

Start of a new era

Audi is the first company to opt for completely carbon-free rail freight transport.

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Totally sustainable

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Time is running out

Climate change is a fact that we have to accept. Leading scientists are convinced that although man-made global warming cannot be prevented, it can nevertheless be kept within limits. Two degrees

Celsius – that is the magic figure that must not be exceeded if the consequences of the greenhouse effect are to remain within our control. In this issue, Professor Hans Joachim Schellnhuber, Director of Potsdam Institute for Climate Impact Research and member of the International Panel on Climate Change, explains what has to be done – and what could happen if we do not take action.

The transport sector is faced with a particular responsibility as its share of CO₂ emissions accounts for roughly a quarter of total emissions in the EU – and the figure is rising. Accordingly, it has to exploit all potential for reducing emissions, despite growing traffic volumes. Rail will play a key role in that respect.

Deutsche Bahn recognised its responsibility years ago and has reduced its specific CO₂ emissions by more than 40 per cent since 1990. By the year 2020, we plan to reduce that level by a further 20 per cent relative to the 2006 figure. This will be achieved by numerous different measures, ranging from the development of an online tool to the ecological optimisation of transport chains, designing intelligent combinations of different transport modes and teaching train drivers how to save energy.

But we do not want to improve only our own ecological performance. The introduction of carbon-free rail freight transport will also help our customers reduce their own carbon footprints. Audi is the first business enterprise to use our Eco Plus product for a large part of its automobile transports and other companies have already followed suit. One thing is clear: in the battle against climate change there is no time for procrastination. We know what has to be done – the time has now come to do it.

Sincerely,

Karsten Sachsenröder
Member of the Management Board
DB Schenker Rail

railways special

Green Logistics

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Accepting responsibility

“Knownled responsibi

ge means lity.”



Prof. Dr. Hans Joachim Schellnhuber,
Director of Potsdam Institute for Climate Impact Research (PIK)



Climate change - learning from our mistakes?

Prof. Hans Joachim Schellnhuber, Director of Potsdam Institute for Climate Impact Research (PIK) and Member of the IPCC, explains the emission reduction measures that can be taken to prevent the global climate from tipping.

4,9 million barrels – that, according to the latest estimates, is the quantity of oil that escaped into the Gulf of Mexico following the explosion on the Deepwater Horizon oil rig on 20 April 2010. To begin with, both the rig operators and the politicians remained paralysed when confronted with the consequences of their actions. There were no contingency plans for dealing with a disaster on that scale – the extent of what could potentially happen had obviously been defined within the bounds of what could be controlled.

However, there had indeed been precedents in the past – such as the Ixtoc I, an exploratory well drilled by the Mexican state oil company, Petróleos Mexicanos. In 1979, its so-called “blowout preventer” had also failed to live up to its name. The rig caught fire and sank. Before the leak could be sealed, a total of 3.3 million barrels of oil had escaped. However, no one learned their lesson from the incident: instead, the potential for healthy risk assess-

ment simply trickled away into the black and golden sands of Lethe. What remained, was the irresponsible principle of hope.

But knowledge means responsibility. This also applies – in fact it applies particularly – in respect of our global climate system. Since publication of the IPCC Assessment Reports at the latest, the findings on global climate have challenged everyone – apart from those who deliberately decide to look the other way – to consider the moral acceptability of their actions. However, we have hardly lived up to the standards we have set ourselves. Our reluctance to face the truth and the slow pace of political action are unfortunately diametrically opposed to the speed at which climate change is progressing: as things currently stand, the self-imposed obligations to reduce emissions undertaken by some countries as part of the Copenhagen Accord would result in global warming which leads to an average temperature that is between three and four degrees Celsius above the pre-industrial level. In the meantime, there are increasing scientific indicators

Hans Joachim Schellnhuber is Director of Potsdam Institute for Climate Impact Research (PIK), Professor of Theoretical Physics at Potsdam University and a Member of the International Panel on Climate Change (IPCC). As an active member of a number of German and international bodies, he advises politicians on environmental and development issues. He is a member of the "Energy and Climate Change" expert group set up by President of the EU Commission José Manuel Barroso and was the Senior Scientific Advisor to the Federal German government in matters of climate change and international climate policies during the G8 and German Presidency of the EU Council in the year 2007.

that the consequences of global warming will be uncontrollable if the average global temperature rises by much more than two degrees Celsius: any further increase could actually cause the so-called climate tipping points to begin to topple and then change finally and irreversibly into a different state.

One example of a tipping point is the Greenland ice sheet, which contains enough water to cause world sea levels to rise by up to seven metres. The past few years have seen a sharp increase in the loss of ice, caused by glaciers flowing into the sea and increasing glacier melting in summer. As a result, the ice sheet – which is up to three kilometres thick in places – has lost height. This, in turn, means that its surface has sunk into warmer air layers and consequently melts even faster. The models available today do not allow us to say when exactly we shall have passed the tipping point for destruction of the ice sheet, or whether we have already done so. Even if global warming were to remain below two degrees Celsius, the ice sheet could still melt; if the temperature increases by more than four degrees, most experts expect it to do so. If that critical level is exceeded, this relict from the ice age, which has remained stable for 12,000 years, could disappear within a few centuries.

The Amazon rainforest is one of the Achilles heels of the planet. As the world's largest tropical primeval forest, it plays a crucial role as a carbon sink, effectively removing carbon dioxide from the atmosphere. Although parts of the rainforest in the south and west of the Amazon basin have meanwhile recovered from the consequences of a drought in 2005, the drought showed that if the forest suffers from an extreme dry spell, it actually becomes a source of carbon dioxide. As a result of global warming, such extreme dry seasons could become the norm in future. Before the end of this century, up to 70 per cent of the rainforest could be replaced by bush or grassland, or by seasonal forest which has adapted to drier conditions. As the rainforest cycles of storing and releasing water into the atmosphere are responsi-

ble for high humidity levels and rainfall, forest decline, once it started, could become a self-reinforcing process.

While the forecasts and warnings of climate experts may occasionally be beyond the bounds of human imagination, the extent of the potential consequences must on no account lead to a loss of reality. Man-made climate change can still be steered into controllable channels by human hand. However, this means that the remaining quantities of carbon emissions have to be fairly distributed to allow us to keep global warming to a maximum of 2° Celsius compared with the pre-industrial level. The negotiations in Copenhagen and afterwards have shown that unless the aspect of fairness is duly implemented in practice, there will be no global treaty.

The simplest method for fair apportionment of the burdens is on a per capita basis, which postulates that each individual has the right to generate the same quantity of carbon emissions. These per-capita rights could then be accumulated and converted into national "budgets" – i.e. entitlement to the remaining limited space in the atmosphere for the deposit of greenhouse gases. As per-capita emissions vary greatly from country to country, an emissions trading system which is designed on a global scale is essential in order to enable the necessary adjustment process in the industrialised countries and simultaneously ensure the flow of sufficient monetary funds to promote climate-friendly development in developing and newly industrialised countries.

However, effective climate protection has to act on several different levels. In addition to developments in society and consumer awareness, innovations in the field of technology in particular could enable the transformation to a carbon-neutral world in time to avert disaster. Examples of such innovations include projects for sustainable development, such as a "plus-energy house" or the "Super Smart Grid", an integrated grid of renewable energies between Europe and North Africa. Alliances between countries which take climate protection seriously are urgently required in order to promote such developments at global level.

In that respect, business enterprises are faced with enormous responsibility for the future. The transport sector in particular plays a central role: at the moment, passenger and freight transport accounts for approx. one quarter of the total EU greenhouse gas emissions. In view of growing earning capacities in some individual countries and the trend towards suburbanisation, these figures are expected to rise. The worldwide trend is similar – in Asia alone, carbon dioxide emissions are expected to treble as a result of increasing private motorised traffic. There is accordingly vast and diverse potential for active climate protection. The development of a more efficient rail network – in connection with a number of other infrastructure innovations – would allow us to cope with the steadily increasing volumes of passenger and freight traffic without straying from our target of becoming a low-emission society. Such concepts have to be integrated swiftly and courageously.

The human race obviously failed to learn its lesson from the oil disaster of 1979. As far as the world's climate system is concerned, we cannot afford to make mistakes in the first place. If we opt for passivity, all that remains is to hope that the climate scientists are wrong and that they have overlooked some fundamental mechanism of climate change that will grant us more time and scope for action. However, to bank on that possibility would be completely irresponsible: there is simply too much at stake for us to take a chance on chance. ■

Two degrees maximum

Clear and binding objectives are essential for effective climate protection. National and international governments have to join forces with industry.

It has meanwhile been recognised all over the world that the consequences of man-made climate change pose a severe threat to the planet. Over the past 150 years, industrialisation has led to a drastic increase in the emission of greenhouse gases, especially carbon dioxide. Unless appropriate counteraction is taken, the average temperature on Planet Earth is expected to rise by between 1.4 and 5.8 degrees Celsius. The ecological, social and economic consequences would be disastrous: melting glaciers, rising sea levels, flooding and an increasing number of natural disasters. In its 4th Assessment Report, the Intergovernmental Panel on Climate Change IPCC claims that between 20 and 30 per cent of all species of fauna and flora are faced with a higher risk of extinction if global temperatures increase by between 2 and 3 degrees. The Panel also expects to see an increase in the occurrence of extreme meteorological events. A maximum rise of 2 degrees in the average global temperature relative to the pre-industrial level is regarded as the upper limit which must not be exceeded; the consequences of any global warming over and above that figure would be beyond our control.

The first official agreement aimed at reducing greenhouse gas emissions and global warming dates back to 1992, when a large number of countries signed a Framework Convention at the United Nations Conference of Environment and Development.

Five years later, binding targets were agreed at the Kyoto Summit: as a result, the industrialised nations were obliged to reduce their emissions by five per cent between 2008 and 2012, based on the 1990 figure. In the EU, the burdens of doing so were distributed amongst the Member States, with Germany undertaking to achieve a 21 per cent reduction.

At the last summit held in Bonn in May 2010, the competent ministers of 45 countries met for the “Petersberg Climate Dialogue”, where they again endorsed the importance of climate protection and the two-degree limit for global warming. The next major summit will be the Climate Conference to be held in Mexico at the end of 2010: the agenda will include the specification of binding international climate protection and emission targets for the period after 2012.

Germany regards itself as a pioneer in matters of climate protection policies. If the EU Member States agree to reduce greenhouse gas emissions by 30 per cent by the year 2020 relative to

1990, the German government has promised to reduce emissions by 40 per cent over that same period. The government’s “Integrated Energy and Environment Programme” is intended to enable achievement of that target. In addition to reducing greenhouse gas emissions by 40 per cent, the programme aims to raise the share of renewable energy to at least 30 per cent of total current generation, to 14 per cent of heat generation and also to promote biofuels.

Hand in hand with industry

However, responsibility for climate protection is not solely in the hands of the politicians. Leading Germany industrialists support the German government and established the alliance “2° – German CEOs for Climate Protection” back in 2007.

The initiative was the brainchild of Dr. Michael Otto, CEO of the Otto Group, and the CEO of Deutsche Bahn was one of the eight founder members. The aim is to reduce greenhouse gas emissions in a concerted effort between politicians and industry in order to achieve the two degrees upper limit. The members endorse that objective by means of their business management concepts and with the help of technological innovations. They also speak up for their own beliefs in the public debate and help to keep the topic of climate protection in the focus of society.

And finally, the alliance supports the government in the ongoing development of German and European climate protection strategies and global emissions trading.

Deutsche Bahn also supports joint endeavours to protect the climate as a member of the Community of European Railways and Infrastructure Companies (CER). For example, CER aims to achieve a 30 per cent reduction in specific CO2 emissions by 2020 (relative to 1990) and thus support the climate protection targets of the EU. Various measures are to be undertaken to consolidate the position of railway as an extremely climate-friendly transport mode, such as fleet modernisation, systems for feeding brake energy back into the traction current grid and the promotion of energy-saving driving patterns. ■

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2°

Experts predict disastrous consequences if the average temperature on the planet rises by more than degrees compared with the pre-industrial level.



