehensive Income					
	Financial assets held for sale	Actuarial gains and losses	Share of TÜV NORD AG's owners	Non-controlling interests	Consolidated equity
	118	42,172	122,036	5,027	127,063
	-56	-38,904	-3,273	1,569	-1,704
	0	0	-6,375	-745	-7,120
	0	0	-176	-8	-184
	0	0	-1,129	-336	-1,465
	62	3,268	111,083	5,507	116,590
	62	3,268	111,083	5,507	116,590
	880	-3,351	5,138	1,753	6,891
	0	0	-4,275	-638	-4,913
	0	0	14	-421	-407
	0	0	0	0	0
	942	-83	111,960	6,201	118,161

1. General principles

1.1. Corporate information

TÜV NORD Group is one of the biggest technical service providers in Germany, offering a broad range of consultancy, testing and other services in its *Industry Services, Mobility, Training and Human Resources, International, Natural Resources* and *Aerospace* business units in more than 70 countries all over the world.

TÜV NORD AG, with its registered office in Hanover, Germany, is the parent company of the Group, registered with the Commercial Registry of Hanover Local Court under no. HRB 200158.

The Board of Management of TÜV NORD AG completed the preparation of the Consolidated Financial Statements as of 31 December 2011 and the Group Management Report for the 2011 fiscal year on 2 March 2012, and authorised them for issue to the Supervisory Board.

1.2. Basis of presentation

Taking advantage of the right of election pursuant to Art. 315a (3) of the German Commercial Code (HGB), TÜV NORD AG has prepared its Consolidated Financial Statements as of 31 December 2011 in accordance with International Financial Reporting Standards (IFRS), while at the same time complying with the German supplementary provisions pursuant to Art. 315a (1) of the HGB. All the International Accounting Standards (IASs) and International Financial Reporting Standards (IFRSs) adopted by the International Accounting Standards Board (IASB) up to 31 December 2011 and all the pronouncements of the International Financial Reporting Interpretations Committee (IFRIC) have been applied in relation to the 2011 fiscal year, to the extent that such standards had received the endorsement of the Commission of the European Union up to the time of publication of the Consolidated Financial Statements, and that their

application is mandatory. In addition to the Income Statement, the Balance Sheet (Statement of Financial Position) and the Cash Flow Statement, a Statement of Comprehensive Income is presented.

In order to achieve equivalence with consolidated financial statements prepared in accordance with the HGB, all statutory requirements of disclosure and explanation going beyond the IASB requirements have been complied with, in particular the preparation of a Group Management Report.

The Consolidated Financial Statements are presented in euros and on the basis of original cost (costs of purchase or production), with the exception of certain financial instruments which are recognised at fair value. Unless otherwise indicated, the amounts are stated in thousands of euros (€ k). For the sake of clarity and to make the financial statements more readily understandable, certain individual items are aggregated in the Balance Sheet and the Income Statement but disclosed and explained separately in these Notes.

The Consolidated Financial Statements are based on the consolidated accounts. Separate financial statements of subsidiary companies prepared in their local currencies are translated into euros.

The reporting periods of TÜV NORD Group and of all consolidated subsidiaries end on 31 December of each successive calendar year.

1.3. Accounting standards applied for the first time in the year under review

The following standards, interpretations and amendments to existing standards issued by the IASB and the IFRIC have received endorsement from the EU, i.e. have been adopted into European law, and their application in respect of the 2011 fiscal year is mandatory:

Application mandatory Standard / Interpretation	Mandatory application
IFRS 1 (amendment): "Limited Exemption from Comparative IFRS 7 Disclosures of First-Time Adopters"	Reporting periods beginning on or after 1.7.2010
IAS 24 (revised): "Related Party Disclosures"	Reporting periods beginning on or after 1.1.2011
IAS 32 (amendment): "Financial Instruments – Presentation: Classification of Rights Issues"	Reporting periods beginning on or after 1.2.2010
IFRIC 14 (amendment): "IAS 19 – The Limit on a Defined Benefit Asset, Minimum Funding Requirements and their Interaction"	Reporting periods beginning on or after 1.1.2011
IFRIC 19: "Extinguishing Financial Liabilities with Equity Instruments"	Reporting periods beginning on or after 1.7.2010
Improvements to IFRS (issued 6.5.2010)	Reporting periods beginning on or after 1.1.2011

All the accounting standards whose application is mandatory as from the 2011 fiscal year have been applied by TÜV NORD AG; this has not, however, had any material impact on the presentation of the financial statements.

1.4. Newly issued accounting standards not yet applied

The IASB and the IFRIC have issued a further amendment to an existing standard which has already been adopted into European law by the EU, but which it is not yet mandatory to apply for the year under review. The company has not elected to apply this provision in advance of its becoming mandatory.

No elective application in advance Standard / Interpretation	Mandatory application
IFRS 7 (amendment): "Financial Instruments: Disclosures"	Reporting periods beginning on or after 1.7.2011

TÜV NORD AG is of the opinion that the application of this standard, which was issued before the reporting date but whose application is not yet mandatory, will have no material consequences for its financial position or financial performance.

The following standards, interpretations and amendments to existing standards issued by the IASB or the IFRIC have not yet received EU endorsement, so that their application is not yet admissible:

Application in advance inadmissible Standard / Interpretation	Mandatory application
IFRS 1 (amendment): "Severe Hyperinflation and Removal of Fixed Dates for First-Time Adopters"	Reporting periods beginning on or after 1.7.2011
IFRS 7 (amendment): "Disclosures – Offsetting Financial Assets and Financial Liabilities"	Reporting periods beginning on or after 1.1.2013
IFRS 9: "Financial Instruments"	Reporting periods beginning on or after 1.1.2015
IFRS 10: "Consolidated Financial Statements"	Reporting periods beginning on or after 1.1.2013
IFRS 11: "Joint Arrangements"	Reporting periods beginning on or after 1.1.2013
IFRS 12: "Disclosures of Interests in Other Entities"	Reporting periods beginning on or after 1.1.2013
IFRS 13: "Fair Value Measurement"	Reporting periods beginning on or after 1.1.2013
IAS 1 (amendment): "Presentation of Items of Other Comprehensive Income"	Reporting periods beginning on or after 1.7.2012
IAS 12 (amendment): "Deferred Tax – Recovery of Underlying Assets"	Reporting periods beginning on or after 1.1.2012
IAS 19 (amendment): "Employee Benefits"	Reporting periods beginning on or after 1.1.2013
IAS 27: "Separate Financial Statements"	Reporting periods beginning on or after 1.1.2013
IAS 28: "Investments in Associates and Joint Ventures"	Reporting periods beginning on or after 1.1.2013
IAS 32 (amendment): "Offsetting Financial Assets and Financial Liabilities"	Reporting periods beginning on or after 1.1.2014
IFRIC 20 (interpretation): "Stripping Costs in the Production Phase of a Surface Mine"	Reporting periods beginning on or after 1.1.2013

2. Summary of significant accounting policies

2.1. Basis of consolidation

In addition to TÜV NORD AG, the Consolidated Financial Statements cover 43 (2010: 43) domestic and 40 (2010: 37) foreign companies in which TÜV NORD AG directly or indirectly holds a majority of the voting power, or over whose financial and operating policies it otherwise exerts control and so is in a position to obtain benefits from their activities. In determining the situation with regard to control, potential voting rights which are currently exercisable or convertible are also taken into consideration.

Not included in consolidation are companies which are of only minor significance for a true and fair view of the financial position, financial performance and earnings of the Group. This waiver of consolidation has the effect of reducing Group revenue by 0.6% (2010: 0.5%) and of decreasing consolidated earnings before tax (EBT) by -0.2% (2010: increase of 1.1%).

In addition, two companies (see under 4.3.) are accounted for by the *equity method*.

A list of shareholdings has been prepared in which TÜV NORD Group's affiliates and other equity investments are listed, showing the proportion of the capital held. A list of all the Group's shareholdings is published in the electronic Federal Gazette as part of the Notes to the Consolidated Financial Statements.

2.2. Changes in the basis of consolidation

In the 2011 fiscal year consolidation was extended by the initial consolidation of seven companies, namely TÜV CYPRUS LTD. of Nicosia, Cyprus (TÜV CYPRUS), the newly established company TÜV NORD IBERIA S.L.U. of Madrid, Spain (TN IBERIA), and the new acquisitions Petrologic Geophysical Services GmbH of Hanover, Germany (Petrologic), ENCOS GmbH Engineering + Construction + Service of Hamburg, Germany (ENCOS), ALTER TECHNOLOGY TÜV NORD S.A.U. of Seville, Spain (ATN), TOP REL S.R.L. of Rome, Italy (TOPREL) and HIREX ENGINEERING SAS of Toulouse, France (HIREX).

The effective date of initial consolidation of these new inclusions was 1 January 2011 or the date of acquisition.

TÜV CYPRUS was included in the basis of consolidation by TÜV NORD AG for the first time with effect from 1 January 2011. In previous years, in view of its minor significance, the company had been recognised as a non-consolidated affiliate.

TÜV NORD International GmbH & Co. KG of Essen acquired the entire share capital of ALTER Group, consisting of the ATN, TOPREL and HIREX companies, with economic effect as of 1 July 2011. The purchase price amounted to €26,878k. The initial consolidation of these companies gives rise to goodwill amounting to €12,465k. ALTER Group contributed €22,240k to Group revenues during the fiscal year under review, and achieved earnings of €1,933k. Had the acquisition taken place as of 1 January 2011, revenue would have amounted to €49,342k and earnings for the year to €2,662k.

Corporate acquisition, ALTER Group Net assets acquired, goodwill and purchase price € k	Carrying amounts before initial consolidation	Carrying amounts at initial consolidation
Intangible assets, property, plant and equipment	108	3,037
Other assets (excluding cash and cash equivalents)	19,426	19,960
Cash and cash equivalents	9,530	9,530
Liabilities	-17,591	-18,630
Total net assets acquired	11,473	13,897
Non-controlling interests		516
Goodwill		12,465
Purchase price		26,878
Cash and cash equivalents acquired		-9,530
Net outflow of funds for corporate acquisition		17,348

Under the terms of a contract dated 4 March 2011 TÜV NORD SysTec GmbH & Co. KG of Hamburg acquired the entire share capital of ENCOS with economic effect as of 1 June 2011. The purchase price for these shares amounted to €6,000k. From the time of inclusion in consolidation onwards, the company's

revenues amounted to €3,526k and its earnings to €516k. On the basis of the figures as of the time of acquisition, the impact of the acquisition of ENCOS on the consolidated financial statements is as follows:

Corporate acquisition, ENCOS Net assets acquired, goodwill and purchase price € k	Carrying amounts before initial consolidation	Carrying amounts at initial consolidation
Intangible assets, property, plant and equipment	191	1,860
Other assets (excluding cash and cash equivalents)	2,520	2,520
Cash and cash equivalents	121	121
Liabilities	-1,039	-1,573
Total net assets acquired	1,793	2,928
Non-controlling interests		0
Goodwill		3,072
Purchase price		6,000
Cash and cash equivalents acquired		-121
Liability under earn-out arrangement		-2,100
Net outflow of funds for corporate acquisition		3,779

DMT GmbH & Co. KG of Essen acquired the entire share capital of Petrologic with economic effect as of 1 January 2011, for a purchase price of €2,400k. The initial consolidation of this company gives rise to goodwill amounting to €1,901k. The company contributed €1,717k to Group revenues during the fiscal year under review, and achieved earnings for the year of €205k.

