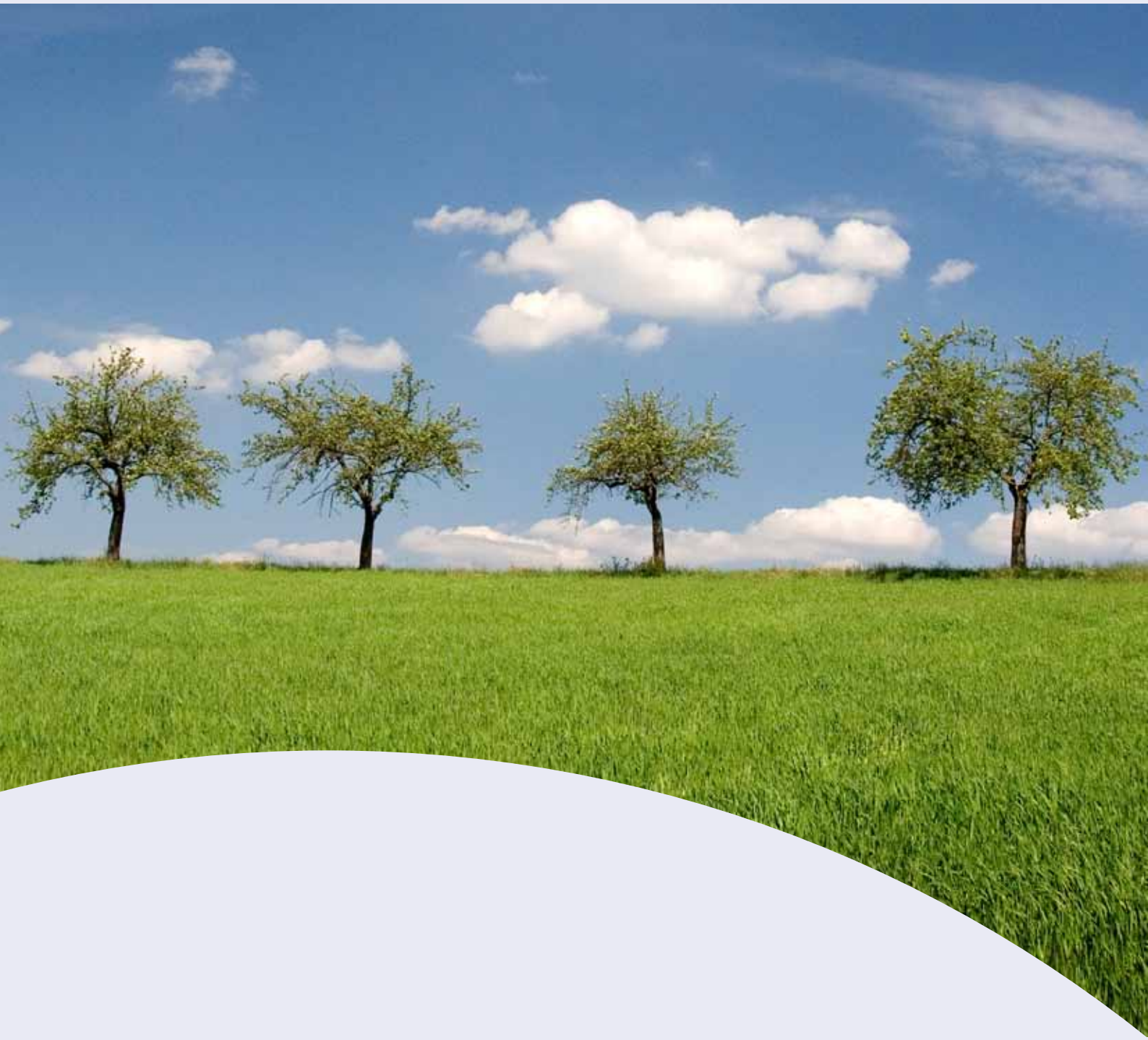
Active climate protection in power generation, buildings, manufacturing, traffic and logistics



Energy efficiency means improved profitability

Government policies on climate and energy are facing major global challenges. Climate protection is something that concerns everyone – businesses and private households alike. The Federal Ministry for the Environment has put together some far-reaching packages of measures as part of its integrated energy and climate programme. TÜV NORD Group made sure very early on that it was in a position to take on these new challenges, and so is able to offer a broad portfolio of climate protection services that make it one of the world's leading addresses in this field.

Products and services that bear the TÜV NORD Group seal are greatly valued. TÜV NORD Group's range of climate protection services includes, among other things, participation in the development of modern technologies to reduce or prevent harmful emissions, assistance with the organisation of climate protection projects and certification of the products of carbon-neutral manufacturing.

Already today, progressive climate change is leading to a marked increase in the incidence of drought and flooding. According to the Federal Ministry for the Environment, the global temperature could rise by up to 6° C by the year 2100 unless resolute action is taken. Scientists say that the most severe consequences can only be avoided if the surface temperature of the earth does not rise by more than 2° C as against the pre-industrial age by the end of the century. The Ministry therefore recommends that efficiency should be enhanced, more use made of renewable forms of energy and emissions of greenhouse gases – which does not only mean CO_2 – reduced.