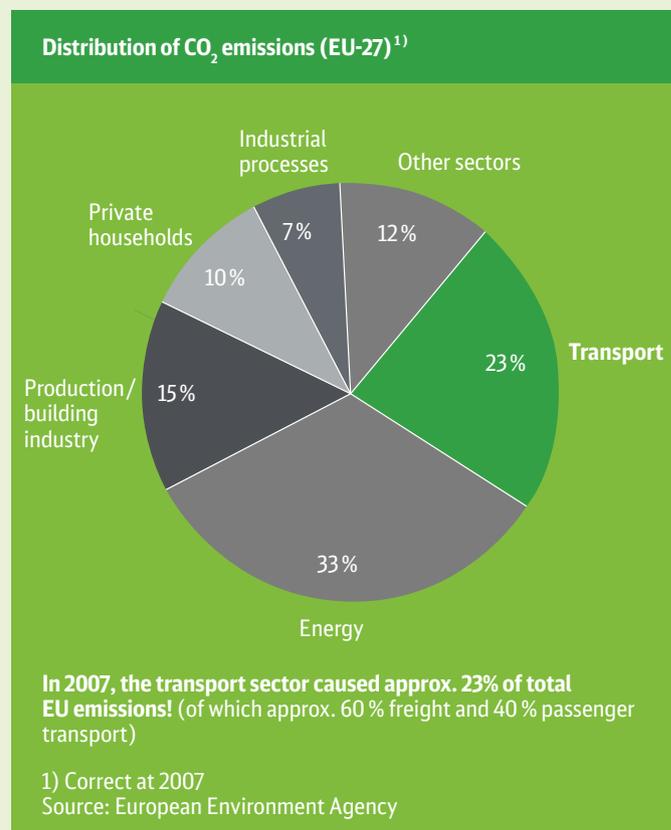
Pioneer in environment protection

The transport sector is one of the primary emitters of CO₂. Deutsche Bahn is aware of its responsibility and has initiated numerous programmes and measures to make its transport services more environment friendly.



Photo: Salajeau/Shutterstock

Compared with car and air travel, rail is the most environment friendly transport mode. A passenger travelling by long-distance train causes emissions of 45 grams of CO₂ per person and kilometre. If the same person opted to use his own car and travel alone, the emissions would be three times as high, or even four times as high if he travelled by plane. The ecological advantage of rail is even more apparent in the freight transport sector: rail freight generates 23 grams of greenhouse gas per tonne-kilometre, compared with 87 for road haulage and a level of 795 grams for air freight.



Accepting responsibility

Deutsche Bahn has already been making proactive efforts to improve its carbon footprint for years, because it realises that further measures have to be implemented in order to achieve effective climate protection. Man-made global warming is one of the most dramatic challenges facing us today. The International Panel on Climate Change estimates that the average temperature on our planet has already risen by 0.75 degrees Celsius since 1905 and expects that trend to continue over the next few years. If the average temperature rises by more than around two degrees Celsius relative to the pre-industrialisation level, experts predict drastic consequences: the Greenland ice sheet will melt, sea levels will rise by several metres and extreme meteorological incidents will become more frequent.

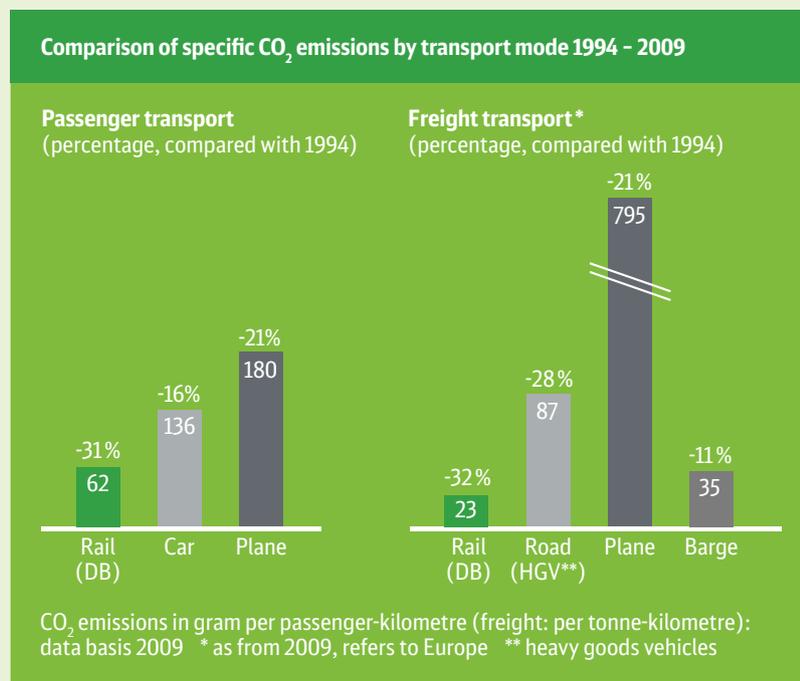
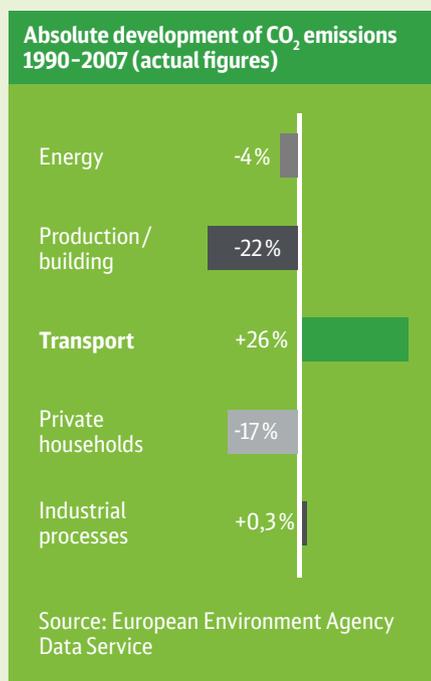
The transport sector is one of the main sources of CO₂. In 2008, transport accounted for a share of 23 per cent in the European Union, surpassed only by the energy industry, which was responsible for roughly one third of emissions. But whereas absolute emissions by most other sectors have decreased in recent years, emissions by transport have increased substantially – by almost a quarter between 1999 and 2008. In view of the ongoing trend towards the international division of labour, this increase is likely to continue over the coming years.

Accordingly, the transport industry has a special responsibility for reducing its emissions of greenhouse gases – an obligation which applies in particular to the leading players in this sector, such as Deutsche Bahn, who provide the greater part of all transport services.

Sustainability as a corporate principle

Deutsche Bahn recognised this responsibility years ago and has meanwhile evolved into a pioneer in matters of environment protection. The basis for all its activities has been the firm integration of sustainability as a core element of the Group's mission statement and corporate strategy. In its endeavours to become the world's leading provider of mobility and logistics services, the DB Group aims to deliver an economically and ecologically intelligent combination of the different transport modes.

Since 1990, DB has succeeded in reducing the specific CO₂ emissions of rail transport – i.e. emissions per passenger and kilometre / per tonne of freight and kilometre – by more than 40 per cent. The next stage will include all the transport modes: the target of the DB "Climate Protection Programme 2020" is to reduce specific CO₂ emissions by the entire DB Group, in other words by all means of transport on rail, road, in the air and on water, by 20 per





cent by the year 2020 relative to the 2006 figure.

This will call for a whole number of carefully coordinated measures, all embedded in a strategy that encompasses the entire DB Group. Measures geared to operations and production will improve energy efficiency, whilst opting for new ways of energy procurement will reduce dependency on fossil fuels.

DB Schenker plays a central role in achieving the targets of the Climate Protection Programme 2020. The DB Transportation and Logistics Division includes all transport modes in its portfolio: rail freight, road haulage, aviation and shipping. Clever combinations of these different modes are one of the keys to avoiding greenhouse gases. DB is banking on the support of its customers in that respect, as acceptance for more environment friendly transport services is steadily growing: “The issue of climate protection has become of enormous significance in the transport industry and is increasingly becoming an important criterion for contract award,” comments Dr. Karl-Friedrich Rausch, Management Board Member for Transportation and Logistics at DB Mobility Logistics AG. “We do not see cost effectiveness and environment protection as a contradiction in terms. Companies which minimise their impact on resource are already paying attention to energy efficiency and that is something that pays – both for the environment and for our customers.”

Beacons of environment friendly freight transport

DB Schenker has focused its entire climate protection activities in four so-called lighthouse projects: Green Logistics Networks, Green Road, Green Terminals and Green Products.

The “Green Logistics Networks” project investigates intelligent combinations of the transport modes of freight train, truck, ship and aeroplane. The objective is to offer customers transport solutions which minimise CO₂ emissions but simultaneously take into account other criteria such as price, speed, flexibility and reliability. To achieve these objectives, the company has to implement steps that begin long before the actual transport; on request, the environment experts at DB Schenker can accordingly draw up detailed carbon footprint analyses or advise customers on how to design the optimum transport chain in terms of CO₂ emissions.

An intelligent modal split can combine the flexibility of road haulage with the cost and energy efficiency of rail – for instance, by using the combined transport services of DB Intermodal: the main haul of the journey is executed on environment friendly rail, the pre- and post-rail segments are handled by truck. DB Intermodal trains connect all the major economic centres in Europe and also link the north and west range ports to the European hinterland. Compared with pure truck transport, this relieves the atmosphere of roughly one million tonnes of CO₂ per annum.

The Europe-wide DB Schenker Railport network also promotes climate protection, as it provides access to the rail network even for business enterprises which do not have their own rail sidings. The Railports serve as collection and distribution points and enable even freight which is not suitable for containerised transport to be carried by rail over long distances.

DB SCHENKER*skybridge* offers a combination of ocean and air freight for transports between Europe, Asia and North America. Compared with pure air freight, this improves the carbon footprint by up to 50 per cent.

EcoTransIT World, an emissions calculation program developed by Deutsche Bahn in cooperation with the International Union of Railways UIC and six other rail freight operators, allows customers to make a realistic assessment of the environmental impact of even complex intermodal and international transport chains. The online tool can be used to calculate the energy consumption as well as the emissions of CO₂ and other pollutants of any given transport. Further information about EcoTransIT World is contained in the article on page 44.

Accepting responsibility

The “Green Road” project is concerned with reducing the CO₂ emissions of European road haulage and a whole bundle of measures are planned with that aim in mind. For instance, all truck drivers – not only DB employees, but also drivers working for DB subcontractors – are to be given training in energy-saving driving patterns. Speeds will be reduced on certain routes to save fuel. Hubs will be used to bundle Europe-wide transports, avoiding no-load runs and improving capacity utilisation. DB Schenker is gradually replacing its old trucks by more modern, Euro 5-compliant vehicles with better energy efficiency. The company is currently testing improved fuel mixtures for future use.

And finally, the DB Schenker “Green Terminals” project integrates the subject of environment protection in the company’s own day-to-day business activities. This project is intended to help avoid carbon emissions at stationary facilities such as terminals, depots and warehouses. This not only means improving energy efficiency at existing facilities, but investigating and implementing sustainable construction methods for new buildings and conversion projects. This involves, for example, the installation of photovoltaic and solar energy systems, natural cooling systems, geothermal plant, energy-efficient lighting, thermal



insulation and the use of rainwater. However, DB Schenker is not relying solely on technology, but first and foremost on its human resources. The employees at nearly all European national companies receive training in environment protection and the company's internal media provide regular information about alternative work methods with minimum environment impact. Moreover, the company's resource management strategy is geared to the avoidance of waste. At DB Schenker locations in Germany, the target is to have 100 per cent of all waste paper recycled.

DB Schenker also develops green products which help customers improve their carbon footprints. "Eco Plus" is a groundbreaking development in the transport and logistics industry as it is the first product which allows firms to opt for completely carbon-free transports. A full article about Eco Plus begins on page 20.

Freight trains take the strain off the atmosphere

Rail plays a significant role in enabling environment friendly freight transport. In 2009, there were more than 4,700 DB Schenker Rail freight trains in operation every day, avoiding the need for around 84,000 truck transports and thus preventing the occurrence of approx. 19,400 tonnes of CO₂. This impressive figure is also largely due to the high share of electric traction: 96 per cent of traffic performance is meanwhile handled by electric locomotives. DB Schenker Rail also pays due attention to the origin of the current used to power its trains. At present, 18.5 per cent of traction current is obtained from renewable energy sources and there are plans to increase that proportion in future. But even so, rail is already the transport mode with the highest share of renewable energy.

DB Schenker Rail makes substantial efforts to improve the environment friendliness its rolling stock, for instance, by retrofitting older diesel locomotives and traction units with modern, low-pollutant engines. Beginning at the end of July 2008, DB Schenker Rail successfully conducted a two-year test programme on the cleanest diesel locomotive in the world. In the electric traction sector, DB Schenker Rail applies three-phase current technology which is used to recover energy from braking processes and feed it back into the traction current grid. Read more about the environment friendly technology of DB Schenker Rail in the article on page 32.

To ensure the exploitation of all environment and climate protection potential, it is important to consider not only organisational and technological measures, but also to boost the skills of the train drivers. Paying attention to energy aspects when driving can save five per cent energy in electric traction and four in diesel operations. As soon as a train has reached its target speed, it can coast over long distances without losing much speed. This is just one of the many things that DB Schenker Rail train drivers learn at the Energy Saving courses that were launched in 2005.

The invention of the TEMA-Box allows train drivers to check the efficiency of their own driving patterns at all times. The box permanently measures energy consumption and displays the status in the driver's cab, so that the driver can respond immediately. This data is also transmitted at five-minute intervals by GSM radio to DB Energy, where it is collected and analysed. DB

Schenker Rail is the first rail freight operator in Europe to introduce the remote monitoring of current consumption.