GUI Gesellschaft für Umwelt- und Innenraumanalytik mbH of Mönchengladbach was deconsolidated as of 1 January 2011, due to the insolvency of the company. As of 31 December 2010 the company's non-current assets were recognised at a value of €165k and its current assets at €409k. Non-current and current debt amounted to €186k and €355k respectively. The deconsolidation of the company gave rise to a loss amounting to €895k.

TÜV NORD Testing Oy of Oulu, Finland (TN Testing) was deconsolidated as of 1 January 2011, due to the insolvency of the company. As of 31 December 2010 the company's non-current assets were recognised at a value of €410k and its current assets at €244k. Current debt amounted to €754k and non-current debt to €354k. The deconsolidation of the company gave rise to a loss amounting to €1,232k.

TÜV NORD Kft. of Budapest, Hungary, was deconsolidated with effect from 1 January 2011, due to the cessation of business activities in Hungary. This company is of only minor significance.

TÜV NORD Bauqualität GmbH & Co. KG of Hamburg was absorbed by Hundt & Partner GmbH & Co. KG of Hanover, with retrospective effect as from 1 January 2011.

2.3. Consolidation policy

The annual financial statements of the subsidiaries included in consolidation are prepared in accordance with TÜV NORD AG's accounting and valuation methods, which are applied uniformly throughout the Group.

Capital consolidation is effected using the purchase method, pursuant to IFRS 3, *Business Combinations*. Using the purchase method to account for business combinations assumes that at the time of initial consolidation all the assets, liabilities and contingent liabilities of the company acquired and also any intangible assets that are to be recognised in addition are measured at fair value. Any difference amounts between the cost of acquiring the interest in the company and the acquirer's pro rata share in the reassessed equity at the time of acquisition are allocated to the appropriate balance sheet items of the subsidiary up to the amount of their fair value. Any remaining positive difference is recognised as goodwill. If a negative difference arises, it is to be recognised as expense in profit and loss for the reporting period during which the business combination takes place. Goodwill is tested for impairment at least once a year.

The earnings of subsidiary companies acquired or disposed of in the course of the fiscal year are included in the Consolidated Income Statement from the point in time when control was acquired or up to the effective time of disposal.

Significant associates and joint ventures are accounted for using the equity method. An associate is a business entity upon which the Group can exert significant influence through participation in financial and operating policy decisions, but over which it cannot exercise control. In general, such significant influence may be presumed if the Group holds 20% or more of the voting power. The pro rata earnings from such equity holdings are recognised under the item *Income from investments in associates*. Should any such equity investments be subject to long-term impairment, impairment losses are recognised. Where a Group company undertakes transactions with an associate, any resulting unrealised gains or losses are eliminated pro rata to the Group's interest in the associate or joint venture.

Receivables and payables between companies included in consolidation are netted. Profits and losses arising out of intercompany transfers of assets that are to be recognised in the Consolidated Financial Statements are eliminated unless they are immaterial. Revenue and other income between consolidated companies are offset against the corresponding expenses.

During the process of consolidation, income tax effects are taken into account and deferred taxes are recognised where appropriate.

Shares in the equity of subsidiaries that are held by parties outside the Group are recognised separately within equity capital. The proportions of the earnings of subsidiary companies attributable to outside shareholders (non-controlling interests) are stated separately in the Income Statement.

2.4. Currency translation

Translation into the presentation currency

The annual financial statements of any foreign Group company whose functional currency is not the euro are translated into the Group presentation currency, i.e. euros, in accordance with the functional currency concept. In general, the functional currencies of the foreign subsidiaries are their respective local currencies.

Assets and liabilities of foreign subsidiaries are translated at the exchange rate prevailing as of the balance sheet date. Equity is translated at historical rates of exchange. Expense and income are translated into euros at average rates for the year. Differences arising out of currency translation are recognised in *Other comprehensive income*. Such a translation difference recognised in comprehensive income is posted to profit and loss only if the company concerned is deconsolidated.

Translation into the functional currency

Foreign currency transactions are translated into the functional currency at the exchange rate prevailing at the time of the transaction. Gains and losses resulting from the fulfilment of such transactions and from the translation as of the reporting date of monetary assets and liabilities denominated in foreign currencies are recognised in the Income Statement.

The following exchange rates are among those used for the translation of the currencies of countries that are not members of the European Monetary Union:

Currency	ISO Code	Exchange rate as of the reporting date		Annual average rate	
		31.12.2011	31.12.2010	2011	2010
Brazilian real	BRL	2.4158	2.2102	2.3084	2.3459
British pound sterling	GBP	0.8372	0.8630	0.8499	0.8778
Bulgarian lev	BGN	1.9562	1.9557	1.9558	1.9558
Canadian dollar	CAD	1.3197	1.3277	1.3236	1.4100
Chinese renminbi yuan	CNY	8.1485	8.7697	8.4477	9.2410
Croatian kuna	HRK	7.5359	7.3853	7.4598	7.3568
Czech koruna	CZK	25.8129	25.1760	25.4907	25.7785
Danish krone	DKK	7.4342	7.4555	7.4449	7.4487
Estonian kroon*	EEK	–	15.6466	–	15.6475
Hong Kong dollar	HKD	10.0513	10.3382	10.1927	10.7016
Hungarian forint	HUF	312.7639	279.5326	295.2465	276.0906
Indian rupee	INR	68.9826	59.6527	63.9795	63.0517
Indonesian rupiah	IDR	11,933.1742	11,933.1742	11,904.7619	12,658.2279
Korean won	KRW	1,490.1353	1,507.2499	1,498.5764	1,586.7978
Latvian lat	LVL	0.6999	0.7095	0.7047	0.7093
Malaysian ringgit	MYR	4.1102	4.0955	4.1028	4.4650
Polish zloty	PLN	4.4553	3.9675	4.1973	4.0481
Swedish krone	SEK	8.9190	8.9815	8.9526	9.5785
Thai baht	THB	40.8308	40.1316	40.4776	43.6186
Turkish lira	TRY	2.4424	2.0625	2.2366	2.1115
US dollar	USD	1.2938	1.3282	1.3108	1.3774

* Estonia has been a member of the euro zone since 01.01.2011.

2.5. Use of estimates

The preparation of IFRS financial statements requires management to make certain estimates and assumptions which have an impact on the carrying amounts of assets and liabilities, the disclosure of contingent assets and liabilities existing as of the reporting date, and the income and expense recognised for the fiscal year. In compiling the Consolidated Financial Statements, estimates had to be made in particular with regard to the valuation of employee benefits under IAS 19, the impairment testing of goodwill, the restructuring provision, the provision for threatened losses from pending transactions and the deferred tax assets relating to loss carryforwards.

Employee benefits relate essentially to obligations arising out of defined benefit pension commitments, which are determined on the basis of actuarial parameters. These require assumptions to be made about future wage and salary increases, trends in pension levels and the discount rate. Furthermore, variations between the expected and actual return on plan assets have an impact each successive fiscal year.

Changes in the parameters for determining defined benefit obligations and plan assets do not however affect consolidated earnings for the current year, since any actuarial gains or losses are recognised in *Other comprehensive income*.

Goodwill is subjected to an impairment test annually on the basis of the smallest cash-generating unit to which goodwill has been allocated and the management's approved three-year operating plan. Cash-generating units are subjected to impairment testing on the basis of their fair value less costs to sell.

Recognition and measurement of the restructuring provision and of the provision for threatened losses are based on estimates of the probability of a future outflow of resources and on the basis of experience values and of the circumstances known at the reporting date. To this extent, the actual outflow of resources may vary from the amount of the provision.

Deferred tax assets relating to loss carryforwards are accounted for on the basis of estimates of the extent to which the tax advantages can be realised in future, i.e. whether adequate taxable income or reduced tax expense is to be expected. The actual tax situation in future periods, and thus the actual extent to which loss carryforwards can be utilised, may vary from the estimate made at the time when the deferred taxes were recognised.

2.6. Accounting policies

Accounting is undertaken in accordance with the following principles:

Revenue realisation

Revenue from services rendered is recognised as soon as performance is completed. Any diminutions of the income, such as trade discounts and rebates, are deducted.

Income from contracts to render services is recognised by reference to the stage of completion, to the extent that the criteria of IAS 18.20 are fulfilled. Such service contracts are accounted for using the percentage of completion method, under which revenue is recognised in proportion to the stage of completion. This is determined by the *cost-to-cost* method.

Other income is recognised when the amount can be reliably determined and when the inflow of resources is to be regarded as sufficiently probable.

Intangible assets

Intangible assets encompass intangible assets acquired for consideration, internally generated intangible assets and goodwill.

Intangible assets acquired for consideration, e.g. software and accreditations, are valued at cost. This category also includes items identified during purchase price allocations, e.g. customer relations, trade mark rights and the value of the order book.

Internally generated intangible assets, e.g. software or research and development costs, are recognised at production cost if this meets the recognition criteria of IAS 38.

All intangible assets except goodwill have a certain useful life, and are subject to amortisation by the straight-line method over a period of generally between 3 and 15 years, depending on the expected future economic benefits. The useful life is subject to annual review, and if necessary is adjusted in accordance with future expectations. If there is any indication of impairment, or if the recoverable amount is less than the amortised cost, an impairment loss must be recognised.

If the reasons for recognising such an impairment loss cease to apply, the impairment loss is reversed, whereby the resulting enhanced carrying amount may not exceed the amortised cost arrived at by normal amortisation.

Goodwill arising out of a business combination is to be recognised as from the time when control is obtained over the company acquired (the acquisition date). It arises whenever the cost of acquiring the business exceeds the netted fair value of the identifiable assets, debts and contingent liabilities at the acquisition date. Goodwill is not subject to amortisation; instead, it is subjected to an impairment test at least once a year, and more frequently should any triggering event occur.

