Environmental Statement 2005
Environmental Protection and Management at Frankfurt Main Airport

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Validation
Fraport AG’s Environmental Management System comprises environmental policies, environmental objectives and programs, as well as monitoring and audit criteria (EMAS) provisions and the environ-
mental statement. In the context of this document, data are acquired using (EMAS) Nr. 761/2001.
The data and figures presented in this environ-
mental statement align as far as possible with the environmental relevance of all on-site activities.

Freeport, 30 June 2005
Dr. Burkhard Kühnemann
Environmental Expert D-V-0103

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Schedule
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Unless otherwise stated, the data in this environmental statement are based on internal data that has been directly or
indirectly collected by Fraport.

Fraport AG’s Environmental Management System
Fraport AG’s Environmental Management System comprising environmental policies, environmental
objectives and programs as well as eco-management and audit scheme (EMAS) procedures and the envi-
ronmental statement – for the location Frankfurt Am Main – are in accordance with (EWG) Nr. 761/2001.

The facts and figures presented in this environ-
mental statement give a fair and accurate picture of
the environmental relevance of all on-site activities.

Frankfurt, 30 June 2005
Dr. Burkhard Kühnemann
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Long-range vision comes with the burden of responsibility. That is why we are committed to all aspects of environmental preservation. Whenever feasible, we go beyond legal requirements. Environmental protection does not stop at the airport borders. We work hard to keep the world liveable for future generations. Fraport’s certified and validated Environmental Management System contributes to a constantly improving and sustainable business.
Dear Readers

Environmental protection has long been a tradition in our organization. Back in 1972, the predecessor of Fraport AG declared environmental protection part of company policy. Since 1999, we have adhered to the strict EMAS environmental management system. Since 2002, our environmental management program has been certified in accordance with the worldwide-recognized DIN EN ISO 14001 standard. The “Eco-Management and Audit Scheme” (EMAS) is an instrument of the EU, and Fraport is regularly monitored to ensure compliance. EMAS dictates high standards of environmental protection. Aside from complying with legal requirements, other goals are to make continuous measurable improvement to environmental performance and provide information to the general public.

Environmental protection practiced by Fraport is not an isolated specialty; it is a central theme of our business strategy. Historically, and from a practical standpoint, environmental protection helped to pioneer sustainability. In the meantime, our vision of sustainability even outside the field of environmental management, is solidly anchored. It has a strong influence on operational aspects of the business, our personal and social policies, our relationship with the Rhine-Main community, as well as on Fraport’s corporate leadership, and on the posture that Fraport adopts as a corporate citizen and community member.
Frankfurt Airport offers 68,000 jobs, economic advantages due to its location, revenue, and its role as a regional job center. At the same time, its operation is linked to pollution prevention. Experience shows, however, that if there is a will, even situations of complex ecological problems can be solved in an open, honest dialog. That is readily apparent in the mediation process associated with the airport expansion. Enlargement of the airport is essential to the future of our entire region. The same is true for our Noise Abatement Program, the Casa Program that is currently in the process of acquiring a bank of additional property and administering a compensation program for people strongly impacted by aircraft overflights, and many other less spectacular activities. In the future we will continue to seek consensus with members of the community. An example is the planned restriction against flights at night that is expected to take effect when the new north-west runway (used for landing aircraft only) opens.

Our business philosophy and actions are based on the compatibility of economics, public service and ecology. This new 2005 Environmental Statement delivers many examples that show we are on the right track and that we are also implementing our vision in a practical sense.

This 2005 Environmental Statement is organized differently compared to its predecessors: The section “Discussions About the Environment” contains commentaries and interviews about current environmental themes at the airport. The second part – “Environmental Information” – contains data and facts from a variety of working fields within the realm of the environmental management program.
As things get tougher, we get better.

Dr. Peter Marx, Vice President Environmental Management (VAU)
When you look closely at our environmental performance, Frankfurt Airport holds its own. We are DIN EN ISO 14001 certified and EMAS validated, and are therefore able to meet stringent environmental standards. We offer compensation programs to people who live with low flying aircraft. These programs are viewed as models because of their depth and quality. Last but not least, since 1997 we have spent approximately €18.5 million out of our environmental fund. As a result, about 350 environmental projects within the region have been financed. Meanwhile the Fraport AG has become by far the largest environmental sponsor in the Rhine-Main region.