In addition to CO₂, nitrogen oxides and soot particulates, noise is another harmful emission. The DB Group does a great deal to protect lineside residents and is planning to halve the level of transport-induced noise by 2020 compared with 2000. This will require a package of measures affecting rolling stock, tracks and lineside installations. Please turn to page 38 for detailed information about the subject of noise abatement.

Service providers and consultants

DB Schenker has concentrated its technical expertise and consultancy services in all matters relating to environment protection at an Environmental Competence Centre, where a team of experts work on an intermodal basis and support environmental issues throughout the entire DB Group. The Environmental Competence Centre is both an internal service provider and also acts as a consultant for third parties; according to the "13th Annual Third-Party Logistics Study", this makes DB Schenker one of the eight per cent of logistics companies which advise their customers on environment matters. The Environmental Competence Centre advises customers on how to optimise their transport chains and reduce CO₂ emissions. It calculates the carbon footprint of entire supply chain across all transport modes, giving customers an overview of the CO₂ emissions of their activities in the sectors of land transport, air and ocean freight as well as contract logistics. This carbon footprint then serves as the basis for eco-controlling and environment management systems.

In its capacity as internal service provider, the Environmental Competence Centre develops and monitors the DB Schenker climate protection targets. It supports implementation and marketing of the relevant measures and is responsible for certification processes.

This expertise in calculating carbon footprints is not only put to use on behalf of our customers, but also for the benefit of the company itself. In March 2008, the first figures were calculated for all worldwide CO₂ emissions in the sectors of land transport, air and ocean freight, contract logistics and by all operating facilities for the year 2007. As an external expert, the Institute of Applied Ecology in Berlin calculated the footprint using the ISO 14064-1 method, which was validated by Deloitte Cert. The second DB Schenker AG environmental report has meanwhile been published. Entitled "Environmental Performance Report 2009", it provides information about the carbon footprint, the environment activities and prospects for future action at the DB Schenker Logistics Business Unit. The findings are based on the analysis of approx. 1.5 million data items, which are updated annually. This has revealed that in 2009, transport services and stationary facilities emitted a total of 10.9 million tonnes of CO₂, roughly 40 per cent of which was caused by air freight, around 30 per cent by ocean freight and one fifth by land transport. ■

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A photograph of a white wind turbine with three blades, positioned in the center of a lush green field. The sky is a clear, bright blue. The text is overlaid on the image in a large, white, sans-serif font.

“I believe there is
alternative to the
in the climate sec



no
UN process
tor.”



Federal Chancellor Angela Merkel
at the Petersberg Climate Dialogue on 2 May 2010

Source: bundesregierung.de



Start of a new era

Thanks to Eco Plus, rail freight transports can now be offered as a carbon-free alternative. The car manufacturer Audi is the first customer to opt for this innovative product.

Green train: Eco Plus transports are operated using only power from renewable sources.



Rousing welcome at Potsdamer Platz in Berlin: a red carpet has been rolled out beside platform 1 of the underground regional station, which is crowded with journalists, photographers and camera teams, all eagerly awaiting the new arrival. Then, to the sound of dramatic music, a green locomotive rolls up to the platform, pulling a train carrying brand new Audi limousines.

Suddenly, flashlights explode everywhere. This enormous media turnout on 12 August 2010 is to celebrate no less occasion than the start of a new era in rail freight transport. This is the day on which DB Schenker Rail presents Eco Plus, the first product to offer completely carbon-free freight transports. On the platform, Dr. Karl-Friedrich Rausch, Member of the DB Mobility Logistics AG Management Board for Transportation and Logistics, is accompanied by Dr. Ernst-Hermann Krog, Head of Brand Logistics at AUDI AG, the first company to use Eco Plus. Every year, DB Schenker Rail carries approx. 150,000 Audi A3, A4, Q5 and TT vehicles from the parent plant in Ingolstadt to the North Sea port of Emden, where the cars are shipped to destinations all over the world. As from now, these transports – which account for a quarter of the total rail transport of Audi’s finished vehicles – will no longer generate any carbon dioxide. “We are delighted that Audi, one of our most important customers, was first to opt for carbon-free rail transport,” stated Rausch. “This is sure to be a landmark decision!”

EcoPlus avoids the generation of carbon right from the start

The transport sector is responsible for a growing share of greenhouse gas emissions worldwide, On launching Eco Plus, DB Schenker Rail shows how emissions can be reduced despite an increase in transport volumes. In contrast to other “green” transport products which offer compensation measures for the carbon emissions, Eco Plus transports avoid the generation of carbon right from the start.

This is how the system works: to begin with, the quantity of current required for the planned transports is calculated using the online tool “EcoTransIT World” (see article on p. 46). DB Schenker Rail then purchases the required electricity from renewable energy sources in Germany – at the moment this refers primarily to German hydro-electricity – through DB Energie GmbH, the Deutsche Bahn energy management company. “DB Energie purchases the carbon-free eco-electricity in the market and feeds it into the DB traction current grid, in addition to the existing share of renewable energy. At the last count, renewable energy made up a share of 18.5 per cent and DB will continue to raise that proportion, quite apart from its new carbon-free option. The target for 2020 is a share of 30 per cent. Eco Plus promotes the expansion of renewable energies in two different ways: the additional demand for eco-electricity creates incentive for expanding production capacities, and DB uses ten per cent of the proceeds directly to finance the construction of new plant for the production of renewable energy. “A key element of the Eco Plus concept is that the carbon savings are allocated exclusively to the customer that orders carbon-free transport,” explains Peter Westenberger, Head of Sustainability and Environmental Information at the DB Environment Centre. “This avoids double counting.” For just a small surcharge, the customer can make a significant improvement of its carbon footprint. A certificate is issued for the transports which the customer can use in its corporate communications. The tech-



5.250 Tonnen CO₂

By opting for Eco Plus, Audi plans to avoid 5250 tonnes of CO₂ per annum. This means that all car transports between Ingolstadt and Emden are now carbon-free.

Der Aufenthalt auf den Ladeebenen
während der Fahrt ist verboten





Landmark decision:
Dr. Ernst-Hermann Krog
(l) and Dr. Karl-Friedrich
Rausch at the presenta-
tion of Eco Plus



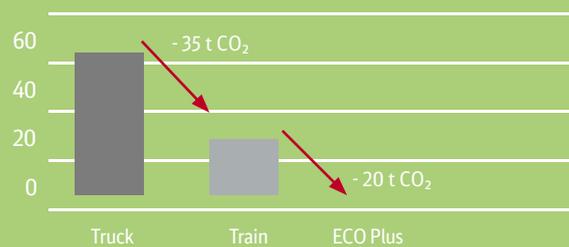
Photo: DB AG/Manuel Kranert

nical supervisory authority TÜV Süd, which verifies the calculation methods and practical procedures for ordering the eco-current and feeding it into the traction grid, confirms that the CO₂ has actually been avoided to the extent stated.

The quantifiable benefits of Eco Plus are highly impressive, as the example of a 1000-tonne train travelling from Hamburg to Munich clearly shows: a single trip with Eco Plus saves 20 tonnes of CO₂ compared with standard rail transport. Compared with road transport, the savings are as high as 55 tonnes.

Eco Plus completely avoids CO₂

CO₂ emissions in tonnes



Example: a 1000-tonne transport from Hamburg to Munich by truck emits 55 tonnes of CO₂. Standard rail transport reduces that figure to 20 tonnes, and transport with Eco Plus means that no greenhouse gas is generated at all.

But Audi thinks on a far grander scale: the carbon-free trains carrying finished vehicles run between Ingolstadt and Emden two or three times a day – a total of 625 times a year. Compared with standard rail transport, the Eco Plus transports for Audi relieve the atmosphere of more than 35 kilograms of CO₂ per transported automobile, amounting to a total of around 5250 tonnes per annum, which is equivalent to the emissions caused by the power consumption of almost 2200 four-person households.

Pioneer in the automotive industry

When it comes to the use of eco-power for freight transport, Audi plays a leading role in the automotive industry. “Carbon-free rail transport is a central element of our commitment to the environment and a highly interesting product for us,” explains Krog. “Customers expect an innovative premium manufacturer like Audi to pay due attention to sustainability and environment protection in all its processes – from the production stage, to use of the vehicle and all the way through to its ultimate recycling – and this also includes considering the ecological aspects of the company’s distribution chains.” For years, Audi has paid strict attention to the effective use of resources, far exceeding the legal requirements, with reference to the entire life cycle of an automobile. During the production process, for example, it plans to reduce the carbon emissions per vehicle to 30 per cent below the

1990 figure. In its logistics processes, Audi exploits all potential for avoiding transports and optimising capacity utilisation. Rail plays a central role in that respect: “Wherever possible, we opt for rail as a dependable ecological transport mode,” says Krog. In transports at the parent company in Ingolstadt, rail meanwhile accounts for a share of 70 per cent, one of the highest levels in automobile distribution. Large components such as engines, axles and gearboxes are also supplied to the production plants primarily by rail. One example is the high number of transports between Ingolstadt and the plant in Győr, Hungary: the car body shells and attachment parts make the 610-kilometre journey from the parent company in Bavaria to the assembly plant in closed double-deck wagons. The return transports bring back finished cars as well as engines for the entire range of models. Over the past twelve years, this has involved a total of around ten millions of kilometres by rail. If these transports had not been made by rail, they would have required more than 325,000 truck trips per annum, polluting the atmosphere with an additional 36,000 tonnes of CO₂.

Audi therefore regards the switch to carbon-free transports as the logical next step. “The decision to use Eco Plus is another major milestone in our environmental strategy,” explains Krog, “as it allows us to avoid emissions right from the start.”

Flexible options

However, the new product is not intended only for key accounts such as Audi. Eco Plus is extremely flexible and totally independent of the transport volume. Business enterprises can therefore order this carbon-free option even for very small quantities – whether for new or existing connections inside Germany. Over the medium term, DB Schenker Rail is planning to roll out Eco Plus throughout Europe.

In order to cope with growing demand, the company is already booking sufficient capacities of green energy in the electricity market, as it is convinced that the future belongs to products based on renewable energies. In June 2010, Eco Plus and bahn.corporate Umwelt-plus, the corresponding passenger transport product which enables companies to opt for carbon-free transport for all their business travel requirements, won second place in the UIC Sustainability Awards, which are presented by the International Union of Railways UIC every two years.

DB Schenker Rail and the DB Group are totally convinced that demand for climate-friendly transport products will increase. “To us, green logistics is not just an image factor, but also a competitive advantage,” concludes Rausch.

“Eco Plus consolidates and expands rail’s position as the most environment friendly transport mode.” ■

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The Audi logo, consisting of four interlocking rings, is positioned at the top of the page. The rings are rendered in a dark purple color with a metallic sheen and are set against a background of a purple and blue geometric pattern of intersecting lines.

Audi

Logistik

Facts and Prospects

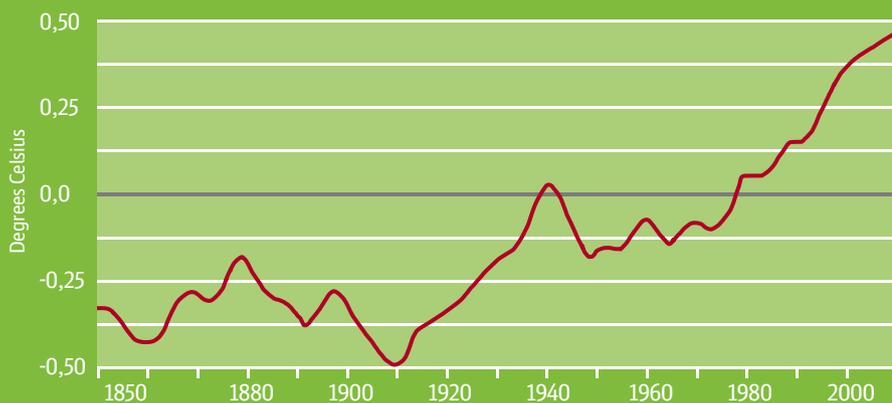
Climate change and climate protection at a glance

Experts already consider it a given that the global climate is influenced by man and have projected various scenarios that depict the future ecological, social and economic costs of climate change. A crucial factor for the scale of these consequences is whether and to what extent the emission of harmful gases can be reduced. One thing is clear: climate change cannot be reversed. However, international efforts can make it controllable. ■

Carbon emissions cause global warming

Natural climate factors cannot account for the rise in global temperature, because although solar and volcano activities cause the Earth's radiation budget to fluctuate, they do not raise it. Global warming, on the other hand, runs parallel to the increasing concentration of CO₂ in the atmosphere

Global temperature change



Concentration of CO₂ in the atmosphere



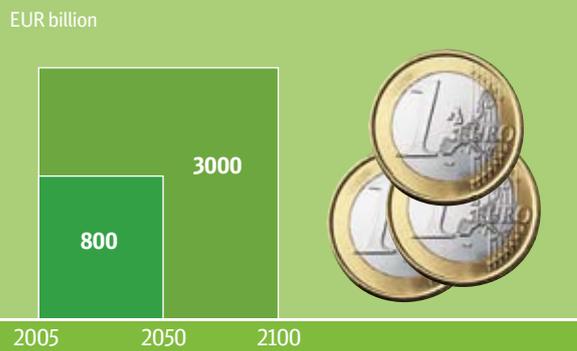
Source: IPCC 2007, Renewable Energy Agency

“The ice cover at the Arctic Ocean is shrinking faster than even pessimists expected. By summer 2007, it was only half the size it was in the 1960s.”