The impairment test is carried out on the basis of cash-generating units, the recoverable amount of a cash-generating unit being compared with its carrying amount. Under IAS 36, an impairment loss is recognised if the carrying amount of a cash-generating unit to which goodwill has been allocated exceeds its recoverable amount. Impairment losses on goodwill, once recognised, may not be subsequently reversed.

In the case of TÜV NORD Group, and in accordance with its management approach, the cash-generating unit's are the Mobility, Training and Human Resources, International, Natural Resources and Aerospace business units, and the Systems, Energy and Systems Engineering, and Certification business areas which make up the Industry Services business unit.

The recoverable amount is the higher of the cash-generating unit's fair value less costs to sell and its value in use. The recoverable amount of a cash-generating unit is calculated by determining its fair value less costs to sell, using the discounted cash flow method on the basis of the three-year plan adopted by management. In determining fair value certain assumptions have to be made, relating essentially to the rate at which operating profit will grow over the planning period and the cost of capital. The cost of capital is determined on the basis of the weighted average cost of capital (WACC).

Property, plant and equipment

Assets falling into the category of property, plant and equipment are recognised at depreciated costs (purchase or construction costs). Construction costs include not only direct costs but also attributable overheads.

Property, plant and equipment is normally depreciated by the straight-line method, unless in exceptional cases some other depreciation method appears more appropriate. Depreciation is based on the following useful lives:

Useful lives of property, plant and equipment	
	years
Office buildings	30 – 50
Test facilities	20 – 30
Machinery	5 – 12
Furniture, fixtures and office equipment	3 – 20

Under IAS 36, *Impairment of assets*, property, plant and equipment is subject to impairment if the recoverable amount (see also under *Intangible assets* above) of the asset concerned has fallen below its carrying amount. If the reasons for recognising such an impairment loss cease to apply, the impairment loss is reversed, but only to the extent that the enhanced carrying amount does not exceed the asset's depreciated cost. Such a reversal of an impairment loss is recognised as income.

Leases

Leases are to be classified either as operating leases or finance leases. Under IAS 17, leases under which substantially all the risks and rewards incidental to ownership of an asset are transferred to TÜV NORD Group are to be classified as *finance leases*; other leases are *operating leases*.

In the case of a finance lease, the leased item is recognised as from the time of its first use at the lower of fair value and the present value of the minimum lease payments, and depreciated by the straight-line method over its economic life, or the term of the lease if shorter. The corresponding liability to the lessor is to be recognised in the Balance Sheet as a liability from a finance lease and is to be amortised over the subsequent period of time using the effective interest rate method. In the case of operating leases, the net lease payments are recognised in the Income Statement over the term of the lease.

Investments accounted for using the equity method

Associates and joint ventures are initially recognised at cost at the time of their acquisition, and in subsequent accounting periods are recognised in accordance with the proportion of the equity held, using the equity method. The carrying amounts are increased or decreased annually by the amount of the earnings attributable pro rata, the dividends distributed or other changes in equity. Under IAS 28.24, accounting using the equity method is effected on the basis of the financial statements for the previous reporting period. Any goodwill is reviewed in connection with the impairment testing of the investment in the associate (IAS 39) or joint venture. Goodwill is not subject to amortisation.

Other financial assets

The item *Other financial assets* covers in particular investments in non-consolidated affiliates, other equity investments, loans, securities and claims arising out of the reinsurance of pension obligations.

Under IAS 39, four categories of financial asset are distinguished:

- Financial assets at fair value through profit or loss (held for trading),
- Available-for-sale financial assets,
- Held-to-maturity investments,
- Loans and receivables.

No financial assets are held for trading. Investments in non-consolidated affiliates, other equity investments and securities that are available for sale are assigned to the *Available for sale* category. Investments in non-consolidated affiliates and associates are recognised at amortised cost, since no fair values are available and other admissible measurement procedures do not lead to reliable results. Securities that are available for sale are recognised at fair value. Changes in value are recognised in equity, making due allowance for deferred tax effects.

Held-to-maturity securities are recognised at amortised cost using the effective interest rate method, or at fair value if lower.

If the fair value of a financial asset falls below cost, the impairment loss is recognised as expense.

Loans granted fall into the category *Loans and receivables*, and are recognised at amortised cost.

Claims arising out of reinsurance fund shares that do not form part of the plan assets are accounted for at fair value in accordance with IAS 19. They are not recognised at surrender value, since this currently represents around 99% of the value of the guarantee fund shares.

Inventories

Inventories essentially cover work in progress and are measured at cost of production. This includes not only direct labour but also an allocation of proportions of material and production overheads on the basis of normal utilisation of capacity, and also depreciation. In addition, the costs of occupational pensions and of the company's voluntary welfare benefits are included, to the extent that they are attributable to the production area. Administrative costs are recognised to the extent that they are attributable to the production area.

Inventories may be written down to an appropriate and adequate extent to take account of contract-related risks. Where necessary, they are recognised at the lower net realisable value. If the reasons for subjecting inventories to such an impairment loss cease to apply, the impairment loss is reversed.

Trade and other receivables, Other assets

Receivables include the company's trade receivables, other receivables and other assets. They are measured at nominal value or at cost net of impairment. Non-current receivables bearing no or only low interest are discounted at a rate appropriate to the risk, to the extent that the interest effect is material. The amount discounted is recognised pro rata under *Interest income* until the receivable becomes due.

Other receivables and *Other assets* also include receivables from partly fulfilled contracts to render services as per IAS 18.20, which are recognised by the percentage of completion method. The stage of completion is determined from the ratio between the costs of the transaction that have accrued up to the reporting date and the estimated total contract costs (cost to cost method). Any advance payments received are netted against the receivables.

Cash and cash equivalents

Cash and cash equivalents include freely disposable cash in hand, cheques and bank credit balances with a term of up to three months. They are recognised at nominal value.

Deferred tax assets and liabilities

Deferred tax assets and liabilities are recognised for all temporary differences between the carrying amounts of assets and liabilities in the IFRS balance sheet and their tax bases, and also for consolidation measures recognised through profit or loss, and are set off against each other in the Balance Sheet as far as is permissible. Deferred tax assets are recognised to the extent that it is probable that there will be taxable income against which the deductible temporary difference can be offset. Deferred tax assets also include claims for reductions in amounts of tax payable arising out of the expected utilisation of existing loss carryforwards in subsequent years, to the extent that their realisation is sufficiently certain. Deferred tax assets and liabilities are also recognised where temporary differences arise in connection with business combinations (corporate acquisitions), with the exception of temporary differences relating to goodwill.

Deferred taxes are determined on the basis of the rates of taxation that apply or are expected to apply under current law in the individual countries at the time of realisation. Tax rates that will be applicable in future years are used for calculation purposes to the extent that they have already been fixed in law or that the legislative process is practically completed.

Changes in deferred tax assets and liabilities in the Balance Sheet generally lead to tax expense or income in the Income Statement; unless they relate to items recognised in comprehensive income, in which case the deferred taxes are also recognised in comprehensive income.

Deferred taxes are not recognised at the reporting date in respect of temporary differences in connection with investments in subsidiaries, associates or joint ventures (outside basis differences). It is not possible to make any reasonable estimate of the amounts of these unrecognised deferred tax liabilities.

For the calculation of domestic deferred taxes, a tax rate of 32.0%, unchanged from the previous year, has been applied.

Assets held for sale

Assets held for sale are shown separately in the Balance Sheet if they can be sold in their existing condition and it is probable that they will be. When assets are first classified as held for sale, they are revalued at the lower of carrying amount and fair value less costs to sell. Impairment losses resulting from the first-time classification of the assets as being held for sale, and also any later impairments (or reversals of impairments), are recognised as expense (or income) in the Income Statement. Assets held for sale are not subjected to amortisation.

Provisions for pensions and other post-employment benefits

Post-employment benefit plans are classified as either defined benefit or defined contribution plans, depending on the economic substance of the plan as derived from its principal terms and conditions. Plans are classified as defined benefit plans if the actuarial risk or the investment risk falls on the employer. Post-employment benefit commitments that cannot be unambiguously classified as defined benefit plans are regarded as defined contribution plans.

The requisite level of pension provisions in respect of defined benefit obligations is determined by actuarial valuation using the projected unit credit method. This valuation is carried out by actuaries as of every balance sheet date. Actuarial gains and losses arising are accounted for directly in equity without passing through the Income Statement, and are recognised in the Statement of Comprehensive Income.

Through the transfer of claims on reinsurance to TÜV NORD PENSION TRUST e.V. of Hanover, plan assets have been formed which serve to secure the pension obligations.

The pension provisions represent the present value of the defined benefit obligations, adjusted for past service cost and actuarial gains and losses, after offsetting of the fair value of the plan assets.

The interest expense included in pension expense is recognised under *Personnel expense*, and the expected return on plan assets/rights to reimbursement under reinsurance contracts under *Other operating income*.

Payment obligations under defined contribution pension plans (the statutory pension funds) are recognised in the Income Statement for the period concerned.

Other provisions

Other provisions are formed if a present legal or constructive obligation exists towards third parties as a result of a past event, in respect of which it is probable that an outflow of resources will be required to settle the obligation and a reliable estimate can be made of the amount of the provision required. The measurement of the provisions is effected using the best estimate of the amount required to settle the obligation; there is no offsetting of any possible claims for recourse. Non-current provisions are discounted if the interest effect is material.

Trade and other payables

Interest-bearing payables to banks are accounted for at the amount disbursed less directly attributable transaction costs. Financing costs are distributed as expense over the term, increasing the carrying amount of the liability in subsequent periods. Trade and other payables are recognised at amortised cost in accordance with IAS 39. Non-current liabilities that are not subject to interest are discounted using the effective interest method if the interest effect is material. Liabilities arising out of finance leases are recognised at the lower of the fair value of the leased item and the present value of the lease payments. In subsequent years, the lease payments are apportioned between the reduction of the outstanding liability and the finance charge; as per IAS 17.25 this is done in such a way as to produce a constant rate of interest on the remaining balance of the liability.

Contingent liabilities

Contingent liabilities are possible obligations that might arise from past events and whose existence will be confirmed by future events not within the control of the reporting entity. It may also be a question of existing obligations that cannot be recognised because an outflow of resources is not probable or because the amount of the obligation cannot be estimated with sufficient reliability. Such contingent liabilities are recognised at the level of liability existing at the reporting date.