This is good news and a solid foundation to build on in the future. Nevertheless, we have no plans to rest on our past success. The world continues to turn, and change is constant on and around the airport:

- Air traffic is growing worldwide. More and more people use air travel for vacation and business. More and more products are shipped by air. Increased air traffic means that more capacity is needed on the ground. Because of these demands, we want and need to expand our airport. At the same time we face the challenges of efficiently managing the environmental impacts that accompany growth.
- The current tendency of political and social development indicates that laws at all levels of government – European Union (EU), Germany and the German state of Hesse – will become more demanding. This will both directly and indirectly impact future airport operation and expansion. An active environmental management program allows us to recognize these problems ahead of time and place them in the forefront.
- The impending start of expansion projects will once again place the airport into the public spotlight. If we prepare correctly now, we will not have to face future opposition from businesses and citizens. Instead we will create an opportunity to work constructively with local governments and the general public.

Fraport AG would like to strengthen further and focus its commitment on environmental protection. For us, sustainability is one of the ways we measure success. It is also a necessary part of airport development. We work hard to keep impacts low to nature, the environment and people. Airport growth and environmental impacts do not necessarily go hand in hand. The following three points play an important role:

- Keeping all decisions and activities transparent to our stakeholders.
- Communicating openly with surrounding communities and the general public.
- Acting voluntary beyond the minimum legal requirements.

Our environmental protection programs incorporate the surrounding communities and do not stop at the borders of our property. We pay close attention to the region and we clearly accept the responsibilities that come with the operation of an airport. We are not only a driving force behind the economy, but are committed as a company to expand our involvement in education, sports, culture and health.

Our program planned over the next few years adopts the previous issues and clearly emphasizes the following:

- We will have sustainable and measurable environmental performance.
- We will work to separate environmental impacts from airport growth.
- We will recognize our environmental impacts and activities, and communicate openly with the general public.
- We will align our thoughts and actions to reflect that we are a responsible partner within the region.
- We will cultivate our “green side” and openly display it publicly.
What is Fraport AG’s environmental strategy for the coming years?

One of our most important goals is to improve the relationship between environmental impacts and traffic growth. What does that mean? For example, considering the consumption of potable water, we compare the total volume of water used to the number of traffic units (a traffic unit is equivalent to one passenger with luggage or 100 kg of cargo or mail). The consumption of water per traffic unit has declined meaning the ecological efficiency of our services has improved. The same holds true for sewage and waste generation as well as energy use.

A central topic of our environmental strategy is aircraft noise. Airport expansion will lead to an increased amount of air traffic movements. As a result some areas will become more affected by noise. In other areas, especially through the use of the proposed north-west runway (used for landing only), departing traffic north-west of the airport will decline. On a positive note, airline manufacturers have continued to reduce noise with each generation of new aircraft. A good example of this development is the new Airbus A380, which is equipped with quieter engines and a noise reduction function as part of its flight management system. The Boeing B 787 “Dreamliner” will be equipped with similar features. As older aircraft are replaced with more modern models, the maximum noise levels will continue to decline.

In view of the predicted growth at Frankfurt Airport, Fraport will strive to influence the main actors as to decouple airborne noise in relation to the increase in air traffic. In practice we would like to ensure that increased air traffic does not automatically means more noise. Our air quality goals are just as ambitious. Fraport is confident that site-specific, climatically relevant emissions can be reduced by a moderate amount. Drastic reductions in emissions have been achieved through steps like establishing fixed electrical ground power supplies on the airport aprons. The power units allow parked aircraft to curtail the use of on-board auxiliary power units.

1st ACI EUROPE Best Airport Awards was Fraport

In June 2005 the winner of the Best Airport in the over 25 million passengers category was Fraport (FRA), which was commended by the judges “for its absolutely outstanding approach to environmental management”.

German Environmental Reporting Award 2005

In November 2005, Fraport was the winner of the German Environmental Reporting Award 2005 (Deutscher Umwelt-Reporting Award (DURA) 2005) for its official German version of the Environmental Statement 2005. The airport was honoured through the German Chamber of Public Accounts (“Wirtschaftsprüferkammer”) in the category “Best environmental reporting”.

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New ground equipment proposed for use on the aprons will meet the newest standards of environmental protection. We are contemplating how, in the future, we can encourage the use of low-emission jet aircraft engines through airport charges. Of great importance is the requirement for the use of low-noise aircraft engines which are currently available. Frankfurt Airport is the first airport in the world to base airport charges on currently measured noise levels. In 1974 we were already offering financial incentives to promote the use of quieter aircraft. Additionally, Fraport is working as a partner with the international community with the goal of helping to reduce global warming and establishing emissions trading rules for the airline industry by 2008.