Source: Federal Ministry of the Environment, Climate Change in Germany, 2009

Climate change costs the German economy billions

Accumulated costs of climate damage

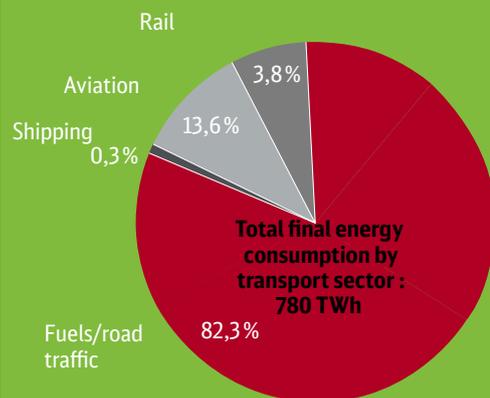


Source: DIW 2007, Renewable Energy Agency

“Deutsche Bahn supports the United Nations’ target of limiting global warming to two degrees”

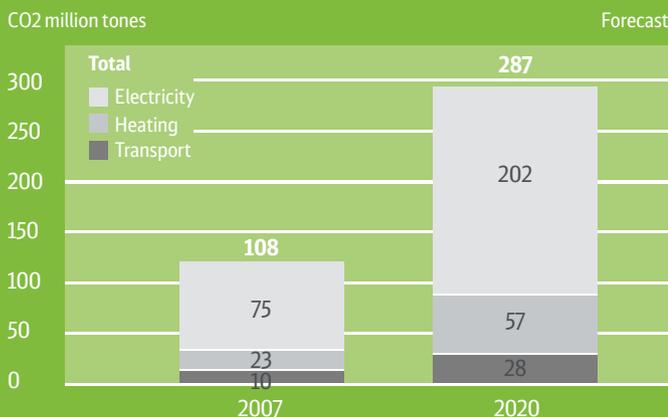
Deutsche Bahn CEO Dr. Rüdiger Grube

Energy consumption by transport sector



Source: Forecast for the industry (10/2009), Renewable Energy Agency, German Renewable Energy

Greenhouse gas emissions avoided by renewable energy



Source: Forecast for the industry (10/2009), Renewable Energy Agency, German Renewable Energy Federation

“During the 20th century, sea levels have risen by a global average of 17 centimetres, latterly at a rate of three millimetres per annum.”

Source: Federal Ministry of the Environment, Climate Change in Germany, 2009

“Our vision
one of carbo
transport.”

is n-free rail

Photo: Plainpicture, DB AG



Deutsche Bahn CEO Dr. Rüdiger Grube



Green fleet

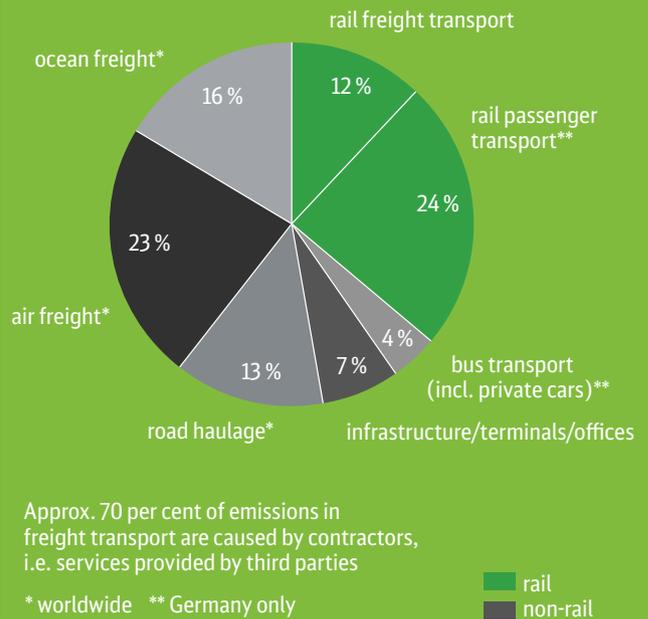
Modern technology and high energy efficiency make rail the most environment friendly transport mode. Numerous programmes ensure that we exploit that potential in full to increase our lead over other companies.



DB Schenker Rail train drivers are given instruction in energy-saving driving patterns. This can lead to savings of five per cent for electric locos and four per cent for diesel.

Absolute CO2 emissions by DB in 2009, in per cent

100 per cent = 19.13 million tonnes of CO2 (incl. upstream processes)



Modern technology and high energy efficiency make rail the most environment friendly transport mode. Numerous programmes ensure that we exploit that potential in full to increase our lead over other companies.

What exactly is it that makes rail the most environment friendly transport mode? One crucial factor is the technology that it uses. But even though something is already good, there is always room for improvement: Deutsche Bahn and DB Schenker Rail are constantly endeavouring to raise the energy efficiency of their fleets even further and to minimise emissions of CO₂, nitrogen oxides and particulates.

One of the main reasons why DB Schenker Rail, in particular, boasts such a good carbon footprint is the use of electric traction. In contrast to diesel locomotives, electric locos do not create any direct emissions of pollutants. DB Schenker Rail has already made great progress in that respect and 96 per cent of its total traffic performance is meanwhile handled with electric traction.

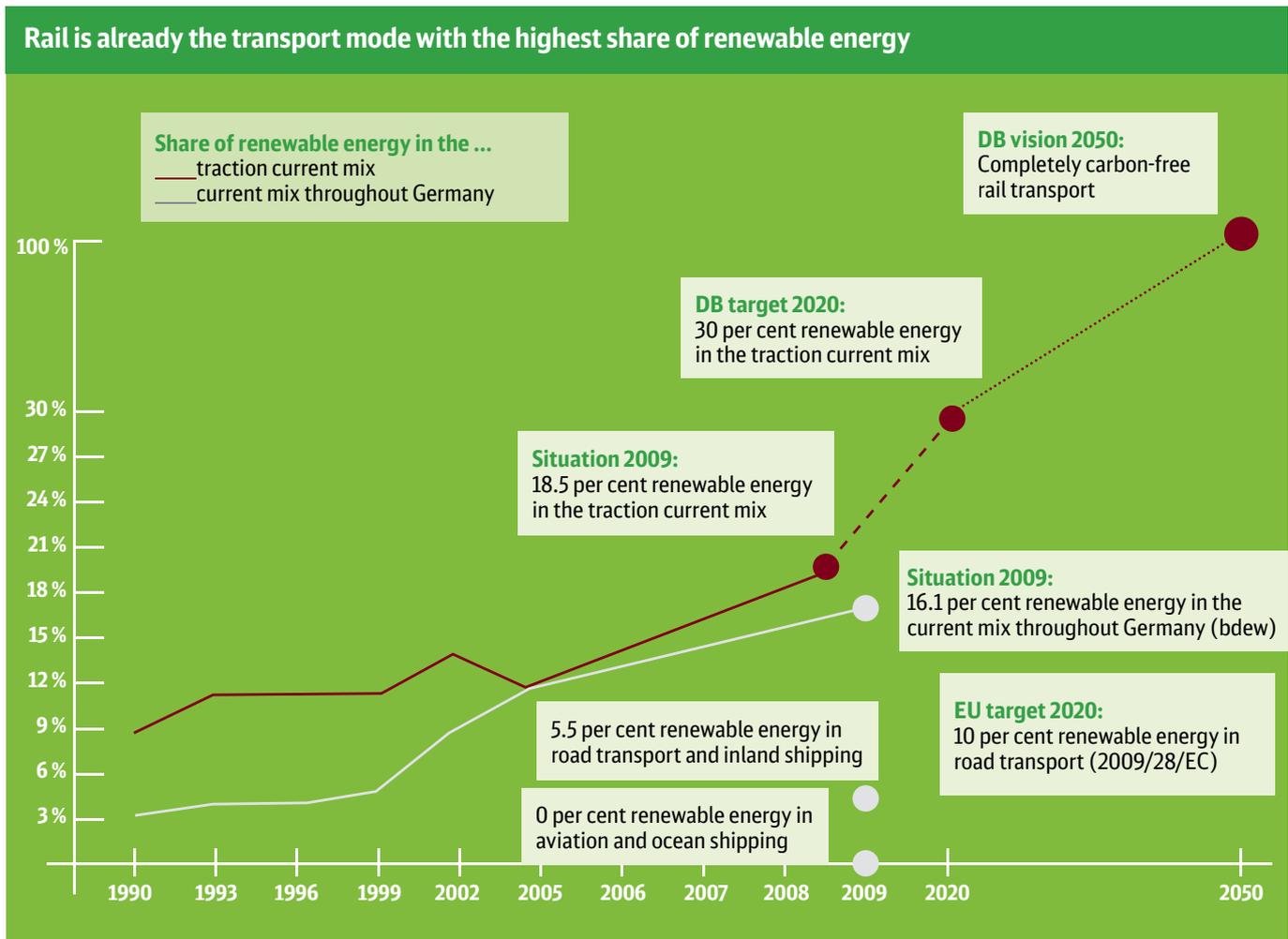
Use of renewable energy sources

Another key criterion for the carbon footprint is the source of the current that is used to power the trains. Renewable energy accounts for a share of 18.5 per cent of traction current, which means that rail already has the highest share of all transport modes. But Deutsche Bahn is determined to increase that lead: by the year 2020, it intends to raise the share of renewable energy in its traction current mix to 30 per cent. Its vision for 2050 is to offer rail operations that are completely carbon free.

However, good intentions alone are not enough, because current from renewable sources is not available in unlimited quantities. The capacities available for the generation of that current are limited. Moreover, the availability factor fluctuates severely: as the greater part of German eco-current comes from wind farms, power generation literally depends on the weather.

In order to meet its renewable energy requirements in future and acquire more experience of this erratic resource, Deutsche Bahn has signed a contract to purchase the output of an entire

Making innovative use of technologies



wind farm for the next 19 years. Each of the 20 wind turbines at Märkisch Linden wind farm near Neuruppin has a power rating of 1.5 megawatts and now generates electricity exclusively for Deutsche Bahn. The anticipated output is approx. 59 gigawatt-hours of electricity per annum, which will be fed into the DB Energy grid. Compared with the use of conventional electricity for railway operations, this will avoid up to 31,400 tonnes of CO₂ per annum.

The train as power station

Using eco-current is good – but increasing energy efficiency is even better. That is why Deutsche Bahn banks on modern technology that saves energy. Energy recovery is one interesting method of saving energy and works as follows: a locomotive or traction unit draws alternating current from the overhead line. Transformers and power converters change the alternating current into three-phase current for the traction motor that drives the locomotive to set the train in motion. When the train driver applies the brakes, the traction motor acts as a generator, convert-

ing braking energy into current that is fed back into the overhead line, where it can be used by other vehicles operating in the same overhead line section. In other words, the train itself acts as a power station. Roughly 2000 vehicles with three-phase current technology are already in service at Deutsche Bahn.

In passenger transport, the share of this „recycled“ energy amounts to approx. ten percent. The share is lower in the freight sector because freight trains have to rely more often on the compressed air brakes of the wagons, where this recovery technology does not work. Nevertheless, both these sectors play a key role in promoting the success of this technology and helping us to achieve our climate protection targets. In 2009, approx. 850 gigawatt-hours of braking energy were fed back into the traction current grid – an amount equivalent to the electricity consumption of a city with around 200,000 households.

Combating nitrogen oxides and particulates

The combustion of fossil fuels not only causes CO₂, but also leads to the emission of other pollutants. The harmful substanc-



Overhead line: the share of renewable energy in the traction current mix amounts to approx. 18.5 per cent. The target is to raise that share to 30 per cent by 2020.

es emitted by diesel engines include, in particular, nitrogen oxides, which are responsible for acid rain, smog and ozone, as well as soot particulates which, together with other substances, form what are known as „fine particulates“. Over the past few years, Germany has made impressive progress in combating air pollution and Deutsche Bahn played an important role in that process: between 1990 and 2009, DB reduced its nitrogen oxide emissions by 70 per cent. During that same period, the direct and indirect emissions of fine particulates were reduced by a total of 89 per cent; in 2009 alone, DB achieved a reduction of approx. 3.9 per cent.