Energy saving is not an invention of the 21st century: even in the 1970s, the oil crisis made the industrialised countries acutely aware of their high level of dependency on primary sources of energy. As Rolf R. Anderson and James B. Sullivan of the Washington-based World Energy Efficiency Association declared in 1995, "In general, increased energy efficiency means improved profitability for companies." Entrepreneurs who invest in the efficient utilisation of energy today will find they have a massive competitive advantage tomorrow.

There are fundamentally two ways of reducing the consumption and costs of energy: firstly by developing more energy-efficient technologies and machinery, and secondly by exploiting the potential for energy saving that is to be found in buildings and production plant. Those who wish to do this will as a rule require external advisers with broad specialist knowledge and many years of experience. In order to be able to initiate effective climate protection measures, the EU summit in 2007 formulated concrete objectives: to increase the use of renewable sources of energy to 20% of total consumption by 2020, to reduce CO_2 emissions by the same percentage over the same period of time, and to enhance energy efficiency also by 20%. Brussels intends that by 2020, fuels should contain a 10% biological component.

It is precisely these requirements that are taken up by TÜV NORD Group's four modules, which offer effective and sustainable climate protection measures. Each of the modules – Power Generation, Buildings, Manufacturing and Traffic and Logistics – contributes to cutting the requirement for energy, reducing emissions and enhancing energy efficiency. TÜV NORD Group staff show their clients the way along the road to effective climate protection accompanied by cost reductions. "The variety and range of TÜV NORD Group's climate protection services are one of this company's distinguishing features," says Dr. Guido Rettig, Chairman of the Board of Management of TÜV NORD Group.

Voluntary environmental management system creates confidence

EMAS, the Eco-Management and Audit Scheme, also known simply as the eco-audit, is the European Union's voluntary scheme to promote good practice in the field of environmental management. Certification under EMAS is supplementary to the globally recognised DIN EN ISO 14001 environmental management system, adding additional requirements – for example the obligation to undertake an environmental audit, to use the best technology available and to inform the public about one's environmental management performance by issuing an environmental statement. The aim is to achieve continuous improvement that goes beyond the mandatory requirements of environmental law. Voluntary acceptance of an obligation to actively implement an environmental management system is a way of avoiding incalculable risks, and at the same time of opening up entrepreneurial opportunities and creating confidence.

In such an environmental statement, organisations disclose what impact they have on the environment, while at the same time setting out details of their environmental performance and objectives. Independent experts from the environmental auditing company TÜV NORD CERT Umweltgutachter Gesellschaft check that the environmental statement is correct.

TÜV NORD CERT Umweltgutachter Gesellschaft is one of the biggest organisations of recognised environmental experts in Europe, with 17 enviromental surveyors and 20 other experts. Environmental auditors and experts with special knowledge of the industry concerned assist entrepreneurs with practical advice as they seek to implement active environmental management. They are distinguished by a multiplicity of qualifications: they are at one and the same time environmental auditors, experts in industrial safety, quality auditors and vehicle inspectors. Apart from the certification and validation of environmental management systems, they also focus on the certification of specialist waste management operators and the validation of sustainability reports and ecological balance sheets.

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The first CO_2-free town introduces an integrated management system

Abu Dhabi is building the first carbon-neutral, waste-free and car-free town that makes use exclusively of renewable sources of energy: Masdar. Its electricity comes from wind turbines and photovoltaic equipment, and the plans provide for its water to be supplied by solar-powered desalination plant. Masdar, which means "spring" or "source", is to cost $22 billion, and should be ready for occupation as early as 2016.

TÜV Middle East is developing an integrated management system for this first green town in accordance with the quality, environmental and industrial safety management system standards ISO 9001, ISO 14001 and OHSAS 18001. TÜV NORD Group will be running seminars to familiarise Masdar staff and managers with the integrated management system, and will assist in its introduction and testing.

Masdar is to be the first carbon-neutral, waste-free and car-free town in the world.

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The certification of carbon-neutral products is an aid to consumers

The certification of carbon-neutral products involves the investigation both of a product's greenhouse gas "footprint" and of how this is compensated for by corresponding emission reduction credits from recognised climate protection projects. TÜV NORD CERT climate protection auditors check the calculations of all the greenhouse gas emissions arising during the manufacture of a product. In addition, these qualified specialists verify whether the confirmed quantity of emissions is balanced by the retirement of a corresponding quantity of emission allowances. By means of such certification, TÜV NORD CERT is for the first time creating a basis on which end users can make CO_2-relevant purchasing decisions.

TÜV NORD CERT has, for example, investigated and certified the calculation of the greenhouse gas footprint of the Dutch organic fruit and vegetable trader Eosta and its compensation for the greenhouse gases emitted through the retirement of emission allowances. Among the certified products are apples and pears from Argentina, tomatoes from the Netherlands and oranges from Egypt. Further certifications of a variety of products are being undertaken for companies in the cosmetics sector, gas utilities and confectionery producers.