3. Consolidated Income Statement disclosures

3.1. Revenue

Revenue breaks down between the six business units as follows:

€ k	2011	2010
Industry Services	332,154	328,139
Mobility	294,101	287,609
Training and Human Resources	139,329	94,209
International	134,819	120,970
Natural Resources	102,471	91,662
Aerospace	22,240	0
Total	1,025,114	922,589

Revenue includes €28,235k (2010: €20,544k) relating to partly fulfilled contracts to render services, which were recognised proportionately by the percentage of completion method as of the reporting date.

Revenue amounting to €800,715k (2010: €725,553k) was generated in Germany, €139,256k (2010: €130,202k) in the rest of Europe and €85,143k (2010: €66,834k) in the rest of the world.

3.2. Other operating income

Other operating income amounting to €58,262k (2010: €76,023k) is made up essentially of the following components: expected return on plan assets €23,584k (2010: €23,152k), income from the reversal of provisions €4,782k (2010: €8,300k), income from grants and allowances €2,220k (2010: €1,650k), canteen takings €1,831k (2010: €1,452k), income from the reversal of impairment losses on trade receivables €1,534k (2010: €1,713k), income from ancillary services €874k (2010: €811k), income from tenancy agreements €700k (2010: €1,135k), income from the reversal of a negative difference recognised as expense €131k (2010: €15,282k) and income from write-ups of financial assets €64k (2010: €3,303k).

3.3. Cost of materials

€ k	2011	2010
Cost of raw materials and supplies	31,114	15,482
Cost of services bought in	135,036	123,967
Total	166,150	139,449

3.4. Personnel expense

€ k	2011	2010
Wages and salaries	501,007	443,533
Social security contributions	91,505	79,822
Post-employment benefit expense	59,412	58,892
Other employee benefits	3,480	2,653
Total	655,404	584,900

On average over the year, the consolidated companies had 9,881 employees (2010: 9,027) (expressed as full-time equivalents). The Group's employees are for the most part salaried staff.

3.5. Depreciation, amortisation and impairment losses

€ k	2011	2010
Depreciation and amortisation of assets	29,699	24,756
Impairment losses	3,236	370
Total	32,935	25,126

3.6. Other operating expenses

Other operating expenses amounting to €215,806k (2010: €202,701k) principally relate to occupancy expenses €60,508k (2010: €59,093k), travelling expenses €43,122k (2010: €41,609k), operating and administrative expenses €21,641k (2010: €20,708k), other services €19,128k (2010: €15,429k), advertising and communication expenses €16,609k (2010: €15,656k), legal and consultancy fees €5,995k (2010: €6,225k) and donations and contributions €2,259k (2010: €2,203k). Value adjustments on doubtful trade receivables amounting to €5,504k (2010: €3,946k) are also included, as are other taxes in the amount of €2,869k (2010: €3,303k).

3.7. Financial items

€ k	2011	2010
Income from equity-accounted investments	849	1,528
Income from other equity investments	249	204
Amortisation of other financial investments and securities	-223	-465
Financial items (excluding interest)	875	1,267
Interest income on bank balances and sight deposits	1,877	1,137
Interest and similar expense	-2,017	-1,649
a) Interest expense on loans and liabilities to banks	-1,858	-1,582
b) Interest included in lease payments	-24	-65
c) Other interest and similar expense	-135	-2
Net interest expense/income	-140	-512
Financial items (including interest)	735	755

3.8. Taxes on income

The Group's tax expense is as follows:

€ k	2011	2010
Current tax expense	-9,336	-14,642
Deferred tax expense/income	-3,634	1,426
Total	-12,970	-13,216

The deferred taxes result from the formation or reversal of tax accruals in profit or loss during the fiscal year. In both fiscal years the deferred taxes are predominantly the result of temporary differences being recognised or reversed.

The following reconciliation statement summarises the individual deferred tax items determined in relation to the individual companies and applying the tax rates prevailing in the various countries, taking due account of consolidation measures. The table reconciles expected tax expense with the tax expense actually recognised.

€ k	2011	2010
Earnings before tax	23,662	49,091
Expected income tax expense (tax rate: 32.0%; 2010: 32.0%)	7,572	15,709
Effect of different foreign tax rates/Other differences	-851	-443
Changes in tax rates or tax legislation	-42	16
Permanent differences resulting from non-deductible expense, tax-free income etc.	6,712	-4,081
Current taxes for previous periods	-1,328	985
Deferred taxes for previous periods	-1,273	329
Effects of value adjustments	2,180	701
Recognised income tax expense	12,970	13,216

The expected tax rate for both fiscal years was determined on the basis of a corporation tax rate of 15.0% plus a solidarity levy of 5.5% of the tax due and a local business tax rating of 462%.

Deferred taxes resulting from recognition and measurement differences arose in the following balance sheet items:

€ k	2011		2010	
	Deferred tax assets	Deferred tax liabilities	Deferred tax assets	Deferred tax liabilities
Intangible assets	1,005	4,865	1,040	3,300
Property, plant and equipment	450	10,207	745	9,585
Inventories	0	1,673	0	1,288
Other assets	1,391	1,527	1,354	1,134
Pension provisions	70,121	0	69,728	0
Other provisions	11,114	429	12,210	345
Other liabilities	1,131	381	709	880
Tax loss carryforwards	1,683	0	2,600	0
Gross amount	86,895	19,082	88,386	16,532
Offsettings	-9,914	-9,914	-9,374	-9,374
Balance sheet recognition	76,981	9,168	79,012	7,158

Deferred tax assets are recognised only if there is sufficient probability that these tax advantages will be realised. Any value adjustments are determined taking into account all positive and negative factors known at the present time that may influence future taxable earnings. The estimates made for this purpose may be subject to future adjustments.

The deferred tax liabilities arising out of intangible assets as of 31 December 2011 include allocations of €1,288k from the purchase prices of ALTER Group and ENCOS.

Deferred taxes amounting to €954k (2010: €18,478k) were recognised in comprehensive income. This is essentially a result of the recognition in *Other comprehensive income* of actuarial gains/losses relating to pension provisions.

As of the reporting date, deferred tax assets were recognised for loss carryforwards in the amount of €10,589k (2010: €16,068k) existing in the Group. In respect of further tax loss carryforwards in the amount of €33,457k (2010: €18,931k), no additional deferred tax assets have been recognised as of the reporting date, since it is not sufficiently certain that these can be realised. Under current legislation, there is no limitation, either of time or amount, on such loss carryforwards for tax purposes.

3.9. Dividend per share

A dividend amounting to €4,275k was paid in the 2011 fiscal year. In relation to the number of shares as recorded in the commercial register – 100,000 – this represents a dividend of €42.75 per share.

4. Consolidated Balance Sheet disclosures

In accordance with IAS 1, the Consolidated Balance Sheet (Statement of Financial Position) is structured to present the breakdown between current and non-current assets and liabilities. Assets and liabilities are regarded as current if they are

expected to be recovered or settled within a year. Inventories and trade receivables are also classified as current, irrespective of their expected use or due dates, if they are to be sold, used or recovered not within one year, but within the company's normal operating cycle. In accordance with IAS 12, deferred taxes are recognised as non-current assets or liabilities.

4.1. Intangible assets

The following changes in intangible assets occurred:

Changes 2011 € k	Concessions, proprietary rights and similar rights and assets, including licences on such rights and assets	Goodwill	Payments made on account	Total
Cost (of purchase or production)				
Amounts as of 1 January	40,837	58,127	32	98,996
Changes in basis of consolidation	7,126	15,779	0	22,905
Additions/Current investments	1,401	507	45	1,953
Disposals	-591	-704	-8	-1,303
Reclassifications	382	0	0	382
Currency translation differences	-8	5	1	-2
Amounts as of 31 December	49,147	73,714	70	122,931
Accumulated amortisation and impairment losses				
Amounts as of 1 January	32,670	1,372	0	34,042
Changes in basis of consolidation	2,415	0	0	2,415
Additions	4,252	1,798	0	6,050
Disposals	-587	-704	0	-1,291
Reclassifications	5	0	0	5
Currency translation differences	-20	0	0	-20
Amounts as of 31 December	38,735	2,466	0	41,201
Net carrying amounts	10,412	71,248	70	81,730

The main factors influencing *Additions to Concessions, proprietary rights and similar rights and assets* are a trade mark (€2,929k) and a customer database (€1,669k) capitalised in the context of purchase price allocations (cf. 2.2.).

The changes in the basis of consolidation presented under *Goodwill* relate essentially to the acquisition of ALTER Group (€12,465k), ENCOS (€3,072k), and Petrologic (€1,901k) and to

the deconsolidation of TÜV NORD Testing (€970k) and GUI (€875k).

The impairment losses pursuant to IAS 36 recognised as *Additions* under *Amortisation and impairment losses* amount to €1,798k (2010: €7k), of which €1,791k relates to the impairment of the goodwill recognised in the *Training and Human Resources* business unit.

Changes 2010 € k	Concessions, proprietary rights and similar rights and assets, including licences on such rights and assets	Goodwill	Payments made on account	Total
Cost (of purchase or production)				
Amounts as of 1 January	36,953	50,540	24	87,517
Changes in basis of consolidation	2,032	7,547	0	9,579
Additions/Current investments	2,102	35	8	2,145
Disposals	-300	0	0	-300
Reclassifications	14	0	0	14
Currency translation differences	36	5	0	41
Amounts as of 31 December	40,837	58,127	32	98,996
Accumulated amortisation and impairment losses				
Amounts as of 1 January	29,017	1,366	0	30,383
Changes in basis of consolidation	607	0	0	607
Additions	3,321	7	0	3,328
Disposals	-300	0	0	-300
Reclassifications	12	-1	0	11
Currency translation differences	13	0	0	13
Amounts as of 31 December	32,670	1,372	0	34,042
Net carrying amounts	8,167	56,755	32	64,954

The Additions to Concessions, proprietary rights and similar rights and assets include the value of a customer base, recognised in the purchase price allocation at €1,217k.

The changes in the basis of consolidation presented under *Goodwill* relate essentially to the acquisitions of TN Sweden (€5,518k), TN Testing (€970k), GUI (€875k) and adapt (€183k).

Impairment testing of all the goodwill recognised in the Consolidated Balance Sheet did not lead to any additional impairment losses, since in each case the fair value less costs to sell is higher than the carrying amount recognised by the cash-generating unit concerned. The weighted average cost of capital (WACC) applied for discounting purposes is 5.11% (2010: 5.71%), whereby a growth discount of 1.0% is applied after the end of the three-year planning period.