These successes are due first and foremost to the electrification of railway lines. Although most of the electricity used in Germany comes from coal-fired power stations, the emissions caused by the generation of that electricity are still substantially lower than those of diesel engines. However, the ecological performance of the remaining diesel locomotives themselves is also improving, not least because DB Schenker Rail has fitted the greater part of its locomotives and traction units with new, low-pollution en-



Making innovative use of technologies

How does it work?



Braking energy recovery

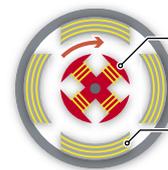
Deutsche Bahn saves energy by feeding braking energy back into the overhead lines. In 2007, this was enough to cover eight per cent of DB's total current requirements for railway operations. The system works as follows: a train draws alternating current from the overhead line. Transformers and power converters change the alternating current into three-phase current for the traction motor that powers the locomotive. When the driver brakes, the traction motor acts as a generator, converting braking energy into current that is fed back into the overhead line, where it can be used by other vehicles operating in the same overhead line section.

1 Braking train

Traction motor as generator



The magnetic fields of the rotating movement generate energy which is converted into electricity.



← Electric current is released.

The kinetic energy of the train continues to turn the **rotor** when the train brakes.

Induction loops convert magnetic energy into electricity.

engines: between 1998 and 2009, the company installed new engines in a total of 880 locomotives, i.e. 65 per cent of the entire DB fleet. This programme pursues a dual strategy: it satisfies the demand for a modern, environment friendly fleet without having to scrap vehicles which are still in good working order. As a result of this strategy, Deutsche Bahn is now responsible for only one per cent of the total diesel soot emissions of the entire transport sector.

Deutsche Bahn supports the development of technologies which make diesel drive systems even cleaner. Since the end of July 2008, for example, DB Schenker Rail has successfully tested the world's cleanest diesel locomotive. As part of the LOCEX project, (Locomotive with Clean Exhaust) engine manufacturer MTU has fitted a Class 294 shunting locomotive with an exhaust gas treatment system (combination of particulate filter and SCR catalytic converter). This technology, together with the injection of urea, has reduced emissions of nitrogen oxides and particulates, which are already below the limit values which will apply as from 2012 when exhaust gas stage III B enters into force.

The human factor

But it is not only technology that helps to save energy: the human factor also makes a crucial contribution. As part of an energy saving project at Deutsche Bahn, train drivers learn how careful driving patterns can help to reduce energy consumption. For example, allowing the train to coast over large distances once it has reached the prescribed maximum speed can save five per cent of energy in trains with electric traction and four per cent in the case of diesel traction. In other words, an ICE driver who pays attention to energy aspects can save 4000 kilowatt-hours of electricity – the equivalent of a four-person household – on the route between Munich and Hamburg. The matter is more complicated in the freight sector, where the train's running and rolling behaviour changes depending on the load and train length, causing sharp fluctuations in energy consumption. The train drivers therefore have to adapt their driving patterns to the individual circumstances of each journey. Nevertheless, considerable savings have already been achieved in the freight transport sector.

This can also be helped along by new technologies: many



driver's cabs have now been fitted with TEMA boxes which allow the driver to read the actual energy consumption at any time and adapt his driving style if necessary. More than that, DB Schenker Rail is the first European freight railway to enable remote monitoring of a train's energy consumption. The consumption data is transmitted by GSM to DB Energy for analysis. Each train driver regularly receives evaluation reports, providing feedback on his energy efficiency performance compared with his colleagues. Special „Save energy“ days, competitions and rewards for high savings are incentives for drivers to improve their performance.

The results speak for themselves: since 2002, energy-saving driving patterns have led to total savings of 310,000 tonnes of CO2 emissions in the Deutsche Bahn passenger and freight sectors.

The Deutsche Bahn carbon footprint

A look at the carbon footprint of the DB Group for 2009 shows that rail transport is responsible for almost seven million tonnes of CO2 emissions, i.e. 36 per cent total emissions by the DB Group. Two thirds of these emissions are caused by passenger transport,

one third by freight. These figures reflect the efforts made by DB in recent years: since 1990, the company has succeeded in reducing its specific CO2 emissions by approx. 30 per cent in the rail passenger sector and by an impressive 47 per cent in rail freight. But the figures also show that it is important to continue to make rail cleaner and even more efficient, as every single percentage of emission reductions helps to protect the climate. The Deutsche Bahn climate protection target and the strategies and programmes launched by DB Schenker Logistics and DB Schenker Rail ensure full exploitation of all potential. ■

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Heading into a quiet future

Deutsche Bahn is planning to halve the noise caused by rail traffic by 2020 by making more use of successful measures and developing new methods.

Noise measurements: despite increasing transport volumes, rail is to become quieter.



Whisper brakes: these innovative brake blocks are made of a composite material which does not roughen the wheels and therefore keeps noise to a minimum.

Noise is also an environmental emission: it is not only perceived as a nuisance, but in extreme cases can impair hearing and cause other damage to health over the long term. Transport plays a major role in the production of noise and there are considerable differences in the levels emitted by the individual transport modes. According to a survey conducted by the Federal Environment Agency, road traffic is the main source of noise and is considered a nuisance by 59 per cent of the population. Noise caused by neighbours came in second in the ranking of unwanted noise sources at 42 per cent, followed by aviation at 30 per cent. Fourth place went to railway traffic: 24 per cent of the people interviewed – in other words every fourth person – considered noise from rail traffic to be a nuisance. All the forecasts predict that transport volumes – and consequently also rail transport – will increase over the long term. Nevertheless, Deutsche Bahn has set itself the target of halving noise from rail traffic by the year 2020, compared with the 2000 level, despite steadily growing traffic volumes. A whole package of measures are to be implemented to achieve that target.

There are many causes for rail traffic noise. The principal source is when the wheels roll over the tracks. Other noise is also emitted by the drive units of engines and ventilators, and during shunting and loading operations at stations and terminals. There is also noise caused by signalling and aerodynamic noises that occur in high-speed operations.

How is noise measured?

The sound pressure perceived by humans is expressed in decibels. This is a logarithmic unit of measurement, which means that an increase of ten dB is perceived by the human ear as double the volume of noise. Noise measurements take this into account as the A measurement (unit of measurement dB (A)), i.e. they include a factor that the human ear responds more sensitively to high pitched noises than lower ones.

As part of its noise protection strategy, Deutsche Bahn concentrates on these measures which have particularly high potential for noise abatement. The company also gives priority to measures which benefit a high number of people. It also bears in mind that noise at night is perceived as a worse nuisance than the same noise level during the day – and this is a fact which affects rail freight traffic in particular.

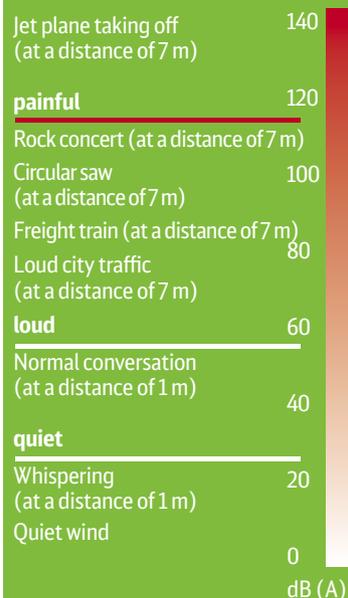
Active and passive noise protection

One area of action which is intended to reduce noise in future involves active and passive noise protection measures on new-build and upgraded lines. The 16th Federal Immission Protection

Act specifies when special noise protection precautions have to be taken for new-build or upgraded lines. Environment protection measures, which also include noise protection, account for an average of twelve per cent of the total costs.

Active measures include in particular noise barriers and earth berm barriers. From the ecological viewpoint, earth berm barriers are a good choice and generate only low subsequent costs. However, they require a comparatively high amount of space, which is why conventional noise barriers are the usual choice. These can be made of aluminium, concrete or wood. Gabion walls are a relatively new

Noise incidents and their noise levels



A grinder at work. The rails have to be smooth to keep noise to a minimum.

development: they consist of wire baskets filled with natural stones and have a core of a material which ensures good noise absorbency, such as recycled waste aggregate.

In addition to active noise protection, passive measures also protect lineside residents from railway noise. These include improvements to the buildings themselves, such as the installation of noise-insulated windows in combination with special insulating ventilators. In some individual cases, the exterior walls and roofs also have to be insulated.

The diagram on page 41 (left) „Causes of railway noise“ shows that rolling noise is the main culprit for the occurrence of noise. Rolling noise increases sharply as the train increases speed because of roughness (corrugations) in the track surface. A project to improve track smoothness has meanwhile been launched on certain track sections („specially monitored tracks“): a special sound measuring train regularly checks the depth of corrugations on these tracks. Once they reach a certain limit, a rail-grinding machine is called in to smooth the track. This enables a lasting noise reduction of three dB (A).

Refurbishment of existing lines

Whereas preventive noise control on new-build and upgraded lines is governed by law, the legislation does not apply to existing lines. In 1999, however, the Federal government launched a voluntary noise abatement programme. A priority list indicates those lines – especially lines running through built-up areas – where noise protection measures are considered particularly urgent. Funds of EUR 100 million per annum are earmarked for these measures. During the first ten years since the programme was launched, almost 40 per cent of the affected areas have been refurbished. Deutsche Bahn has erected noise barriers along a length of 264 kilometres and conducted passive measures for almost 40,000 homes.

Whisper brakes halve the rolling noise

The rolling noise is aggravated not only by corrugations on the track surface, but also by roughness of the wheel rolling surface. This is caused when conventional brakes are used: cast iron brake blocks act directly on the wheels, which roughens the rolling surfaces. In response to this problem, Deutsche Bahn has developed innovative brake blocks in cooperation with other European railways: the new brake blocks for freight wagons are made of an innovative composite material which is easier on the wheels. These „whisper brakes“, in conjunction with well maintained tracks, can reduce the rolling noise by up to ten dB (A), in other words, by half. The composite brake blocks comply with the standard values that came into force in 2007 for noise emission by new rail vehicles. Although the new brakes were not given permanent Europe-wide approval until October 2003, all new freight wagons purchased by DB Schenker Rail since 2001 have been fitted with composite brake blocks. By the end of May 2010, 5,660 of these „quiet freight wagons“ were already in use and that figure will continue to rise.

Retrofitting the more than 135,000 freight wagons which are approved for use in Germany is, however, an enormous challenge which the freight operators cannot overcome without assistance. The direct costs would total up to EUR 600 million in Germany alone; moreover, the operators would also be faced with higher follow-on costs, as replacement blocks are more expensive and the wheelsets are subject to faster wear. State aids are therefore essential to enable retrofitting of the entire existing fleet of freight wagons.

Work is in progress to enable further improvements to the present brake block technology: the new LL composite brake block will eliminate the need for comprehensive changes to the overall braking system and so reduce the costs of retrofitting.

In addition to the voluntary noise abatement programme, the Federal government has also given top priority to retrofitting rolling stock with composite brake blocks and has rolled out a pilot and innovation programme entitled „Quiet freight wagons“, which provides financial support for retrofitting approx. 5,000 freight wagons as part of the „Quiet Rhine“ segment. The project also promotes the ongoing development of brake block technology to create a basis for retrofitting the entire freight wagon fleet.

Innovations for less noise and vibrations

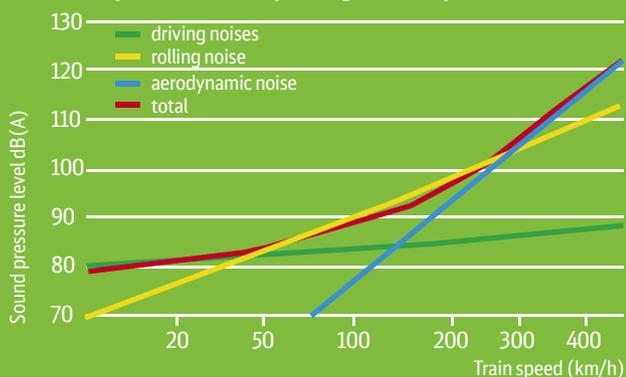
In addition to the above programmes, Deutsche Bahn is also testing various innovative methods to reduce noise and vibrations, such as the research project „Quiet train on real track“ (LZarG). This involves a clever combination of improvements to the vehicles themselves and to the track, which interact to enable maximum noise reduction. Sponsored by the Federal Ministry of Education and Research and under the project management of Deutsche Bahn, universities and industrial companies are cooperating to identify innovations for wheels and track. Development of the components and systems is scheduled for completion in 2011 and the target is to reduce the noise of passing trains by approx. five dB (A). Funds from the economic stimulus programme are being used to test innovative noise and vibration protection methods along railway tracks. As part of these tests, 17 kilometres of track have been fitted with rail web dampers which reduce track vibrations and consequently rolling noise. This is expected to lead to a noise reduction of three dB (A). Funding from the economic stimulus programme has also enabled other innovative methods to be tested (see box on right). The future belongs to quiet rail and Deutsche Bahn sees itself as a driver of these developments. Deutsche Bahn, universities, the rail industry and politicians are all making a concerted effort to achieve the target of halving rail noise by the year 2020. ■

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Causes of noise by rail transport The rolling noise is decisive

Sound pressure level depending on train speed



Testing innovative methods of noise reduction

Foaming the ballast bed is intended to reduce the transfer of vibrations into the ground.