Entrepreneurs whose products come through the test successfully can label them with the climate protection test label "Carbon Neutral Product".

Carbon-neutral flying and driving have become a must for many environmentally aware holidaymakers and business travellers in recent years. A whole number of service providers have been set up to offer either complete travel packages or simply carbon neutralisation. TÜV NORD CERT ensures the necessary transparency by certifying these businesses' management of their emissions credits and of the orders the place for compensatory measures, and so allows customers to rely on their travel being really carbon-neutral.

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Emissions trading: allowance allocations for climate protection

At the beginning of 2005 Germany and the EU introduced a new instrument of climate protection: emissions trading of the greenhouse gas CO_2. The emissions trading system creates an economic basis for reducing emissions of the climate-killing gas CO_2 where it is cheapest to do so. Emission allowance allocations are tradable, and so act as a kind of currency. If a company is able to achieve the cuts in emissions required of it by implementing CO_2 reduction measures of its own, it can sell its emission rights on the market in the form of credits. In the contrary case, it can buy additional credits on the market. If the company fails to meet its reduction obligations, it will be subject to sanctions.

TÜV NORD CERT has in-depth knowledge and wide experience of emissions trading. Companies advised by TÜV NORD Group experts are responsible for annual emissions making up around a quarter of the CO_2 inventory relevant to German emissions trading. The experts scrutinise and confirm all the data set out in the companies' annual CO_2 emission reports.

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Power generation module: getting more out of energy

It is intended that wind energy should cover a quarter of Germany's power requirements by 2020.

TÜV NORD Group's special know-how in the field of renewable forms of energy is particularly apparent in the comprehensive experience it has accumulated over a period of many years in the areas of wind energy and biogas plant and in hydrogen technology. TÜV NORD CERT's "Ökostrom" ("Eco-Power") certificate provides a guarantee that electricity has been generated from renewable sources. An interdisciplinary team of experts is there to apply its knowledge in assisting the industry with the planning of so-called 700 degree power stations and carbon capture equipment, as well as with issues concerning the fossil fuels oil and gas.

Buildings module: well-advised in matters of climate protection

TÜV NORD Systems provides energy consultancy for industrial customers and in the field of building services engineering. Thermography experts check electrical systems for weak points and investigate energy loss from both residential and non-residential buildings. TÜV NORD Group's expert energy consultants suggest ways of saving energy and of modernising buildings, and issue "energy performance certificates" in accordance with the statutory regulations.

If you wish to cut energy consumption in buildings, you need comprehensive all-round energy advice.

Manufacturing module: be successful in promoting energy efficiency

Experts from TÜV NORD CERT inspect one quarter of all the companies in Germany that are involved in CO_2 emissions trading. With its own climate protection group, staffed by 20 experts from different disciplines, TÜV NORD CERT concerns itself with all questions relating to climate protection, from emissions trading to joint implementation and clean development mechanism projects and all the way to carbon-neutral products and the auditing of manufacturing companies' energy management systems.

Successful energy management reduces harmful emissions and enhances energy efficiency.

Traffic and logistics module: moving forward while protecting the climate

Hydrogen can make traffic more climate-friendly.

Alongside other products and services, TÜV NORD Group also certifies carbon-neutral transportation and draws up ecological balance sheets for the automotive industry. TÜV NORD Industrial Consultancy is participating in the process of developing hydrogen technology by networking its expert knowledge in the fields of the manufacture, storage, transportation and utilisation of hydrogen. TÜV NORD Mobilität's technical inspectors determine the fuel consumption and emission levels of cars in everyday use on the road, in order to check the figures provided by the manufacturers.

For the sake of economy and the environment

The global economy is very much concerned at the present time with issues relating to power generation and supply. Both for reasons of environmental protection and due to the pressure of costs, it is essential for existing plant to be optimised and alternative forms of energy to be exploited. This applies to all those involved anywhere along the value chain.

TÜV NORD Group has traditionally been a partner of companies that operate technical plant. One of its focuses has always been, and still is today, the testing of plant safety by technical experts. Increasingly, however, attention is focusing on the use of renewable forms of energy. All over the world, energy producers are coming to be expected to possess expertise and competence in optimising the life cycles of technical installations, in particular those of capital-intensive production machinery. This covers every stage in its lifetime, from planning to operation and maintenance and all the way to decommissioning and dismantling.

The energy sector has to focus both on conventional sources of energy, such as oil, gas and coal, and also on renewable forms such as biomass, wind energy and hydrogen. Although the energy requirement, in Germany as elsewhere, is at present still principally covered by conventional sources of energy, the energy mix of the future will increasingly include renewable forms of energy.

Present-day government policy in the fields of energy, the economy and the environment has created a framework of conditions for the power generating industry which leads more and more often to both the continuing operation of existing facilities and investment in new ones being called in question. The demands made on the industry's partners involved in the planning, construction and operation of new power stations are correspondingly high. In addition to safety aspects, attention has to be paid to high performance, high availability and environmental protection. It is a constant challenge to ensure compliance with all the relevant laws, standards and regulations, while at the same time paying due regard to the achievement of a high level of energy efficiency, since that is the decisive factor in competitiveness.