The goodwill subjected to impairment testing is essentially shared between the *Natural Resources* (2011: €32,535k; 2010: €30,634k), *International* (2011: €17,198k; 2010: €17,622k) and *Aerospace* (2011: €12,465k; 2010: €0k) business units and the *Systems* (2011: €5,593k; 2010: €6,442k) and *Energy and Systems Engineering* (2011: €3.259k; 2010: €0k) business areas.

4.2. Property, plant and equipment

The following changes occurred in property, plant and equipment:

Changes 2011 € k	Land, leasehold rights and buildings, including buildings on third-party land	Machinery	Furniture and fittings, other factory and office equipment	Payments made on account and assets under construction	Total
Cost (of purchase or production)					
Amounts as of 1 January	267,674	84,533	165,738	5,799	523,744
Changes in basis of consolidation	222	6,371	2,876	0	9,469
Additions/ Current investments	4,178	7,473	13,120	8,833	33,604
Disposals	-1,258	-983	-9,302	-25	-11,568
Reclassifications	1,698	1,354	746	-4,216	-418
Currency translation differences	-72	13	-374	-288	-721
Amounts as of 31 December	272,442	98,761	172,804	10,103	554,110
Accumulated depreciation and impairment losses					
Amounts as of 1 January	145,379	50,905	133,911	27	330,222
Changes in basis of consolidation	0	5,001	2,618	0	7,619
Additions	4,696	8,429	13,138	622	26,885
Disposals	-1,118	-853	-8,672	0	-10,643
Reclassifications	0	-45	42	0	-3
Currency translation differences	-28	7	-221	-4	-246
Amounts as of 31 December	148,929	63,444	140,816	645	353,834
Net carrying amounts	123,513	35,317	31,988	9,458	200,276

The *Changes in basis of consolidation* relate for the most part to corporate acquisitions.

Disposals of real estate produced a profit of €581k over its carrying amount.

Impairment losses pursuant to IAS 36 recognised as *Additions* under *Depreciation and impairment losses* amount to €1,445k (2010: €370k).

Changes 2010 € k	Land, leasehold rights and buildings, including buildings on third-party land	Machinery	Furniture and fittings, other factory and office equipment	Payments made on account and assets under construction	Total
Cost (of purchase or production)					
Amounts as of 1 January	221,828	74,541	130,526	4,343	431,238
Changes in basis of consolidation	37,623	3,539	24,789	230	66,181
Additions/ Current investments	7,470	8,297	14,205	3,503	33,475
Disposals	-408	-1,965	-5,592	-158	-8,123
Reclassifications	1,018	-28	1,268	-2,272	-14
Currency translation differences	143	149	542	153	987
Amounts as of 31 December	267,674	84,533	165,738	5,799	523,744
Accumulated depreciation and impairment losses					
Amounts as of 1 January	120,648	44,119	108,223	0	272,990
Changes in basis of consolidation	21,772	1,499	18,758	0	42,029
Additions	3,244	6,883	11,644	27	21,798
Disposals	-325	-1,570	-5,141	0	-7,036
Reclassifications	0	-68	45	0	-23
Currency translation differences	40	42	382	0	464
Amounts as of 31 December	145,379	50,905	133,911	27	330,222
Net carrying amounts	122,295	33,628	31,827	5,772	193,522

The following assets are subject to limitations on their availability:

€ k	31.12.2011	31.12.2010
Machinery	514	529
Furniture and fittings, other factory and office equipment	644	932

Items of property, plant and equipment to the value of €1,059k (2010: €1,161k) are pledged as collateral for debt. Compensation payments by third parties in the amount of €598k (2010: €185k) are recognised as *Other operating income*.

The following carrying amounts of property, plant and equipment relate to assets on lease under finance leases:

€ k	Initial recognition amounts		Accumulated depreciation and impairment losses		Net carrying amounts	
	2011	2010	2011	2010	2011	2010
Furniture and fittings, other factory and office equipment	1,933	1,711	1,555	1,441	378	270

The following minimum lease payments will be payable in future on the basis of existing finance leases:

€ k	Up to 1 year		1 – 5 years		Total	
	2011	2010	2011	2010	2011	2010
Total minimum lease payments	77	157	192	73	269	230
Interest expense included	-1	-4	-8	-7	-9	-11
Present values	76	153	184	66	260	219

There are no minimum lease payments with residual terms of more than 5 years.

Obligations under finance leases are recognised under *Other liabilities* (see under 4.13.).

Future obligations under operating leases where the benefits of ownership do not lie with TÜV NORD Group as lessee are recognised under *Other financial liabilities* (see under 4.16).

4.3. Equity-accounted investments

The following table shows the names and the locations of the registered offices of companies accounted for using the equity method, together with the percentage of the equity held, the company's total equity and its total earnings after tax:

Name, location of registered office	Share of equity %	Total equity € k	EAT 100% € k
National Inspection and Technical Testing Company Ltd. (FAHSS), Damman, Saudi Arabia	25.11	8,674	2,791
UAB TÜVLITA, Vilnius, Lithuania	50.00	3,529	444

In view of the intended sale of TÜV NORD-KTI Kft. of Budapest, Hungary, the equity holding in this company was reclassified under *Assets held for sale* and recognised at fair value.

As of 31 December 2011 the investment in TÜV NORD Engineering (Thailand) Co., Ltd. of Bangkok, Thailand, was reclassified under *Investments in associates (not equity-accounted)* and recognised at acquisition cost.

The following table shows summarised financial information on investments accounted for using the equity method:

€ k	2011	2010
Assets	16,379	18,024
Liabilities	-4,176	-5,196
Equity	12,203	12,828
Investments accounted for using the equity method	2,593	2,472

Income from investments accounted for using the equity method is shown in the following table:

€ k	2011	2010
Revenue	14,369	17,834
Earnings	3,234	4,738
Income from investments accounted for using the equity method	849	1,528

These figures were determined on the basis of audited financial statements for the previous year (see under 2.6.).

4.4. Other financial assets

For TÜV NORD AG's other equity investments, please refer to the *List of shareholdings* (see under 6.8.).

The following changes in other financial assets occurred during the year under review:

Changes 2011 € k	Investments in affiliates	Investments in joint ventures and associates (not equity accounted)	Other equity invest- ments	Long-term securities	Loans granted	Shares in guarantee funds arising from reinsurance	Total
Cost (of purchase or production)							
Amounts as of 1 January	3,483	295	1,783	6,645	40,207	39,056	91,469
Changes in basis of consolidation	2,095	0	0	0	700	291	3,086
Additions/ Current investments	712	0	344	253	219	822	2,350
Disposals	-25	0	0	-93	-6,916	-691	-7,725
Reclassifications	0	50	0	21,700	-21,713	-2,175	-2,138
Currency translation differences	-21	0	0	0	-2	0	-23
Amounts as of 31 December	6,244	345	2,127	28,505	12,495	37,303	87,019
Accumulated amortisation and impairment losses							
Amounts as of 1 January	1,538	268	38	0	2,335	0	4,179
Changes in basis of consolidation	2,095	0	0	0	700	0	2,795
Additions	204	0	18	0	1	0	223
Disposals	-64	0	0	0	0	0	-64
Reclassifications	0	0	0	0	0	0	0
Currency translation differences	18	0	0	0	0	0	18
Amounts as of 31 December	3,791	268	56	0	3,036	0	7,151
Net carrying amounts	2,453	77	2,071	28,505	9,459	37,303	79,868

Of the reinsurance claims on Alters- und Hinterbliebenen-Versorgungsstelle der Technischen Überwachungs-Vereine – VvaG –, Essen (AHV), claims of €22,173k (2010: €25,548k) have been pledged as collateral to secure loan liabilities and obligations arising out of pre-retirement part-time working arrangements.

Changes 2010 € k	Investments in affiliates	Investments in joint ventures and associates (not equity accounted)	Other equity invest- ments	Long-term securities	Loans granted	Shares in guarantee funds arising from reinsurance	Total
Cost (of purchase or production)							
Amounts as of 1 January	2,721	379	461	3,357	3,737	24,702	35,357
Changes in basis of consolidation	-156	0	0	3,301	-542	163	2,766
Additions/ Current investments	1,027	0	1,400	933	37,166	16,974	57,500
Disposals	-153	-84	-80	-946	-155	0	-1,418
Reclassifications	0	0	0	0	0	-2,783	-2,783
Currency translation differences	44	0	2	0	1	0	47
Amounts as of 31 December	3,483	295	1,783	6,645	40,207	39,056	91,469
Accumulated amortisation and impairment losses							
Amounts as of 1 January	1,509	268	38	0	1,969	0	3,784
Changes in basis of consolidation	0	0	0	0	0	0	0
Additions	85	0	0	0	380	0	465
Disposals	-100	0	0	0	-14	0	-114
Reclassifications	0	0	0	0	0	0	0
Currency translation differences	44	0	0	0	0	0	44
Amounts as of 31 December	1,538	268	38	0	2,335	0	4,179
Net carrying amounts	1,945	27	1,745	6,645	37,872	39,056	87,290

4.5. Inventories

€ k	2011	2010
Raw materials and supplies	1,147	893
Work in progress	46,935	35,004
Finished products and merchandise	4,760	443
Payments made on account	2,101	379
Total	54,943	36,719

Write-downs amounting to €33k (2010: €3k) are recognised under *Inventories*.

4.6. Trade and other receivables

Trade and other receivables can be disaggregated in accordance with their residual terms as follows:

€ k	2011			2010		
	Current	Non-current	Total	Current	Non-current	Total
Trade receivables						
from third parties	138,256	108	138,364	125,121	485	125,606
from partly fulfilled contracts to render services	2,356	0	2,356	1,030	16	1,046
Receivables from affiliates	588	1	589	541	12	553
Receivables from joint ventures, associates and other entities in which equity investments are held	957	7	964	372	10	382
Total	142,157	116	142,273	127,064	523	127,587

During the period under review, value adjustments on doubtful receivables were effected in the amount of €5,504k (2010: €3,946k)

The development of specific value adjustments was as follows:

€ k	2011	2010
Carrying amount as of 1 January	9,332	7,403
Changes in basis of consolidation	-46	41
Additions	5,504	3,946
Use	581	439
Reversals	1,534	1,713
Currency translation effects	-73	94
Carrying amount as of 31 December	12,602	9,332

Receivables that have not been subjected to specific value adjustments can be disaggregated in accordance with their age structure as follows:

€ k	2011	2010
Trade receivables from third parties, gross	150,966	134,938
a) of which neither overdue nor impaired	54,405	50,319
b) of which overdue by the following periods, but not yet impaired		
1 to 30 days	61,484	54,038
31 to 60 days	10,734	9,985
61 to 90 days	3,881	3,987
91 to 180 days	5,466	4,365
more than 180 days	14,996	12,244
Value adjustments	-12,602	-9,332
Trade receivables from third parties, net	138,364	125,606

4.7. Other assets

Other assets with a residual term of more than one year are classified as non-current, and those with a residual term of less than one year as current.