The absorption effect of gabion walls with a height of just 38 or 76 centimetres is being tested; it is expected to reduce noise by between 2 and 6 dB (A).

Automatic application of an abrasive agent to the wheel rims of freight wagons is expected to reduce brake squealing at the hump in marshalling yards by approx. 20 dB (A).

Rails are to be given preventive treatment with heavy-duty grinding machinery. This should reduce running noise by 3 dB (A).

Tests are in progress to establish how noise propagation from solid track without ballast can be reduced.

Special absorbers are aimed at reducing the humming noise of steel bridges by 6 dB (A).

Highly resilient rail supports in the track in areas around bridges are intended to minimise the transfer of vibrations to the substructure.

Special mats under the ballast should reduce vibrations in solid substructures.

Automatic lubrication of the rails in tight curves is intended to prevent squeaking and screeching.

“Green Logistics is not just an image factor, but a competitive advantage.”



Dr. Karl-Friedrich Rausch,
*Member of the DB Mobility Logistics
AG Management Board for
Transportation and Logistics*



Photo: Siegfried Kramer/Ullstein Bild,
DB AG/Marc Darchinger

Making sustainability transparent



Tool for transparency

EcoTransIT World enables business enterprises to obtain a detailed assessment of the environmental impact of their transports. The system provides a realistic representation of global multimodal transport chains.

Whether train, ship, truck or plane: EcoTransIT World calculates the best combination of transport modes in terms of environmental impact for any given route.

Environment friendly solutions and sustainability are increasingly important criteria for the award of transport contracts and in corporate communications. All business enterprises – whether in the sector of industry or transport – are called upon to document the environmental impact of their transports and furnish proof of improvements. Transport chains should be planned so as to ensure minimum emission of CO₂ and pollutants, as well as minimum use of resources. The firms are required to present alternative solutions and weigh up the pros and cons of each option. This applies particularly to companies which have a corporate environmental management system.

However, the ecological optimisation of transport chains is a complex matter. Between starting point and destination, there are alternative routes on which different transport modes – either alone or in combination – are available. Moreover, the environmental impact of a transport mode varies depending on the route on which it is used and the capacity utilisation factor.

More than ten years have passed since DB Schenker Rail – together with the DB Environmental Centre and four other European railway undertakings – launched EcoTransIT, a software solution that enables calculation and visualisation of the environmental impact of international and multimodal transport chains inside Europe with just a few mouse clicks. At the end of May 2010, DB Schenker Rail and UIC, the International Union of Railways, presented the latest version of EcoTransIT World to the public at the World Transport Forum in Leipzig. The new program is capable of analysing worldwide routes for all transport modes and combinations, thus allowing the user to calculate the best mix of transport modes simply and quickly, also for intercontinental requirements. It also delivers a direct comparison of alternative routes. The program is available free of charge on the Internet at www.ecotransit.org.

EcotransIT World is perfectly simple to operate: the user only has to enter the quantity and type of freight to be transported, the starting point and destination in the input mask. After a few seconds, the system delivers a detailed graphic and tabular presentation of the ecological effects of the transport. It shows the primary energy consumption, the emissions of CO₂, nitrogen oxide, particulates and other pollutants as a comparison between the major transport modes of truck, train, plane, barge and ocean-going vessel, as well as for intermodal transport. It automatically takes into account any other transport modes which may be required before and after the main haul of the journey. The system calculates the optimum transport routes and also takes into account all private sidings, ports and airports. It shows the distances that have to be covered by the alternative transport chains according to the individual means of transport. The routes can also be visualised in Google Maps.

Making sustainability transparent



Scientific methods and comprehensive data

The simple operation and swift processing of inquiries give no indication whatsoever of the huge database and complex algorithms that are processed by the program in the background. To produce EcoTransIT World, the programmers had to compile data on the transport networks in every country in the world and then integrate topographical data. They also had to include much more information in order to achieve a realistic presentation of the environmental impact. In the case of rail transport, for example, the assessment has to consider whether the line sections are electrified. If the transport uses electric traction, EcoTransIT World also includes the individual national traction current mix in the equation in order to calculate the indirect CO₂ emissions caused by the generation of the consumed current. EcoTransIT World also takes the production and distribution of diesel or kerosene into account to ensure that the overall ecobalance gives a comprehensive picture of all aspects of the transport. The entire data is updated at regular intervals.

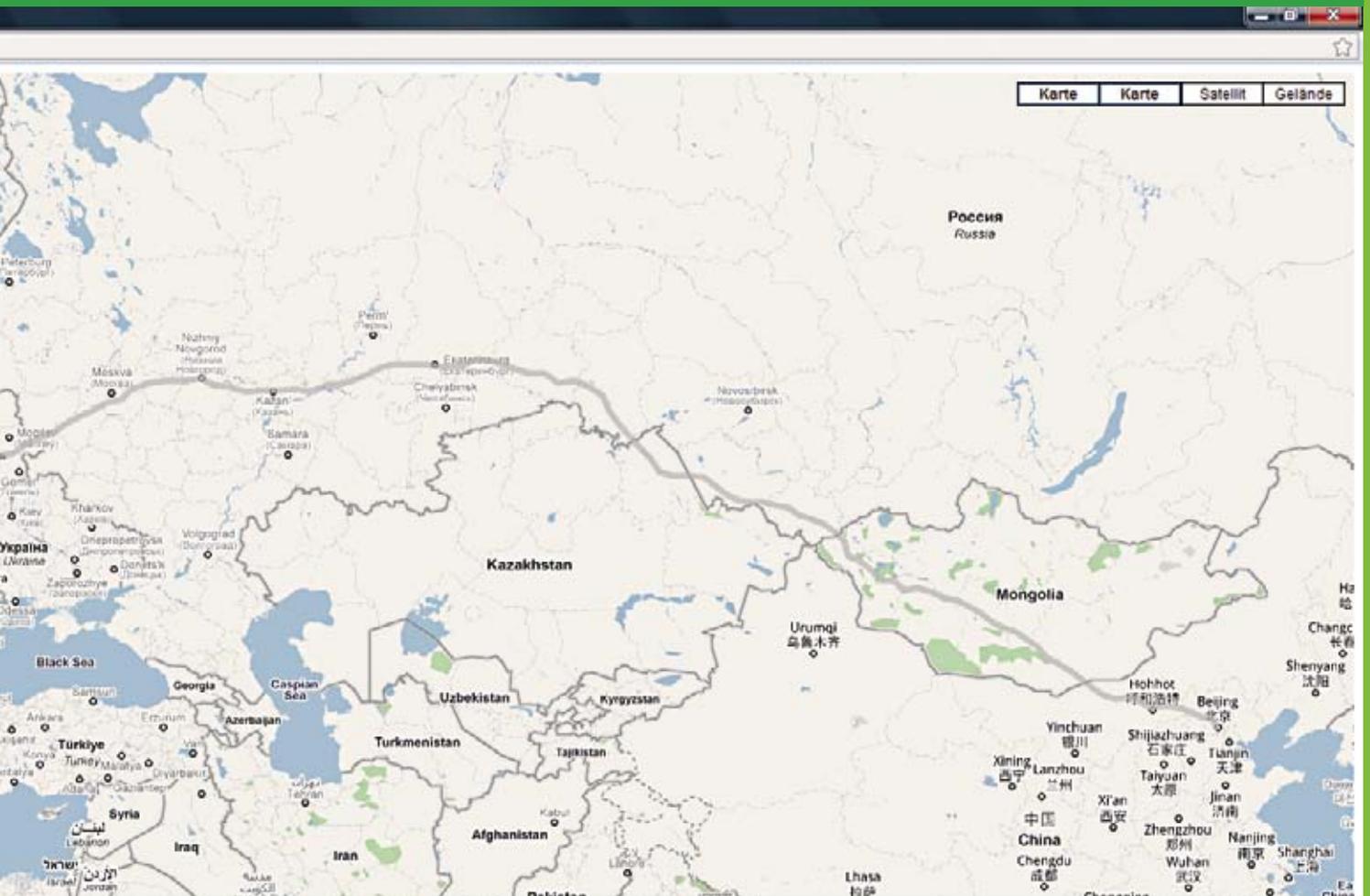
The quality of the data as well as the validity and objectivity of the algorithms used by the program are crucial factors for acceptance of the system. Accordingly, highly respected and independent partners were involved from the start and they have also been commissioned with the expansion and ongoing development of EcoTransIT. For example, the Institute for Energy and Environmental Research (ifeu) in Heidelberg developed the fundamental methodology for the ecological calculations and is responsible for scientific questions and maintenance of the data for the truck and railway transports. The Institute for Applied Ecology in Berlin developed the method for drawing up the ecobalance of transports by air, inland waterway and sea. Over the past few years, both these institutes have set recognised standards for the calculation of the environmental impact of transport. The methodology they developed for EcoTransIT is endorsed by the European Environment Agency. EcoTransIT is also recognised as an „Official Partner“ of the European Commission’s „Sustainable Energy Europe“ campaign. The technical implementation was handled by the Hanover-based firm IVE GmbH, the Consultant Company for Traffic and Railway Engineering. The practical expertise is contributed by the consortium that initiated the development of EcoTransIT. Further partners are welcome to join at any time.

EcoTransIT World is available in two different versions. The standard modus, which provides a fast initial overview of the environmental impact of a transport, requires the input of just a few parameters; the program makes plausible assumptions for further criteria which affect the environmental impact. In the expert modus, these technical and operating details can be specified separately to make presentation of the transport chain even more realistic. For example, it is possible to specify the emissions class of the trucks used, or the hauled mass of freight trains, the load factor or share of no-load runs. Users can optionally specify

How EcoTransIT World works



In the input mask, the user enters the type and quantity of freight to be transported, the place of shipment and destination. Other technical and operating details can optionally be stated.



Karte Karte Satellit Gelände

Gewicht: ? TEU Typ: ?

Umschlag definieren: ?

Versandort Typ: Name: Gleisanschluss verfügbar

Verkehrstyp

Id	Verkehrstyp	Fahrzeugklasse ?	Sch	Elek	Buttons
1	<input type="text" value="LKW"/>	<input type="text" value="24-40 t"/>	EL		<input type="button" value="+"/> <input type="button" value="X"/>
2	<input type="text" value="Zug"/>	<input type="text" value="1500 t"/>	EL		<input type="button" value="+"/> <input type="button" value="X"/>

Empfangsort Typ: Name: Gleisanschluss verfügbar ?

Making sustainability transparent



„via“ points to choose a different transport route to the one proposed by the system.

Choice of the optimum transport chain

The following example clearly illustrates how EcoTransIT World works and the advantages it offers: a standard container is to be transported from Beijing to Hamburg. In the standard version, only the type and quantity of freight, starting point and destination have to be entered, plus the transport modes that are to be compared. After just a few seconds, the system provides tables and graphics which help the user choose the right transport chain. The comparison shows, for example, that transport by plane is fastest, but with a figure of 56 tonnes of CO₂, it generates by far the highest carbon emissions. Transport by ship takes longer, but with emissions of 2.5 to 3.5 tonnes (depending on the sailing speed) this option can offer a far better ecobalance. With just under 2 tonnes of CO₂, rail transport has the lowest emissions of all, even assuming truck transports for the pre- and post-rail legs. To reach a compromise between transport time and environment friendliness, users can also consider intermodal transport chains. Intermodal transport by plane and ship, for example, would cause just over 31 tonnes of CO₂.

While this freely accessible application helps customers perform complex calculations about the environmental impact of different transport chains before making their decision, DB Schenker Rail uses an internal interface to draw up individual ecobalances for its customers. This involves the retrospective evaluation and aggregation of the total emissions caused by a company over the course of a year. In addition to a detailed statement, the customer also receives a certificate of the environmental impact of its transports, which it can then use as part of its corporate communications. DB Schenker Rail also uses this extended tool to draw up potential analyses for carbon-free transports.