Like all other utilities, wind turbine operators with their highly sophisticated technical equipment are required to operate within a legal and political framework. To enable these companies to produce electricity economically and efficiently, TÜV NORD Group experts assist them with certification and individual and type testing in accordance with German regulations and international directives, and also with site assessments, construction surveillance, operations and maintenance.

TÜV NORD Group experts are concerned with wind turbines throughout their entire life cycle.

Making biogas plant more profitable

The Renewable Energy Sources Act (*Erneuerbare-Energien-Gesetz* – EEG) guarantees operators of plant that produces electricity from renewable sources reliable remuneration. The EEG 2009 forms a part of the German government's integrated energy and climate programme, its objective being to increase the proportion of electricity produced from renewable sources to 25-30 per cent by 2020. This new, revised version of the EEG makes greater demands on the operators of plant producing electricity from biogas. The framework of conditions for the planning, construction and operation of biogas plant makes many demands on all concerned. TÜV NORD Group is able to offer professional assistance to all who are required to meet these demands.

The basic level of remuneration for biomass plant producing energy from vegetable or animal materials can be enhanced through technical improvements, the use of particular materials and the reclamation of waste heat. The amounts paid to operators of small installations have been increased, while for existing plant there are improvements in the avoidance of emissions and the enhanced utilisation of waste heat. Right from the planning stage, promotors and operators need to take on a technical expert who can show them how to design their installations in compliance with the law, operate them safely and ultimately also achieve the highest possible returns. TÜV NORD Group experts draw up licensing applications, prepare noise, odour and emission forecasts, and inspect plant for safety in order to ensure that it is legally compliant. To obtain the formaldehyde bonus, operators need to have annual measurements carried out by a notified body, in order to demonstrate compliance with the principle of emission minimisation incorporated in the Technical Instructions on Air Quality Control (*TA Luft*). The environmental protection specialist TÜV NORD Umweltschutz is able to offer this. TÜV NORD CERT's environmental inspectors carry out annual audits to ensure that the conditions for the bonuses are fulfilled. Basically, this involves checking the documentation, doing a walk-down of the plant, discussing the results with the management and drawing up the required expert opinion itself.

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Certificate for photovoltaic components

The most important components of solar technology, with which electrical energy can be gained directly from sunlight, are photovoltaic modules and power converters. In order to ensure that products placed on the market comply with the requirements of the product standards and good engineering practice, TÜV NORD CERT now offers type inspections and the certification of components.

Thus manufacturers and importers of photovoltaic modules and power converters or vendors of complete systems can now obtain a test label from TÜV NORD Group. This indicates that the product concerned has been tested and the manufacturing facility audited, and that the manufacturing process is properly conducted and regulated. The test label is also an important aid to the end user in deciding what to buy.

In view of rising energy prices and the falling production costs of solar cells, photovoltaic technology can be expected to undergo rapid expansion in the future.

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Certified eco power

Environmentally aware consumers would like to be able to decide for themselves whether they wish to be supplied with electricity generated from traditional sources of energy or from renewable sources such as wind, water or sunshine. This enables the consumer to make a contribution towards avoiding the depletion of the available sources of energy, and also to environmental and climate protection. Electricity producers and traders can take part voluntarily in the TÜV NORD CERT certification procedure, in order to set themselves off from their competitors.
Certification entails subjecting the quality of the product to scrutiny, and allows consumers to rely on the fact that their electricity really does come from environmentally friendly, renewable sources: every stage of the route taken by the power from the generator to the customer is examined. A further objective of the TÜV NORD CERT certificate is to promote the expansion of this segment of electricity generation.

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Into the future with hydrogen – whether mobile or stationary

Hydrogen is a source of energy that can be obtained from renewable sources. Fuel cells convert hydrogen and oxygen into electric current and water. This is not only an efficient way of producing energy, but an environmentally friendly one as well. Unlike the burning of oil or coal, it does not give rise to any harmful waste gases. Hydrogen can be used, for example, as fuel in a power station to generate electricity, or else to drive a vehicle. By contrast to electrical energy, hydrogen can be stored in largish quantities for considerable periods of time and can also be transported. Hydrogen, in combination with solar and fuel cell technology, promises to make an essential contribution to the energy mix of the future.

Researchers are working at high pressure on improving the economy of the fuel cell. Standards are currently being drawn up for performance and quality parameters.

TÜV NORD Industrial Consultancy is playing its part in this process of development by networking its expertise in all aspects of the production, storage, transportation and utilisation of hydrogen. TÜV NORD Group specialists offer comprehensive consultancy, testing and certification services with regard to both the mobile and the stationary applications of hydrogen. TÜV NORD CERT collaborates with academic institutions and testing institutes that have close links to research in order to keep up with the latest state of technology at all times. From assistance with planning to safety analyses to tasks related to the licensing of systems, and also in questions of the use of materials, its specialists are contributing to safety and economy.