The other assets recognised essentially consist of accrued items, tax reimbursement claims, and in 2010 also the partial refund of the purchase price from the acquisition of TN Bildung Group. The items break down as follows:

T €	2011			2010		
	Current	Non-current	Total	Current	Non-current	Total
Other assets	14,103	2,685	16,788	9,754	3,704	13,458

As of the reporting date there were no items more than 180 days overdue for which no impairment loss had been recognised.

4.8. Cash and cash equivalents

The cash and cash equivalents consist of cheques, cash in hand and balances on account with a number of different banks in various currencies. The bank balances earn interest at customary market rates.

4.9. Assets held for sale

Under the item *Assets held for sale* as per IFRS 5, developed properties and an equity investment in an associated company in respect of which disposal procedures have been initiated are recognised.

4.10. Equity

For further details of changes in equity between 1 January 2010 and 31 December 2011, see the *Statement of Changes in Consolidated Equity*.

TÜV NORD's capital management policy aims not only at securing the continued existence of the business, but also at achieving an adequate return in excess of the costs of capital, thereby enhancing the value of the company in the long term.

Subscribed capital

The subscribed capital remains unchanged at €10,000k, divided into 100,000 registered no-par-value shares. All the shares are fully paid.

At the time of the preparation of the Consolidated Financial Statements for the 2011 fiscal year, TÜV NORD AG had neither contingent nor authorised capital. TÜV NORD AG does not grant any share-based remuneration (share option programmes) to its employees.

Capital reserves

The capital reserves of TÜV NORD Group in the amount of €115,332k correspond to the capital reserves of TÜV NORD AG.

Retained earnings

The retained earnings include the earnings of the consolidated companies, to the extent that these have not been distributed as dividends. In addition, the offsetting of asset-side and liability-side differences arising out of the capital consolidation of acquisitions up to 31 December 2006 and also the net amount of non-cash adjustments in connection with the first-time adoption of IFRSs are recognised under this item.

Other equity items

The other equity items include the non-cash impacts on equity of the currency translation of foreign subsidiaries' separate financial statements, of changes in the fair values of available-for-sale instruments and of actuarial gains and losses arising out of post-employment benefit plans, and also the deferred taxes recognised in connection with these items.

Non-controlling interests

Non-controlling interests cover holdings by investors outside TÜV NORD Group in the consolidated equity of Group companies.

4.11. Provisions for pensions and other post-employment benefits

Defined benefit pension plans and similar obligations

Provisions are formed for obligations arising out of entitlements and current benefits of serving and former employees and their surviving dependents, to the extent that these arise under a defined benefit plan. These provisions are determined in accordance with actuarial valuations of existing benefit obligations, which are recalculated every year. The costs resulting from these commitments are allocated over the employees' periods of service in accordance with the actuaries' findings, and comprise current or past service cost and interest cost.

TÜV NORD AG exercises the option pursuant to IAS 19.93A to 93D of recognising the full amount of actuarial gains and losses in *Other comprehensive income*, while making due allowance for deferred taxes. These actuarial gains and losses are therefore presented in the Statement of Comprehensive Income.

A contractual trust agreement (CTA) was initially funded with effect from 30 December 2008. Shares in reinsurance guarantee funds which serve exclusively and irrevocably to cover and fund post-employment benefit obligations were vested in TÜV NORD PENSION TRUST e.V. Under IFRS rules, the assets of the CTA are to be regarded as "plan assets". The plan assets consist exclusively of these reinsurance guarantee fund shares. The level of post-employment benefit obligations (the present value, determined by actuarial valuation, of the defined benefit obligation (DBO)) was calculated by actuarial methods, a procedure in which the use of estimated values is unavoidable.

Pursuant to IAS 19, *Employee benefits*, the level of post-employment benefit obligations is determined by the projected unit credit method, under which actuarial methods on the basis of best estimates of the relevant parameters are used to assess the vested future obligations existing as of the valuation date.

The post-employment benefits that are expected to become payable, including dynamic components, are distributed across the employee's entire period of service. For the year under review, the following assumptions were made by the actuaries with regard to the variable parameters to be included in their calculations:

%	2011	2010
Discount rate	4.75	4.75
Future pension increases	1.50	1.50
Future wage and salary increases	2.00	2.00
Employee turnover	2.00	2.00
Rate of return on plan assets	2.25 – 4.00	2.25 – 4.00

The actuaries review and revise their findings every year. The actuarial assumptions with regard to mortality are based (with regard to Germany) on the Heubeck mortality tables, version 2005G. The actuarial assumptions do not materially differ as

between Germany and other countries, except in respect of the discount rate (other countries: 2.0% to 8.6%).

The following table shows changes in the present value of future post-employment benefit obligations and of the plan assets.

€ k	2011	2010
Changes in present value of future benefit obligations		
Present value of future obligations as of 1 January	869,858	774,589
Current service cost	12,009	9,768
Interest cost	40,633	41,917
Actuarial gains/losses	3,189	62,393
Pension payments	-45,746	-43,626
Initial consolidations/Transfer of obligations and other effects	2,866	24,817
Present value of future benefit obligations as of 31 December	882,809	869,858
Changes in plan assets		
Rights to reimbursement as of 1 January	629,363	613,979
Expected return on reimbursement rights	23,584	23,152
Actuarial gains/losses	-1,165	4,411
Employer's contributions	26,488	16,541
Benefit reimbursements	-31,329	-30,168
Other reimbursements/repayments	-856	-1,188
Transfer of obligations	1,490	2,636
Plan assets as of 31 December	647,575	629,363

The return on plan assets in the amount of €22,419k (2010: €27,563k) is made up of the sum of the expected return on the plan assets and the actuarial gains and losses.

The actuarial losses recognised in *Other comprehensive income* during the year under review amounted to € -4,354k (2010: € -58,087k). The actuarial gains recognised in equity under

Accumulated other comprehensive income amounted to €6,701k (2010: €11,055k).

The table below shows the funding status as calculated from the difference between the present value of future benefit obligations and the plan assets, including reconciliation with the provisions for pensions recognised in the Balance Sheet.

€ k	Not funded	Funded	Total
Funding status as of fiscal year end 2011			
Actuarial present value of defined benefit obligation	0	882,809	882,809
Plan assets at fair value	0	-647,575	-647,575
Net obligation	0	235,234	235,234
Other amounts recognised in the balance sheet	711	0	711
Provisions for pensions recognised in the balance sheet	711	235,234	235,945

€ k	Not funded	Funded	Total
Funding status as of fiscal year end 2010			
Actuarial present value of defined benefit obligation	0	869,858	869,858
Plan assets at fair value	0	-629,363	-629,363
Net obligation	0	240,495	240,495
Other amounts recognised in the balance sheet	546	0	546
Provisions for pensions recognised in the balance sheet	546	240,495	241,041

The net retirement benefit cost is composed as follows:

€ k	2011	2010
Current service cost	12,009	9,768
Interest cost	40,633	41,917
Expected return on plan assets/reimbursement rights	-23,584	-23,152
Effect of plan settlements and new accessions	723	530
Net pension expense	29,781	29,063

The “interest cost” and “current service cost” components are recognised in *Personnel expense*, the “expected return on plan assets” in *Other operating income*. The following table shows the development of the present value of future benefit obligations and of the plan assets over the last years:

€ k	2011	2010	2009	2008	2007
Defined benefit obligation (present value)	882,809	869,858	774,589	731,804	725,414
Plan assets	647,575	629,363	613,979	581,381	0
Obligations not covered by plan assets	235,234	240,495	160,610	150,423	725,414
Differences between expected and actual return					
in % of the present value of the obligation	0.3	-1.1	-0.1	0.7	1.5
in % of the fair value of the plan assets	-0.2	0.7	-0.2	0.2	-

4.12. Other non-current and current provisions

€ k	Provisions for the areas of personnel and welfare	Sundry other provisions	Total
Carrying amounts as of 1 January 2011	62,821	32,976	95,797
Additions	25,858	14,265	40,123
Use	21,582	8,699	30,281
Reversals	2,359	2,847	5,206
Reclassifications/Transfers	-158	257	99
Currency translation differences	-12	-5	-17
Carrying amounts as of 31 December 2011	64,568	35,947	100,515

The provisions for obligations in the areas of personnel and welfare relate essentially to pre-retirement part-time working, long-service bonuses, social plan measures and other personnel and non-wage personnel costs.

The sundry other provisions relate mainly to provisions for warranty obligations, provisions for threatened losses from pending transactions and other risks.

Of the total amount of the sundry other provisions as of 31 December 2011, €29,369k (2010: €26,310k) are current and €6,578k (2010: €6,666k) are non-current. No material interest accruals have been recognised on non-current provisions.

4.13. Non-current and current trade and other payables

Payables can be disaggregated in accordance with their residual terms as follows:

€ k	2011			2010		
	Current	Non-current	Total	Current	Non-current	Total
Amounts payable to banks	49,231	979	50,210	10,021	634	10,655
Amounts payable under finance leases	106	155	261	142	64	206
Financial liabilities	49,337	1,134	50,471	10,163	698	10,861
Trade payables						
to third parties	33,423	351	33,774	16,391	245	16,636
from partly fulfilled contracts to render services	1,257	0	1,257	209	0	209
Payables to affiliates	631	0	631	109	0	109
Payables to joint ventures, associates and other entities in which equity investments are held	1,532	25	1,557	1,997	26	2,023
Outstanding invoices	15,968	0	15,968	13,888	0	13,888
Amounts payable to employees	27,745	107	27,852	25,575	102	25,677
Other payables	33,646	33,927	67,573	34,001	36,017	70,018
Trade and other payables	114,202	34,410	148,612	92,170	36,390	128,560
Payments received on account	35,704	102	35,806	27,316	25	27,341
Other taxes	19,640	4	19,644	16,676	0	16,676
Sundry payables	55,344	106	55,450	43,992	25	44,017
Total payables	218,883	35,650	254,533	146,325	37,113	183,438

The *Amounts payable to banks* include an amount of €49,000k drawn down under a syndicated credit line with a ceiling of €175,000k. The amount outstanding as of the reporting date is payable within a month, and at the time of disbursement carried interest at one-month EURIBOR plus a margin of 60 basis points.

Amounts payable under finance leases relate to leases of capital goods, and are recognised as liabilities in the amount of the future obligation.