In view of the increasing pressure on companies to optimise the ecological aspects of their transports, there is growing demand for tools which enable a realistic presentation of the environmental impact of transport chains. EcoTransIT World is an impressive instrument that is easy to use and which delivers results that are a direct help in making the decision. It thus provides a sound basis for the effective reduction of emissions and for saving resources – which in turn generates competitive advantages for the users. ■

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Phone: +49 (0)30 297-54248 | christian.schroer@dbschenker.eu

Our customer support agents can answer any questions about transport solutions

Standard
Graphen
Tabelle

Zeige Well to Tank / Tank to Wheel

■ Zug
■ Binnenschiff

Primärenergieverbrauch
Energieresourcenverbrauch (Megajoule)

© EcoTransIT.org

Primärenergieverbrauch
Energieresourcenverbrauch (Megajoule)

	TK 1	TK 2
LKW	127.236	0
Zug	0	34.162
Summe:	127.236	34.162

© EcoTransIT.org

Kohlendioxid
Treibhausgas, Klimaveränderung (Tonnen)

	TK 1	TK 2
LKW	8	0
Zug	0	2
Summe:	8	2

© EcoTransIT.org

Stickoxide
Versauerung, Überdüngung, Smog (Kilogramm)

	TK 1	TK 2
LKW	64	0
Zug	0	4
Summe:	64	4

© EcoTransIT.org

CO₂-Äquivalent
Klimaveränderung (Tonnen)

	TK 1	TK 2
LKW	9	0
Zug	0	2
Summe:	9	2

© EcoTransIT.org

Feinstaub
Verbrennungsbedingt (Kilogramm)

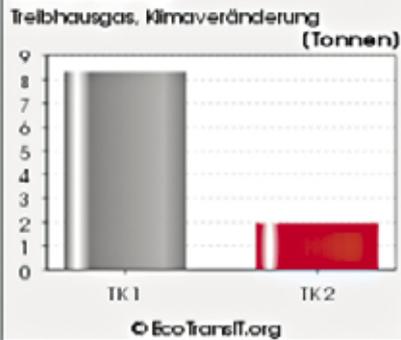
	TK 1	TK 2
LKW	1,8	0
Zug	0	0,7
Summe:	1,8	0,7

© EcoTransIT.org

Entfernungen

- LKW
- Seeschiff

Kohlendioxid



Kohlendioxid

Treibhausgas, Klimaveränderung (Tonnen)

	TK 1	TK 2
LKW	8	0
Zug	0	2
Summe:	8	2

© EcoTransIT.org

Primärenergieverbrauch

Energieresourcenverbrauch (Megajoule)

	TK 1	TK 2
LKW	127.238	0
Zug	0	34.162
Summe:	127.238	34.162

© EcoTransIT.org

Nicht-Methan-Kohlenwasserstoff

Smog, Gesundheitsschäden (Kilogramm)

	TK 1	TK 2
LKW	5,8	0
Zug	0	0,3
Summe:	5,8	0,3

© EcoTransIT.org

Schwefeldioxid

Versauerung, Gesundheitsschäden (Kilogramm)

	TK 1	TK 2
LKW	19	0
Zug	0	9
Summe:	19	9

© EcoTransIT.org

Entfernungen

Entfernungen der einzelnen Verkehrsmittel (km)

	TK 1	TK 2
LKW	9.155	0
Zug	0	10.673
Summe:	9.155	10.673

© EcoTransIT.org

Transportkette 1

Entfernung [km]	Verkehrsträger	Versandort	Empfangsort
0,00	LKW	[Stadt/Stadtteil] [cn] Beijing	39.90449 / 116.39147
9.155,27	LKW	39.90449 / 116.39147	[Stadt/Stadtteil] [de] Hamburg

Zusammenfassung: 9.155,27 km

[Export als Google Earth Route](#)

[In Google-Map anzeigen](#)

Länderspezifische Distanzen in [km]

cn: 0,28
 cn: 2.061,69
 ru: 939,88
 asp: 410,28
 ru: 3.243,08
 eur: 638,80
 pl: 680,90
 de: 380,58
 de: 0,00

Transportkette 2

Entfernung [km]	Verkehrsträger	Versandort	Empfangsort
0,00	Zug [Elektro]	[Stadt/Stadtteil] [cn] Beijing	39.90449 / 116.39147
1.261,50	Zug [Elektro]	39.90449 / 116.39147	45.761776 / 126.63281
930,08	Zug [Diesel]	45.761776 / 126.63281	49.641613 / 117.33078
4.216,60	Zug [Elektro]	49.641613 / 117.33078	56.46472 / 67.68158
0,04	Zug [Diesel]	56.46472 / 67.68158	56.46475 / 67.68086
4.264,77	Zug [Elektro]	56.46475 / 67.68086	[Stadt/Stadtteil] [de] Hamburg

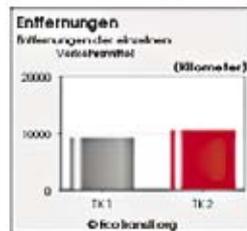
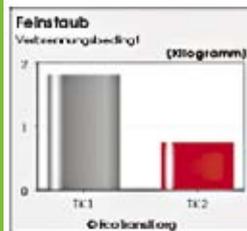
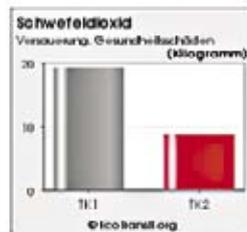
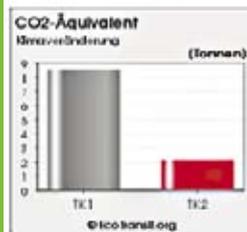
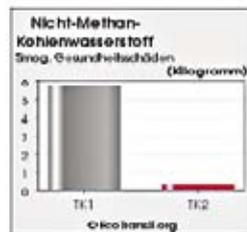
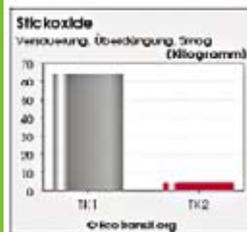
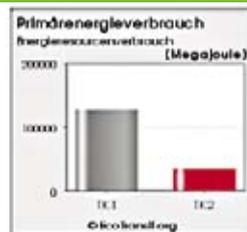
Zusammenfassung: 10.673,01 km

[Export als Google Earth Route](#)

[In Google-Map anzeigen](#)

Länderspezifische Distanzen in [km]

cn: 2.191,59
 ru: 8.827,11
 by: 808,74
 pl: 885,83
 de: 379,72



On the results page, EcoTransIT World shows the energy consumption and pollutant emissions of the different transport modes.

“In the battle
climate change
there is no
procrastination

tle against
ange
time for
ation.”

Photo: Corbis,
DB AG/Max Lautenschläger

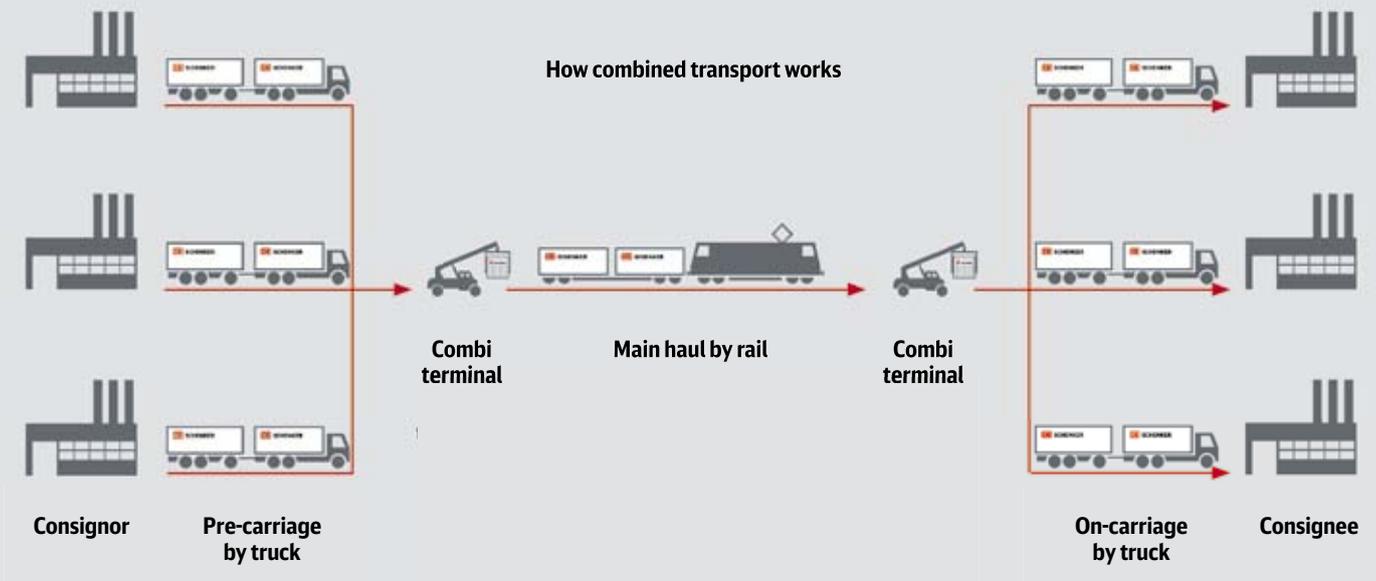


Karsten Sachsenröder,
*Member of the Management Board,
DB Schenker Rail*

Joint action



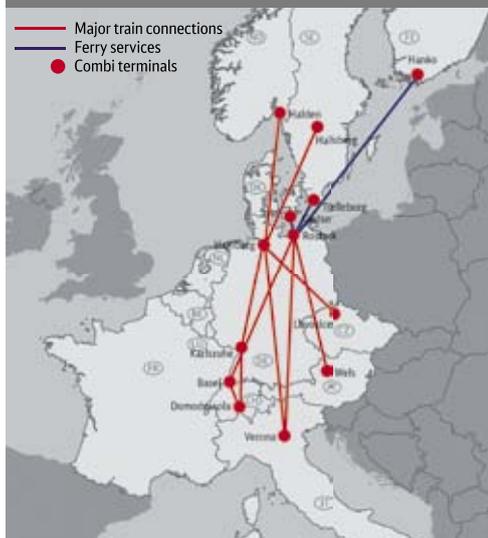
Synergies for the benefit of the customer: DB Schenker contributes its Europe-wide road connections, Hangartner its first-class rail infrastructure to the transport chain.



The best of both worlds

DB Schenker and Hangartner join forces in combined transport for the benefit of both customers and the environment.

DB SCHENKER*hangartner*: intermodal connections from Scandinavia to Italy



To begin with, the new service will be available on the north-southbound corridor. Preparations are under way to expand it to the west.

DB Schenker now links road and rail even more efficiently: the new DB SCHENKER*hangartner* service offers customers from trade and industry a combination of truck and train as a one-stop shop. The pre- and post-rail hauls are handled by truck, on longer routes, the freight travels by rail as unaccompanied combined transport.

The new DB SCHENKER*hangartner* service ensures optimum exploitation of the advantages of the individual transport modes. Truck transports, for example, can reach any consignor and consignee, which allows more flexible planning. To enable this option, the reliable transport services provided by the DB Schenker subsidiary Hangartner have been integrated in the product ranges of the different national companies.

Less expensive, more flexible and environment friendly

This means that two already successful logistics providers have joined forces to maximise performance. Hangartner benefits from DB Schenker's Europe-wide road connections, which enable faster and more efficient pre- and post-rail hauls by exploiting synergies. DB Schenker, on the other hand, benefits from the integration of Hangartner's first-class rail infrastructure in its own network.