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Wind turbines to enhance network stability

In future, it will not only be traditional large-scale power stations that are required to provide so-called system services in order to maintain network security, as has been the case in the past: under the Renewable Energy Sources Act (*Erneuerbare-Energien-Gesetz* - EEG 2009) and the System Services Regulations (*Systemdienstleistungsverordnung* - SDLWindV) wind energy conversion plant is also to be required to do so. Certification will allow operators to demonstrate that their installations are able to provide these system services. Operators of such certified units and plant will receive additional remuneration for energy fed into the grid.

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Carbon capture readiness: a new climate protection standard for power stations

TÜV NORD Group's power plant and climate protection specialists have developed a catalogue of requirements for the voluntary monitoring of new power station projects with regard to the feasibility of retrofitting carbon capture technology. This equipment extracts CO_2 – for example from the stream of flue gas – so that it can then be compressed, transported and stored underground. The overall process is known as carbon capture and storage (CCS). It may be assumed that this technology will take on great significance in the field of climate protection in the coming decades. The "carbon capture readiness" (CCR) standard can be applied to power plants constructed since 2008, or to ones that are still at the planning stage. Up until now no detailed and binding catalogue of requirements for the possibility of retrofitting power stations with such equipment had existed either at the national or at the international level. Thus carbon capture readiness certification offers power station operators a valuable tool for demonstrating to regulatory authorities or the interested public that their facilities are being planned and constructed in such a way as to allow the retrofitting of carbon capture equipment at a later date.

Auditing for the certificate covers not only technical, environmental and organisational aspects, but also concepts for the transport and storage of the captured CO_2.

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700 degree technology: TÜV NORD Group is involved in the power stations of the future

Trials of the first 700 degree power station are to start in 2014.

A lot of new power stations are going to have to be built in Germany in the next 20 years, in order to allow old and from today's point of view inefficient stations to be switched off while at the same time ensuring that an adequate supply of power can be maintained. This will bring about a substantial reduction in CO_2 emissions, since simply replacing an old power station with modern 600 degree technology reduces CO_2 emissions by around 35%. Furthermore, power stations with 700 degree technology and efficiency levels above 50%, as well as various procedures for capturing and storing CO_2, are under development.

"In the development of modern power stations, the materials used and their degree of stability are very important," says Dr. Gerhard Dreier, sectoral manager for conventional power stations at TÜV NORD Systems. The company is involved in the development of the power station technology of tomorrow. Trials of the first 700 degree power station are to begin in 2014.
With its broad range of engineering, consultancy and inspection services, TÜV NORD Group is uniquely positioned and is right up among the front runners where the development of this technology is concerned. A team of specialists drawn from a variety of disciplines will assist in the construction of these state-of-the-art power stations, starting from the planning phase, continuing with the implementation and going on all the way to the commencement of operations.

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Wind farm in Korea: energy yield calculated with a meteorological model

TÜV NORD Group has successfully completed a project in Korea to determine the wind potential and energy yield of a projected wind farm with a nominal capacity of 160 megawatts. The project related to 65 wind turbines that are to be erected at heights of between 560 and 1,175 metres on a ridge in the Sobaek Mountains.

The challenge was that it was not possible for a single anemometer (wind measuring) mast to provide an accurate picture of wind conditions over the whole area. To solve this problem, wind data was determined using a meteorological model which simulated wind flows across the terrain. In this way, TÜV NORD Group engineers were able to calculate the energy yields of the individual turbines and thus of the entire wind farm.

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Baltic pipeline project from Wyborg to Greifswald

Two pipelines, each 1,210 kilometres long, laid through the Baltic Sea are to connect Greifswald to Wyborg on the Russian coast, thereby linking Europe directly to the biggest gas reserves in the world.

Natural gas is to start flowing through the new pipeline at the end of 2011.

A consortium consisting of SGS and TÜV NORD Group, acting as technical experts on behalf of the responsible authorities, is responsible for design verification (i.e. the independent scrutiny of the specifications and technical planning documents of the pipeline project with regard to safety), for inspection and quality assurance (monitoring the manufacture of pipes and prefabricated components), and also for undertaking construction surveillance tasks for certain sections of the pipeline as it is laid. In view of the unusual technology and the environmental protection requirements, the project makes heavy demands in respect of safety and quality assurance. SGS and TÜV NORD Group bear part of the responsibility for the quality of the construction work and the safety of the pipeline at every phase of the project.The consortium consisting of SGS and TÜV NORD Group was awarded the contract by Nord Stream, which is jointly owned by Gazprom, Wintershall, E.ON Ruhrgas and Gasunie

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Buildings required to have energy performance certificates

In Germany, the heating of buildings and the provision of hot water account for around one third of annual energy consumption. This is why Brussels introduced the Energy Performance of Buildings Directive as long ago as 2002, on the basis of which the German Energy Saving Regulations (*Energiesparverordnung* – EnEV) were drawn up. Germany is currently introducing energy performance certificates in stages.