Trade payables from partly fulfilled contracts to render services relate to contracts with regard to which the payments received from customers on account exceed the accumulated receivables from the fulfilment of the contracts concerned.

Amounts payable to employees include €10,846k (2010: €10,363k) for obligations in lieu of free time and €8,099k (2010: €7,991k) for obligations relating to holiday not yet taken.

Other payables include an accrual of TÜV NORD College GmbH (formerly RAG BILDUNG Berufskolleg GmbH) in the amount of €35,100k (2010: €38,292k), arising out of the financing of the operations of the vocational training colleges. In addition, payables due to the Alters- und Hinterbliebenen-Versicherung der Technischen Überwachungs-Vereine – VvaG –, Essen (AHV), are recognised in the amount of €678k (2010: €2,575k). Reinsurance claims against AHV in the same amount have been pledged as collateral.

No security has been given for any other payables.

4.14. Contingent liabilities

TÜV NORD AG bears liability in cases where it and its subsidiaries have given guarantees in favour of various contractual partners, as set out in the following table:

€ k	2011	2010
Sureties given	4,578	1,748
Collateral provided for third-party liabilities	32	31
Total contingent liabilities	4,610	1,779

Of the contingent liabilities recognised, an amount of €4,578k relates to sureties given for the most part to banks. TÜV NORD AG gives performance bonds in respect of liabilities of Group companies arising out of joint projects or consortia. If the consortium partner does not honour its contractual obligations, TÜV NORD AG may be liable to meet claims for payment up to the amount of the agreed surety. Generally, the agreed terms correspond to those of the underlying transaction.

4.15. Litigation

Neither TÜV NORD AG nor its Group companies are involved in litigation that could have a material impact on the economic or financial position of the companies or of the Group. In respect of other litigation, adequate provisions have been formed by the company concerned in any given case for any awards that may be made against it. As of the reporting date, these provisions amount to €807k (2010: €698k).

4.16. Other financial liabilities

As of 31 December 2011, there exist obligations to order items of property, plant and equipment to the value of €140k (2010: €688k).

The other financial liabilities relate to rental and leasing obligations for premises, furniture and fittings and factory and office equipment which are classified as operating leases pursuant to IAS 17.

The minimum lease payments fall due as follows:

€ k	Up to 1 year	1 – 5 years	More than 5 years	Total
Minimum lease payments for rented real estate	12,693	35,055	35,217	82,965
Minimum lease payments under other operating leases	6,517	21,394	24,280	52,191

The other financial rental obligations are predominantly to be classified as non-current. They have terms of between five and ten years.

Expense under such contracts recognised in the Income Statement amounts to €40,551k (2010: €36,187k).

5. Consolidated Cash Flow Statement disclosures

The figures for cash and cash equivalents presented in the cash flow statement embrace all cash and cash equivalents recognised in the balance sheet, i.e. cash in hand, cheques and balances on account with banks. The recognised cash and cash equivalents are freely disposable and not subject to any restrictions in favour of third parties.

6. Other disclosures

6.1. Events after the reporting period

No events that are material to the presentation of the Group's financial position had occurred up to the date on which the financial statements were authorised for issue.

6.2. Fees paid to the auditors of the Consolidated Financial Statements

The following fees, paid to the auditors of the Consolidated Financial Statements, BDO AG Wirtschaftsprüfungsgesellschaft, and their associated companies during the year under review, have been recognised as expense pursuant to Article 314 (1) No. 9 of the German Commercial Code (HGB):

€ k	2011	2010
Auditing services	529	484
Tax consultancy services	89	105
Other consultancy services	74	36
Total	692	625

6.3. Financial instruments

Under IAS 39, financial instruments are allocated to various categories for measurement purposes. In the following overview, those items in the TÜV NORD Group Balance Sheet that include financial instruments are allocated to the appropriate categories. The resulting measurements are also presented.

FINANCIAL INSTRUMENTS AS OF 31 DECEMBER 2011

€ k	Category as per IAS 39	Carrying amounts	Loans and receivables measured at amortised cost*	Available-for-sale financial assets recognised at fair value in comprehensive income	Financial liabilities measured at amortised cost*
ASSETS					
Non-current assets					
Loans	LaR	9,459	9,459		
Securities	FAHtM	1,301	1,301		
Securities	AfS	27,204		27,204	
Receivables and other assets	LaR	1,980	1,980		
Current assets					
Trade receivables from third parties	LaR	140,612	140,612		
Receivables and other assets	LaR	7,091	7,091		
Cash and cash equivalents					
	LaR	60,623	60,623		
LIABILITIES					
Non-current liabilities					
Financial liabilities	FLAC	979			979
Trade payables to third parties	FLAC	351			351
Other liabilities	FLAC	3,659			3,659
Current liabilities					
Financial liabilities	FLAC	49,231			49,231
Trade payables to third parties	FLAC	34,680			34,680
Other liabilities	FLAC	107,707			107,707
Total by category as per IAS 39			221,066	27,204	196,607
of which (aggregated by category as per IAS 39):					
Loans and receivables (LaR)		219,765			
Financial assets held to maturity recognised at fair value in comprehensive income (FAHtM)		1,301			
Available-for-sale financial assets (AFS)		27,204			
Financial liabilities measured at amortised cost (FLAC)		196,607			
* The carrying amounts correspond to the fair values.					

FINANCIAL INSTRUMENTS AS OF 31 DECEMBER 2010

€ k	Category as per IAS 39	Carrying amounts	Loans and receivables measured at amortised cost*	Available-for- sale financial assets recognised at fair value in comprehensive income	Financial liabilities measured at amortised cost*
ASSETS					
Non-current assets					
Loans	LaR	37,872	37,872		
Securities	FAHtM	1,301	1,301		
Securities	AfS	5,344		5,344	
Receivables and other assets	LaR	3,725	3,725		
Current assets					
Trade receivables from third parties	LaR	126,151	126,151		
Receivables and other assets	LaR	6,580	6,580		
Cash and cash equivalents	LaR	40,063	40,063		
LIABILITIES					
Non-current liabilities					
Financial liabilities	FLAC	634			634
Trade payables to third parties	FLAC	245			245
Other liabilities	FLAC	3,994			3,994
Current liabilities					
Financial liabilities	FLAC	10,021			10,021
Trade payables to third parties	FLAC	16,600			16,600
Other liabilities	FLAC	93,919			93,919
Total by category as per IAS 39			215,692	5,344	125,413
of which (aggregated by category as per IAS 39):					
Loans and receivables (LaR)		214,391			
Financial assets held to maturity recognised at fair value in comprehensive income (FAHtM)		1,301			
Available-for-sale financial assets (AFS)		5,344			
Financial liabilities measured at amortised cost (FLAC)		125,413			
* The carrying amounts correspond to the fair values.					

No financial assets are held for trading.

In view of the predominantly short maturities of the assets and liabilities measured at amortised cost, it is assumed that their carrying amounts correspond to their fair values.

For the securities classified as *Available for sale*, the fair values are based on market prices quoted on an active market.

Net profit or loss by category

Net profit or loss from financial instruments that is recognised in the Income Statement is allocated to the following categories:

€ k	2011			2010		
	From interest	From subsequent measurement	From disposal	From interest	From subsequent measurement	From disposal
Loans and receivables	1,877	-4,725	0	1,137	-3,459	43
Financial liabilities measured at amortised cost	-1,858	120	0	-1,582	111	0

Interest on financial liabilities and impairment losses on loans granted are recognised in *Financial items*. Impairment losses on receivables (essentially trade receivables) and gains or losses from disposals of securities are recognised under *Other financial items*.

6.4. Management of financial risks

TÜV NORD Group companies are exposed to financial risks in the course of their operations. These risks consist of credit risks, liquidity risks and market risks in the form of currency and interest rate risks. Through TÜV NORD AG's centralised risk management system these risks are managed and controlled on a Group-wide basis. The principles of the risk management system are explained in more detail in the Management Report.

Credit default risks

Default risks arise in particular out of day-to-day operations. The receivables of TÜV NORD Group companies are generally subject to a default risk which it may seek to counter by demanding security, depending on the type and amount of the performance rendered. Where required, credit insurance with an excess component is concluded in respect of individual counterparties. In addition, payment in advance may be required. In order to minimise the risk of default, counterparties are subjected to credit-worthiness assessments in accordance with internal guidelines before contracts are concluded. Furthermore, customers' financial standing is regularly reviewed during the term of the contract. Where there is any concrete risk of default precautionary write-downs are effected, on the basis either of objective evidence in specific cases, or of the structure of maturities and the actual occurrence of defaults on payment.

Defaults on trade receivables, on receivables based on percentage of completion and on loans cannot exceed their carrying amount as of 31 December 2011. The structure of due dates of trade receivables is shown under 4.6.

The maximum credit risk relating to assets held for sale and financial instruments is equivalent to their market prices as of 31 December 2011.

Liquidity risks

Possible liquidity risks – the danger that the Group might not be able to meet its payment obligations at all times – are managed through the implementation of comprehensive short-term and long-term liquidity planning, taking into account existing credit lines. Funding requirements are for the most part covered by equity, by participation in cash pooling agreements or by loans from banks, from AHV or from Group companies, to the extent that this is feasible and reasonable in the context of the legal and tax situation in each case. Bank balances are held exclusively with banks of impeccable standing.

A variety of financing instruments available on the market are used to cover the Group's central funding requirements. If events should occur that lead to an unexpectedly high requirement for liquidity, both existing liquidity in the form of cash and cash equivalents and also available credit lines can be drawn upon. A credit line up to a limit of €175,000k is available, which can be drawn upon as required; the amount drawn down as of 31 December 2011 amounted to €49,000k.

An overview of the maturities of financial liabilities and the resulting outflows of funds can be derived from the table of residual terms of liabilities (see under 4.13.).

Currency risks

Currency risks result from the assets and liabilities recognised in the Balance Sheet that are denominated in foreign currencies, the fair values of which may be negatively influenced by fluctuations in exchange rates, and from pending foreign currency transactions whose future cash flows may develop disadvantageously as a result of exchange rate movements.

Exchange rate risk is of only minor importance, since the receivables and payables are due in local currency in the country in which the company concerned is domiciled. There are scarcely any country risks at the present time.

Interest rate risks

Interest rate risks arise predominantly from short-term loans with variable rates of interest taken up in the context of Group funding. TÜV NORD AG's risk and opportunity management system counters the risk that future interest payments may develop unfavourably as a result of changes in interest rate levels by adopting appropriate reporting practices and by laying down competences and responsibilities with regard to the taking up of credit. No sensitivity analysis has been prepared, since current liabilities were essentially already covered at the time of the preparation of the financial statements.