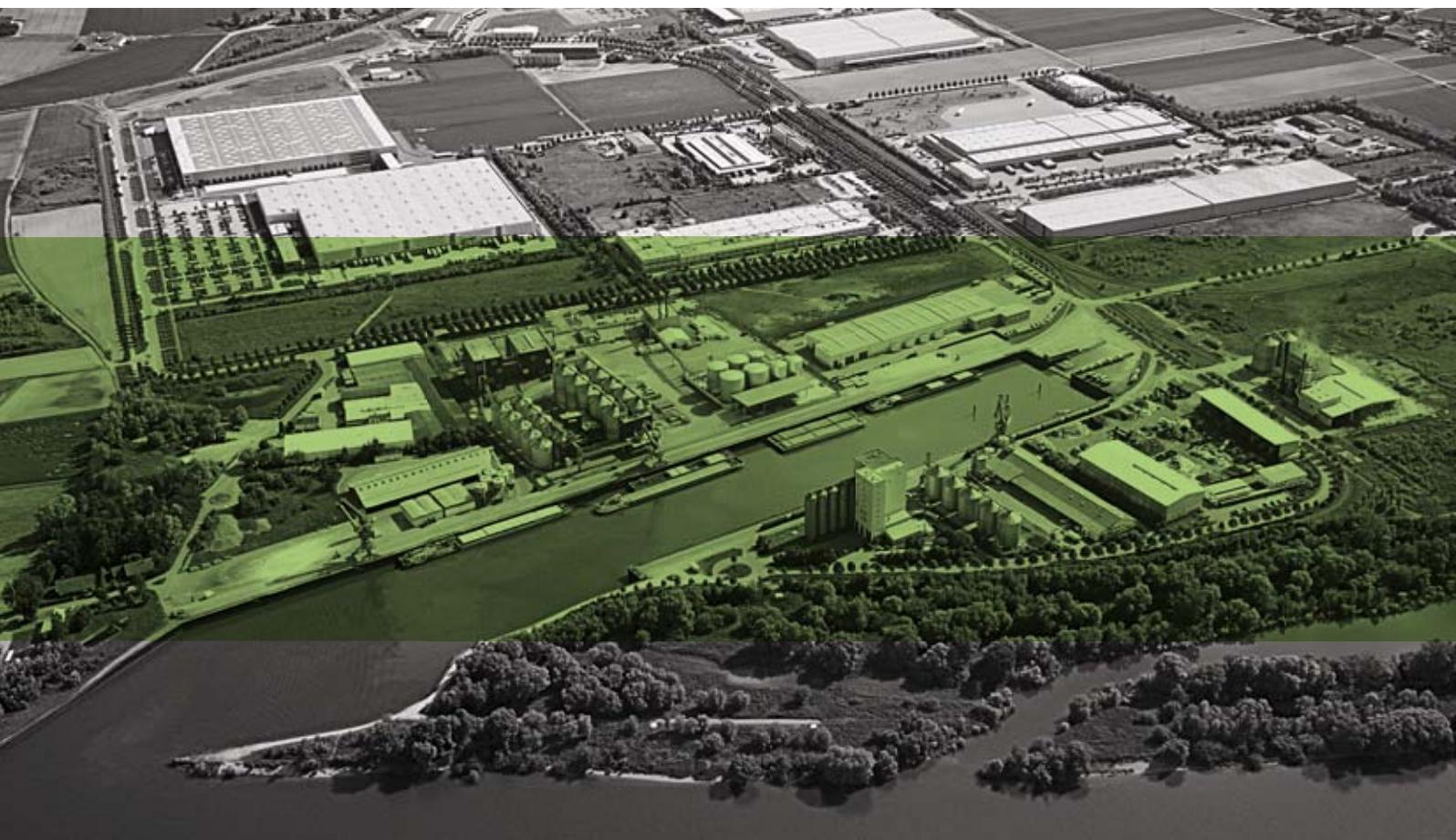
"DB SCHENKER*hangartner* combines the flexibility of truck transport with the advantages of rail, which also has a positive effect on the customer's carbon footprint," explains Karl Nutzinger, CEO Europe of Schenker AG and responsible for European land transport. "To satisfy changing customer requirements, we have also upgraded this service by adding quality features from other elements of our land transport portfolio." The new product

conforms to the overall quality system of DB Schenker Logistics land transport. A tracking option will soon also be available, the first of its kind in the intermodal market.

But in addition to improving their carbon footprint, customers who opt for DB SCHENKER*hangartner* also reap tangible benefits compared with purely truck transport. On the one hand, the new product allows larger volumes and heavier weights per load unit – and that means lower costs. Further savings can be achieved as there is no need to pay motorway tolls. There are no waiting times at national borders or delays resulting from driving bans for trucks at weekends, on public holidays or during the night. Transport planning and prioritisation are geared to the customer's requirements by a central train scheduling department in Zurich, enabling good flexibility. There are 4300 transport units available throughout Europe. At individual customer level, combined transport also simplified the transport of dangerous goods, especially across the Alps.

To begin with, DB Schenker will offer this new service for transports on the north-southbound corridor, from Finland, Sweden and Norway, through Central Europe to Italy and vice versa. Every year, approx. 4000 block trains run in timetabled slots on these routes several times a week. In Italy, DB SCHENKER*hangartner* has its own terminals in Domodossola and Verona, ensuring reliable coordinated handling as well as a range of additional logistics services. Preparations are already under way to expand of this service towards the west. ■

For further information visit the website www.dbschenker.com/dbschenkerhangartner
E-mail: dbschenkerhangartner@dbschenker.com



Straubing, region of renewable resources

The port of Straubing-Sand is not only a hub for rail, inland waterway and road transport, but also a prime location for biomass research and processing.

Straubing-Sand is not just an ordinary inland port. Situated on the Danube in eastern Bavaria, it is a trimodal logistics location which links the transport modes of rail, inland waterway and road. What's more, it is home to one of the largest industrial parks in the south of Germany, with a total site area of 2.2 million square metres. With an annual throughput of 3.5 million tonnes, Straubing is the major freight traffic centre in Lower Bavaria.

Another unique feature of the port, which is jointly managed by Straubing, Straubing-Bogen and Aiterhofen district authorities, is its proximity to the leading research centres in Straubingen Competence Centre for Renewable Resources. In the immediate vicinity, there are a number of key industrial companies dealing with the utilisation of biomass as raw materials or energy.

In addition to the business incubation centre, the location also includes a business centre for renewable resources, the BioCubator, where companies in this sector have access to first-class



Straubing-Sand: the port is a transport hub and home to many companies and research institutes involved in the utilisation of biomass

laboratory and office premises. Their work has helped to establish Straubing's reputation throughout Europe as a "Region of Renewable Resources".

DB Schenker Rail has diverse connections to the port of Straubing-Sand, which is also an innovation driver in the field of environment friendly logistics. Last year, for example, the port staged a forum on the subject of "Green Logistics" in cooperation with Lower Bavaria Chamber of Industry and Commerce, at which it presented a largely carbon-free logistics property which it had developed in collaboration with Salzer & Koch Consulting GmbH.

The freight traffic centre is also the address of one of DB Schenker Rail's key accounts: ADM, one of the largest processing companies of agricultural products anywhere in the world. On its 55,000-square-metre site at the southern quay in Straubing-Sand, ADM operates a state-of-the-art industrial oil mill. DB Schenker Rail delivers the plant-based raw materials to the mill and handles the outbound transport of bio-oils in tank wagons.

Rail is used to transport almost the entire production output by this sector at the freight traffic centre.

Biofuels are not only produced at Straubing freight traffic centre, but also sold locally at a public filling station, making it easy for the port operating companies to run their fleet on bio-fuel. Railway is one of the main beneficiaries of this biomass boom: in each of the past three years, rail has achieved high double-figure growth rates at Straubing freight traffic centre. DB Schenker Rail regional sales department is continually endeavouring to expand the range of products and services for customers at the port and greatly appreciates the close cooperation with the port management. ■

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Meggle transports: the containers carry milk powder on the northbound journey and paper on the way back

Ingenious system

To minimise impact on the environment, Meggle uses rail to transport its milk powder in Germany.

As a food producer and one of the largest producers of dairy products in Europe, the Meggle Group recognises its responsibility to its customers and the environment. Accordingly, Meggle has an integrated management system that reviews all processes in terms of their ecological impact and quality features. Meggle's environment management system covers all areas of the company and is an integral part of the overall corporate organisation.

Fast overnight connection

Since February 2009, milk powder has been transported for Meggle on environment friendly FIT trains (Forwarder's Intermodal Train), ensuring fast overnight connections through Germany. Every day, the Meggle transports link up Dörpen in Lower Saxony and Bönen and Unna in Westphalia with Nuremberg, Landshut, Regensburg and Munich in the south of Germany. The load units that transport the milk powder from the Meggle plant in Wasserburg am Inn are used to carry paper to various printing works in Bavaria on the return southbound journey.

After the swap bodies are unloaded near Munich, they are taken by truck to Wasserburg, where they are reloaded and returned by truck to München-Riem intermodal terminal, before travelling by rail overnight to Dörpen.

"The train runs every day, which means we are also able to satisfy customer orders at short notice," explains Christian Stavermann, sales agent for rail services at Schenker Deutschland AG.

"The ingenious thing about this system is the use of swap bodies: the goods only have to be loaded once, there is no need for reloading between the truck and rail legs – cranes simply move the entire containers from one vehicle to the other."

Shifting the main haul of the journey to rail benefits first and foremost the environment: compared with pure truck transport, this saves almost one tonne of CO₂. ■

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Just in time to Skandinavien

„Green logistics“ are used to supply precast concrete walls from Germany to building sites in Sweden.

Approx. 12,500 tonnes of precast concrete walls for several ultra-modern residential complexes will be carried DB Schenker just-in-time from Neubrandenburg to Sweden until spring 2011. On 8 June, the experts at DB SCHENKER railog, the rail forwarding sector of Schenker Deutschland AG, carried the first eight of a total of more than 400 special containers by rail to Scandinavia. During the first stage up to the end of July, the logistics specialists supplied concrete elements for the construction of 70 modern apartments in Västerås, 80 kilometres west of Stockholm, on behalf of Praefa GmbH, a company which specialises in expanded clay wall elements. This will be followed by further large-scale projects executed by the housing and construction company Bygg Vesta AB in Malmö and Stockholm.

“This is an excellent example of what we can achieve by combining DB Schenker’s unique rail and road networks,” said Dr. Karl-Friedrich Rausch, Member of the DB Mobility Logistics AG Management Board for Transportation and Logistics. With environment friendly rail transport from DB Schenker Rail and a short post-rail haul by truck, the logistics experts opt systematically for green logistics to supply the Swedish building sites. “This means we provide our customers not only with the most cost-effective, but above all the most ecological option for just-in-time deliveries to these large projects,” stressed Dr. Hansjörg Rodi, Chairman of the Board of Schenker Deutschland AG. “Compared

with pure truck transport, we save more than 80% of carbon emissions on the Neubrandenburg-Västerås route alone.” To enable implementation of this concept, Praefa Handelsgesellschaft invested around EUR 75,000 in the expansion of its own transport equipment. Following the conversion of 30 flat-rack containers, loading can now be handled quickly at any container terminal using special mobile cranes. To complement the precisely timed deliveries to the construction sites, Schenker Deutschland AG also offers its customer comprehensive management of the entire transport chain as a one-stop shop.

The logistics experts attend to just-in-time provision of the empty wagons, collect the loaded containers at the Praefa siding in Neubrandenburg and take them by freight train and ferry all the way to the intermodal terminal in Västerås, Sweden, in accordance with a strict timetable. DB Schenker is also responsible for management of the post-rail haul from the container terminal to the building site and has allocated two trailers to Scandinavia specifically for that purpose. The containers are loaded onto the trailers at the intermodal terminal for delivery to the construction sites. ■

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Concrete walls for Sweden:
train and truck enable just-in-time
supply of the building sites



Trees for Silesia

DB Schenker Rail's Polish subsidiary reclaiming former mining areas.

DB Schenker Rail Polska Group, the youngest member of DB Schenker Rail's European network, is not only Poland's most successful private rail freight company, but also has extensive experience in a completely different area: the reclamation of brown-field sites. "We offer customers the benefit of the experience we have gained in reclamation of former mining areas," explains Damian Susek, Manager in Technical Department at DB Schenker Rail Polska Group. "Thanks to it we contribute to the development of natural environment in Silesia."

In Knurów, for example, which is around 30 kilometres from Katowice. Here, in the middle of the Upper Silesian industrial area, the Central Mining Waste Disposal site is in the process of being reclaimed for forestry. Damian Susek knows that "reclamation is a complex exercise." "For a functioning ecosystem, with plants and wild animals, to be recreated here, a variety of measures are needed, over the course of many years." During the preparatory phase, legal issues are resolved, the reclamation and management conditions established, and cost accounting and planning processes put in place. Technical reclamation includes various ground works which give the landscape a new appearance - heaps are cleared and slopes levelled. A 30-centimetre thick layer of subsoil is then spread on top. After digging holes for plants a layer of humus soil is placed there. Then, during the biological reclamation phase, measures are firstly implemented to improve

the aeration and irrigation of the soil, followed by landscaping with plants, and finally reforestation. Birches, black and gray alders, European larches, red oaks, maples, black pines, lime trees and acacias are all planted, in accordance with the regulations of the regional forestry commission. Upon completion of the reforestation, the area is fenced off and access roads are provided. During the ensuing 3 years, the saplings must then be nurtured and any areas which have decayed must be filled in. Since 2003, one of DB Schenker Rail Polska Group companies has by this method alone managed to reclaim 30 hectares on the former mining area in Knurów, and handed them back to the Polish State Forest.

"A forest produces three to ten times more oxygen than an area of the same size which is only covered with low-growing vegetation, and a 25-meter high tree absorbs as much CO₂ as that emitted by two family houses," says Damian Susek. "Our work is therefore helping Silesia become a greener place and playing an important part in climate protection." ■

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RENEWABLE ENERGY

Hydroelectricity

After biomass and wind, water is the most importance source of eco-current in Germany. Most of the energy for the carbon-free Eco Plus transports offered by DB Schenker Rail comes from German hydroelectric power stations

Photo: Andy Ricder/VISUM

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