An energy performance certificate is required for all residential buildings. Commercial buildings and other buildings that are not used predominantly for living in, together classified as "non-residental buildings", have been required to have an energy performance certificate since July 2009. For new buildings, a certificate has been mandatory since 2002. However, it does not need to be presented unless the building is sold, leased or re-let.

Most of the 17 million or so buildings in Germany are in need of substantial energy optimisation. Energy performance certificates show owners where it would be worthwhile having modernisation work carried out. The Energy Saving Regulations are designed to help the government to implement its CO_2 reduction objectives. They lay down considerably stricter requirements for energy saving and energy efficiency than have applied in the past. In addition, an energy performance certificate must be presented whenever there is a change in the owner or user of a building.

Generally, it is sensible to have an energy performance certificate irrespective of any concrete plans to sell a building. There are two types of energy certificate, but TÜV NORD Group experts recommend house-owners to obtain a requirement-based certificate. The consumption-based certificate, which is orientated towards to the amount of energy the occupiers actually use, may in many cases not provide a really useful comparison. A requirement-based energy certificate, on the other hand, presents energy flows irrespective of the parameters of the actual use of the building, and makes it possible to examine rapidly different options and suggestions for improvement. A requirement-based energy certificate gives users of buildings extensive information on energy consumption, and indicates what modernisation measures would be appropriate; this can lead to savings of energy and therefore also of costs, and in addition provides an important aid to decision-making for people who are considering renting or buying property.

The energy performance certificate is drawn up on the basis of German standard DIN 18599.

Energy consultancy for residential and non-residential buildings

Whereas the energy performance certificate for residential buildings covers only the energy requirement for heating and hot water, the certificate for non-residential buildings also has to include the cooling, lighting and ventilation of the property.

TÜV NORD Group experts assess the energy efficiency of buildings, investigate them for energy losses using thermal imaging cameras, analyse the potential for energy saving and modernisation of the entire air conditioning, plumbing and electrical systems and of the shell of the building, and issue energy performance certificates in accordance with the Energy Saving Regulations and the DIN 18599 standard. Clients are given recommendations on how to make savings and suggestions for safeguarding or enhancing the value of the property through energy-related modernisation measures.

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Economy meets ecology

Manufacturing companies too are constantly having to comply with new laws and regulations to prevent further pollution of the air, the water and the soil. This applies equally to the planning of new production plant and to existing facilities and extensions to them.

In the 1997 Kyoto Protocol the industrialised countries, including the member states of the European Union and the European Union itself, entered into a commitment, binding under international law, to reduce emissions of greenhouse gases by an average of 5.2 per cent as against the 1990 figure in the period 2008-2012. In view of its binding objectives for the reduction of emissions of six greenhouse gases by industrialised countries, the Protocol represents an important basis for combating climate change.

One of the core elements of the Kyoto Protocol was the introduction of the so-called Kyoto mechanisms. These instruments are based on the fundamental economic idea of making the reduction of emissions as cost-effective as possible. They include the project-related instruments called Joint Implementation (JI) and the Clean Development Mechanism (CDM), as well as international emissions trading between the signatories to the Kyoto Protocol.

Companies that operate plant have two options: either they can reduce their CO_2 emissions by introducing more modern technology or by switching fuels, in which case they can sell any emissions permits they no longer need; or they can increase their emission allowance by purchasing additional permits. In this way, a price is put on CO_2. In consequence, emissions of greenhouse gases are reduced where it is cheapest to do so. That is the economic idea behind this instrument of environmental policy.

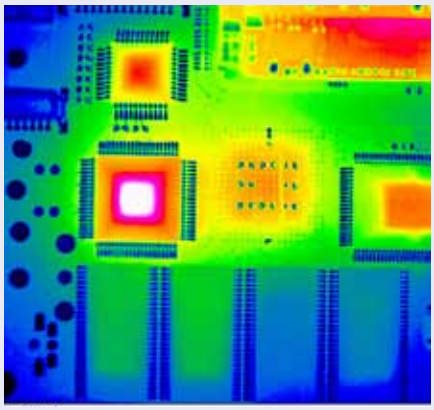
TÜV NORD Group experts not only advise manufacturing companies on emissions trading, but also assist them to introduce energy-saving technology and to change over to different energy sources.

Using thermography to hunt down heat losses from buildings

TÜV NORD Group experts not only investigate the heat insulation of buildings, going in search of energy losses with thermal imaging cameras, but also look for weak points in electrical equipment and analyse the potential for energy savings and modernisation.

The company uses its *Thermography-Check* to help plant operators take prophylactic action to prevent overloading and breakdowns of their equipment, to minimise the resulting costs and so to improve economy.

TÜV NORD Group thermography specialists supplement the results of periodic testing of electrical installations by providing a well-founded statement, quickly prepared, as to whether there is any enhanced risk of the equipment breaking down, and how any such weak points are to be evaluated; and they give effective recommendations for action.



Thermography is an effective measurement procedure by which heat losses from electrical equipment can be identified. On the basis of this, measures can be devised to make such equipment more economic.