6.5. Related party disclosures

Under IAS 24, *Related party disclosures*, companies are subject to an obligation to disclose relationships with, on the one hand, related business entities that are not fully consolidated, and on the other hand with persons with whom a close relationship exists.

Related party entities of TÜV NORD Group are basically the TÜV Nord e.V., TÜV Hannover/Sachsen-Anhalt e.V. and RWTÜV e.V. associations, "Aktaios" Verwaltungs-GmbH and RWTÜV GmbH with its subsidiaries. In addition, the Group maintains direct or indirect relationships in the normal course of its business activities not only with its consolidated subsidiaries, but also with non-consolidated affiliates and associates. All trading relationships entered into in the normal course of business with non-consolidated related entities are conducted on the basis of normal market conditions such as are also customary in arm's-length transactions.

Members of the Board of Management and the Supervisory Board are also considered to be related parties.

6.6. Total compensation of the Board of Management and the Supervisory Board

The key management personnel compensation that is required to be disclosed pursuant to IAS 24 embraces the compensation of the serving members of the Board of Management and the Supervisory Board.

During the 2011 fiscal year, the serving members of the Board of Management received total compensation amounting to €2,063k (2010: €2,081k). The additional current service cost for pension obligations amounts to €241k (2010: €233k). The present value of the overall defined benefit obligation (DBO) to the serving members of the Board of Management amounts to €5,556k (2010: €4,988k) as of the reporting date.

Total payments to former members of the Board of Management and their surviving dependents, consisting of pension payments and other compensation (one-off payments and payments for consultancy services), amounted to €377k (2010: €383k). A DBO in the amount of €3,965k (2010: €3,974k) exists towards former members of the Board of Management and their surviving dependents.

Members of the Supervisory Board were paid compensation of €249k (2010: €247k) for their services.

No loans or advances were granted to members of the Board of Management or the Supervisory Board in the 2011 fiscal year.

6.7. Proposal for the appropriation of profits

The Board of Management proposes to the Annual General Meeting that of the net profits of TÜV NORD AG as determined in accordance with the provisions of the German Commercial code, €1,000k should be distributed to the shareholders as dividends.

Name, location of registered office	Share of equity in %
Consolidated affiliates	
ALTER TECHNOLOGY TÜV NORD S.A.U., Seville, Spain	100.00
adapt engineering GmbH & Co. KG, Nordhausen, Germany	100.00 ¹⁾
Associated Geosciences Ltd., Calgary, Canada	100.00
BRTÜV Avaliações da Qualidade S.A., São Paulo, Brazil	75.01
Cualicontrol-ACI S.A.U., Madrid, Spain	100.00
DMT GmbH & Co. KG, Essen, Germany	100.00 ¹⁾
DMT Geosurvey spol. s.r.o., Prague, Czech Republic	100.00
EE Energy Engineers GmbH, Gelsenkirchen, Germany	100.00
ENCOS GmbH Engineering + Construction + Service, Hamburg, Germany	100.00
FS FAHRZEUG-SERVICE GmbH & Co. KG, Hanover, Germany	100.00 ¹⁾
Guangzhou TÜV Industrial Technical Services Co., Ltd., Guangzhou, China	100.00
GWQ Gesellschaft für Werkstoffprüfung und Qualitätssicherung mbH, Moers, Germany	100.00
HIREX ENGINEERING SAS, Toulouse, France	100.00
Hundt & Partner Ingenieurgesellschaft mbH, Hanover, Germany	100.00 ¹⁾
IGN Ingenieurgesellschaft Nord mbH & Co. KG, Greifswald, Germany	100.00 ¹⁾
IMC Group Consulting Ltd., Nottingham, United Kingdom	100.00
IMC-Montan Consulting GmbH, Essen, Germany	100.00
IMC-SRG Services & Consultancy (P) Ltd., Kolkata, India	51.00
Kalka Bildungsgesellschaft Technik und Kraftverkehr mbH, Datteln, Germany	100.00
MEDITÜV GmbH & Co. KG – Unternehmensgruppe TÜV NORD, Hanover, Germany	100.00 ¹⁾
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TÜV NORD EnSys Hannover GmbH & Co. KG, Hanover, Germany	100.00 ¹⁾
TÜV NORD Finland Oy, Vantaa, Finland	100.00
TÜV NORD Hangzhou Co., Ltd., Hangzhou, China	50.00
TÜV NORD HONG KONG LTD., Kwun Tong, Kowloon, Hong Kong	100.00
TÜV NORD IBERIA S.L.U., Madrid, Spain	100.00

Name, location of registered office	Share of equity in %
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TÜV NORD InfraChem GmbH & Co. KG, Marl, Germany	51.00 ¹⁾
TÜV NORD INTEGRA BVBA, Berchem, Belgium	70.00
TÜV NORD International GmbH & Co. KG, Essen, Germany	100.00 ¹⁾
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TÜV NORD Korea Ltd., Seoul, Korea	100.00
TÜV NORD (Malaysia) SDN. BHD., Petaling Jaya, Malaysia	100.00
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TÜV NORD Mobilität Immobilien GmbH, Essen, Germany	94.00
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TÜV Thüringen Fahrzeug GmbH & Co. KG, Erfurt, Germany	99.50 ¹⁾
TÜV UK Ltd., London, United Kingdom	100.00
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Unterstützungseinrichtung des Technischen Überwachungs-Vereins Hannover/Sachsen-Anhalt GmbH, Hanover, Germany	100.00
Verebus Engineering B.V., Rijswijk, The Netherlands	100.00
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British Mining Consultants Ltd., Sutton, United Kingdom	100.00
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IMC Montan Consulting Limited, Nottingham, United Kingdom	100.00
IMC Montan Limited, Nottingham, United Kingdom	100.00
IMC Montan Russia Limited, Nottingham, United Kingdom	100.00
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Name, location of registered office	Share of equity in %
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TÜV NORD Certification (Tianjin) Co., Ltd., Tianjin, China	76.90
TÜV NORD EGYPT S.A.E., Kairo, Egypt	60.00
TÜV NORD Energieagentur Verwaltungsgesellschaft mbH, Essen, Germany	100.00
TÜV NORD EnSys Hannover Verwaltungsgesellschaft mbH, Hanover, Germany	100.00
TÜV NORD France SAS, Tourcoing, France	100.00
TÜV NORD Immobilien Verwaltungsgesellschaft, Essen, Germany	100.00
TÜV NORD InfraChem Verwaltungsgesellschaft mbH, Marl, Germany	51.00
TÜV NORD International Verwaltungsgesellschaft mbH, Essen, Germany	100.00
TÜV NORD Kft., Budapest, Hungary	100.00
TÜV NORD Luxembourg s.a.r.l., Luxembourg, Luxembourg	100.00
TÜV NORD Material Testing GmbH, Duisburg, Germany	51.00
TÜV NORD Mobilität Verwaltungsgesellschaft mbH, Hanover, Germany	100.00
TÜV NORD MPA Verwaltungs GmbH, Leuna, Germany	100.00
TÜV Nord Nederland B.V., Apeldoorn, The Netherlands	100.00
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Other investments	
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Engineering Financial Cooperative (formerly Engineering a Mutual Benefit Society), Seoul, Korea	0.02
FSD Fahrzeugsystemdaten GmbH, Dresden, Germany	13.43
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¹⁾ These trading partnerships take advantage of the exemption rule pursuant to Art. 264b HGB

Auditor's Report

(Note: the original German text is the sole authoritative version)

We have audited the consolidated financial statements prepared by the TÜV NORD AG, Hanover, comprising the consolidated income statement, the consolidated statement of financial position, the consolidated statement of cash flows, the consolidated statement of comprehensive income, the consolidated statement of changes in equity and the notes to the consolidated financial statements, together with the Group management report for the fiscal year from 1 January 2011 to 31 December 2011. The preparation of the consolidated financial statements and the Group management report in accordance with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Art. 315a (1) HGB are the responsibility of the parent company's management. Our responsibility is to express an opinion on the consolidated financial statements and on the Group management report based on our audit.

We conducted our audit of the consolidated financial statements in accordance with Art. 317 HGB and German generally accepted standards for the audit of financial statements promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Those standards require that we plan and perform the audit such that misstatements materially affecting the presentation of the net assets, financial position and results of operations in the consolidated financial statements in accordance with the applicable financial reporting framework and in the Group management report are detected with reasonable certainty. Knowledge of the business activities and the economic and legal environment of the Group and expectations as to possible misstatements are taken into account in the determi-

nation of audit procedures. The effectiveness of the accounting-related internal control system and the evidence supporting the disclosures in the consolidated financial statements and the Group management report are examined primarily on a test basis within the framework of the audit. The audit includes assessing the annual financial statements of those entities included in consolidation, the determination of entities to be included in consolidation, the accounting and consolidation principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements and the Group management report. We believe that our audit provides a reasonable basis for our opinion.

Our audit has not led to any reservations.

In our opinion, based on the findings of our audit, the consolidated financial statements comply with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Art. 315a (1) HGB, and give a true and fair view of the net assets, financial position and results of operations of the Group in accordance with these requirements. The Group management report is consistent with the consolidated financial statements and as a whole provides an accurate picture of the Group's position and suitably presents the opportunities and risks of future development.

Essen, 2 March 2012

BDO AG Wirtschaftsprüfungsgesellschaft

Dr Gorny
(German Public Auditor)

ppa. Semelka
(German Public Auditor)

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MAKING OUR WORLD SAFER



PUBLISHED BY

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CONCEPTION AND DESIGN

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D-30519 Hanover

JDB MEDIA GmbH
Schanzenstraße 70
D-20357 Hamburg

TRANSLATION, ENGLISH EDITION:

Elizabeth Flint,
Exmouth
Antony Mellor-
Stapelberg,
Hemmingen

TYPESETTING, LITHOGRAPHY AND PRINTING

diaprint KG
Planetenring 7
D-30952 Ronnenberg

PICTURES AND ILLUSTRATIONS

Volkmar Baldauf (28)
Santanu Bhattacharjee (15, 16, 17)
Martin Bühler (03, 06/07, 19)
Sylvia Chybiak (30)
Clipdealer (10/11)
Corbis (15)
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dpa (33, 44)
ESA (42, 43)
ESA/D. Ducros (03, 40)
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iStockphoto (29, 31, 38/39, 41)
Gunnar Knechtel (01, 03, 45)
Wolfram Schroll (13)
Stage Entertainment (03, 37)
Veer (29)

WE WOULD LIKE TO THANK THE FOLLOWING FOR THEIR SUPPORT

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