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Energy efficiency is high on the agenda

The proportion of companies' total operating costs represented by energy costs is rising, and this is causing them to intensify the search for areas in which there is useful potential for savings. Very often the focus is on evaluating energy-intensive areas of manufacturing, such as compressed air and ventilation equipment, steam generators and lighting.

This is where TÜV NORD Group's energy consultancy service comes in. It does more than simply evaluate individual components; systems are investigated from a holistic point of view and individual, tailor-made solutions are developed for the optimum use of energy, whether in industrial processes, in building services engineering or for buildings themselves.

The aim is to determine worthwhile potential energy savings which can realistically be implemented, for example in the course of implementing capital investment projects. The efficient utilisation of energy cuts operating costs, makes plant more economic and preserves the value of buildings and installations. Drawing up an overall energy balance also makes it easier to identify individual components that it would be worthwhile to replace, even within a production system with a generally high level of energy efficiency. In future, therefore, it will be possible to optimise energy costs even while fuel prices are rising.

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TÜV NORD CERT assists with CO_2 reduction projects all over the world

It is part of TÜV NORD CERT's contribution to climate protection: the company validates and verifies international greenhouse gas reduction projects and operates a certification body for Joint Implementation/Clean Development Mechanism (JI/CDM) that is officially recognised by the United Nations Framework Convention on Climate Change (UNFCCC).

The validation and verification of JI and CDM projects plays an important role in climate policy. Validation confirms whether a project complies with the JI/CDM requirements, in particular whether it really does promise the required savings of greenhouse gases. Verification is a regular check as to whether the expected reductions of emissions do actually occur.

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Saving costs with an energy management system audited as per DIN EN 16001

Manufacturing companies that use a lot of electricity can, under certain conditions, reduce their cost burden by applying the provisions of Sec. 41 of the Renewable Energy Sources Act (EEG), which deals with cases of hardship. One condition is that they should have an energy management system certified by an accredited body such as TÜV NORD CERT. Companies from a variety of different industries such as the iron and steel, chemicals, cement-making, food, timber and non-ferrous metal sectors can save substantial sums in this manner, while at the same time helping to protect the climate.

The initial audit and certification are carried out in accordance with the Directive on the voluntary environmental management and audit system EMAS (see also page 3), and in accordance with the environmental management standard DIN ISO 14001 in conjunction with the Federal Office of Economics and Export Control (BAFA) memorandum, or in accordance with the energy management standard DIN EN 16001.

The company to be certified first presents an inventory of all the types of energy it uses and all power-consuming plant and equipment, and prepares, either on its own or with external assistance, an analysis and evaluation of energy-saving measures.

The TÜV NORD CERT audit team then visits the company's premises and examines the particular circumstances prevailing there, and also checks the results of the company's own report on the current position. If this stage is completed successfully, it is followed by a walk-down of the plant in order to ensure that the documentation of the status quo corresponds to the real situation. After that, the certificate is issued.

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The criteria for certification are laid down by the Federal Office of Economics and Export Control (Bundesamt für Wirtschaft und Aussenkontrolle - BAFA): all the sources of energy used and all power-consuming plant and equipment are inventorised and analysed, and potential savings evaluated.

Emission values at the focus of debate

Increasing volumes of traffic mean higher CO_2 emissions. This makes it essential on the one hand to reduce the emissions of the technologies currently in use by optimising engines, and on the other to introduce new technologies. Amongst those under consideration are hydrogen technology and fuel cells.

In order to draw up guidelines for automobile manufacturers on how to declare the levels of harmful emissions and the fuel consumption of their cars, experts from TÜV NORD Mobilität's Institute for Vehicle Technology and Mobility are investigating the fuel consumption of vehicles actually in service and on the road. For commercial vehicles they are developing a measuring procedure by which to determine levels of harmful emissions in traffic. TÜV NORD Group mobility specialists investigate consumption and emission values at exhaust emissions testing stations on behalf of vehicle manufacturers, importers and exporters, in order to determine whether they conform to a variety of different emission standards.

Lower pollution and consumption despite ever more powerful engines are quality criteria that may decide how successful a particular marque of vehicle is. The automotive market is changing faster than ever. Product life cycles are becoming shorter, consumers more demanding and competition more intense. TÜV NORD Group's broad range of competences is demonstrated by its over 3.2 million customer contacts every year. All of these factors flow into the debate on alternative forms of energy and their applications; because new ecological and energy policy requirements demand new solutions. Hydrogen could make an essential contribution to the energy mix of the future, as could solar and fuel cell technology. Services to assist in the planning of component and system design are just as much in demand as safety analyses and finally vehicle type approval.

Road safety and environmental protection are objectives pursued by the state through measures such as the general inspection that vehicles have to undergo at regular intervals. As a rule, a car has to be put through a general inspection every two years, during which TÜV NORD Mobilität's experts examine the brakes, lights and other safety-relevant systems, while also ensuring that there are no leaks from pipe joints or from the oil sump. The investigation of the car's engine management and exhaust emission control systems during the general inspection is concerned not only with safety but also with environmental protection. Excessive emissions of pollutants may, for example, indicate a defect which is causing the vehicle to consume an excessive amount of fuel.

TÜV NORD Group offers vehicle manufacturers and component suppliers comprehensive consultancy, testing and certification services in the field of mobile applications of hydrogen. Thanks to the networking of its expertise, TÜV NORD Industrial Consultancy is a competent partner for all matters relating to the production, storage, transportation and utilisation of hydrogen.

Exhaust gas measurement with a mobile testing unit

The law requires all vehicles with petrol or diesel engines to be subjected to a regular investigation of their exhaust emissions as part of the general inspection. TÜV NORD Mobilität staff examine all components of the carburettor, engine and exhaust systems, at first for obvious defects and to determine whether they correspond to the vehicle manufacturer's specifications. Then the mobility consultants connect the vehicle's diagnostic interface to the electronic exhaust testing equipment, in order to determine whether certain defects are present which the system is programmed to detect and to run through a checklist of tests of the exhaust emission control system. In many cases, the final step is to measure harmful emissions, in order to ensure that the legal limit values are complied with. The technology required for this has been improved by TÜV NORD Group, and is also available for rail vehicles.

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Comparing emission and consumption figures

TÜV NORD Mobilität's Institute for Vehicle Technology and Mobility (IFM) investigates the exhaust and consumption values of passenger cars on behalf of the Federal Environment Agency. This so-called field monitoring compares the details of CO_2 emissions and fuel consumption provided by manufacturers with the values actually achieved on the road. In addition to the mass and rolling resistance of the vehicle, the IFM technical experts also investigate the impact on fuel consumption of additional consumers such as the radio and the air-conditioning and lighting systems. In the case of one type of vehicle, the investigations showed that various test vehicles consumed between 4.3 and 17 per cent more fuel than the vehicle supplied by the manufacturer for type testing.

The aim of the investigation is to develop uniform guidelines for type testing, so that the information provided by the manufacturers can be compared objectively. The exhaust emissions test on the test rig that is currently prescribed for commercial vehicles is not able to provide CO_2 emission values that correspond to real practice. The IFM is therefore currently carrying out a research and development project for the Federal Environment Agency, with a view to developing and assessing possible procedures for determining the CO_2 emissions of commercial vehicles, and investigating them for applicability.

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Future mobility with electric drive

What climate-friendly alternatives are there to diesel or petrol for powering motor cars? In addition to the mobile application of hydrogen and fuel cells, the prospects for electrically driven vehicles are also good. But the application of this technology in vehicles requires a lot of know-how of a kind that lay people might not expect; because the cells of the accumulators that store the electricity have to be cooled, and preferably all cells of a block to a uniform extent, so that they will continue to work for as long as possible.

This may sound simple, but in fact it is a complex problem that specialists at TÜV NORD EnSys Hannover are trying to solve. The process engineers, working on behalf of vehicle developers, are engaged in simulating flows in accumulator arrays and calculating temperatures in order ultimately to be able to suggest improvements.

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If we're not to be up to our necks in water...

Reports of disasters seem to follow one upon another at ever shorter intervals, and they have given a new urgency to flood protection. It is up to everyone, and not only the job of the state, to take precautions. There is great uncertainty; expert services are in great demand.

Scientific investigations show that higher quantities of precipitation are to be expected in future. This will lead to more flooding. A new law on precautionary flood protection was passed in 2005, with the aim of getting the country better prepared for such contingencies.

Under this new act, state authorities are obliged to designate flood areas and flood-endangered areas and to promulgate appropriate regulations to protect them.

Although flood protection is basically the responsibility of government and of water boards and dyke authorities, the operators and owners of buildings and technical installations are now also expressly obliged to take protective and precautionary measures against flooding and to keep damage to a minimum. This makes a substantial contribution to damage limitation and can serve as a good argument to put to insurance companies, who often refuse insurance cover in areas that are threatened by flooding.

Because it is not possible to provide rivers with permanent dykes over their whole length, mobile systems are also in demand. For some time now the sandbag has faced competition from devices such as tubular systems, interlocking mesh modules and mobile walls.

Obligations on operators and owners

The environmental protection experts from TÜV NORD Umweltschutz are specialists in performing risk analyses and recommending appropriate precautionary measures. These may cover anything from the design of buildings and their fitting out with technology adapted to possible flood situations to the protection of production plant and the provision of mobile flood barriers, together with the organisational planning required to ensure they can be put into place.
The aim is to draw upon TÜV NORD's many years of experience in advising industrial and commercial customers in order to minimise risks and provide facility operators and owners with a flood protection certificate. Firstly a site assessment is made, to determine and describe the current situation. On the basis of this, initial recommendations for action are drawn up. The adoption of comprehensive measures will reduce downtimes and limit consequential losses. In the event of an actual emergency, TÜV NORD experts provide external advice to crisis teams, including on questions of controlled plant shut-downs, the systematic inspection of facilities for damage and above all how to get them back into operation quickly.

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