Our efforts to promote ecological balance and recovery on and around the airport are exemplary. When forest land has to be cleared as part of airport expansion, not only the law but our dedication to the environment requires us to compensate for the loss. A similar, successful compensation project that has already been completed was Hohenau, a mitigation site to offset the CargoCity South development.

All of these activities, including our environmental protection programs, need to be communicated to the public. In doing so, we can avoid the classic cliché that is attached to many public projects: “Do good things and talk about them”. For us, the ability to communicate with our neighbors provides an excellent opportunity to identify and understand their needs and concerns. In the future, we will develop efficient partnerships with our neighbors in order to solve complex problems.

There is no doubt that the challenges we will face in the upcoming years will dwarf those we face today. In order to meet these challenges we will need to make sound decisions that require ecological expertise and innovative financial and technical preparedness. We must also remain sensitive to regional issues and be committed to the public. If we do this, Frankfurt Airport and the Rhine-Main region will succeed in promoting a growth-oriented perspective that is truly sustainable.
Discussions about the Environment
Reports and Interviews about Environmental Protection and Environmental Management at Frankfurt Airport.
Unbiased and precise

Fraport has been measuring aircraft noise at Frankfurt Airport since 1964 and in 2004 the measurement stations were upgraded. The noise measurement data undisputably show that noise abatement methods are succeeding; for example, the variable airport charges based on noise levels and route optimization of arriving and departing flights.
An inconspicuous concrete building on the edge of the airfield is almost invisible behind the giant aircraft that frequent the Frankfurt Airport runways. It would be virtually impossible to get any closer to the moving aircraft. Jochen Steinhauer, Erich Michalla and their eleven colleagues have their offices on the second and top floor of the building. Over two working shifts per day, they oversee Europe’s largest aircraft noise monitoring system. The system consists of 26 permanent measuring stations, two portable measuring stations and one mobile station. This highly technical equipment is the heart of Fraport’s noise management program. The noise data collected are used meticulously to monitor the occurrence of aircraft noise.

The newest technology

It all started more than 40 years ago. At that time, the first generation jet aircraft were in use and were much louder than the current models. The first noise monitoring stations (6 individual stations) were placed into operation in October 1964. They were formally inaugurated by Frankfurt’s lord mayor Rudi Arndt. State of the art at that time required locally measured data to be transferred on to forms by hand. Now, all measured data are sent online into a central data base where they can be evaluated. Since start-up, the plant has been continuously modernized and expanded. The most recent comprehensive technical innovations were adopted in 2004 and included the installation of new digital hardware and upgraded software. The accuracy of data are guaranteed through automatic daily calibration of the instruments, regular testing by an outside engineering firm and annual certification by an independent expert.

The new data from the measuring stations are compared directly to the radar data collected by the German air traffic control. The people behind the computer screens of the noise monitoring stations not only know the exact noise levels on the ground, but also from which flight they came.

Information for experts and the general public

Fraport collects and passes the data on to various parties including: the Noise Abatement Commission, the Noise Abatement Commissioner, air traffic control, airlines, government regulators and the general public. Managing the noise program in a way that avoids and reduces aircraft noise is complicated, requiring the cooperation of many different parties. The noise data collected from Fraport’s noise monitoring system form the basis of this cooperative effort. The Noise Abatement Commission was formed in Frankfurt in 1966 and its work was later integrated into the air traffic law. The members of the committee, sitting together around one table, include: representatives of the surrounding communities, representatives of the responsible local government, specialists from the airport, air traffic controllers and the airlines. They meet with the goal of coming up with aircraft noise abatement solutions. In addition to this, the introduction of quieter aircraft designs, optimization of flight routes, introduction of noise abatement practices, such as implementation of noise abatement procedures and building insulation, are part of the equation.

Fraport also provides information to interested parties within the general public on a regular basis. The semi-annual Noise Report contains a comprehensive discussion of noise in the vicinity of Frankfurt Airport. More current noise data, which are updated monthly, can be found on the internet under: www.fraport.de/cms/infoservice_fluglaerm/rubrik/2/2591.infoservice_fluglaerm.htm (only in German)
It began in the 1960s at a time when the number of civil aircraft powered by jet engines was rising. Compared to modern aircraft, these older jets were extremely loud. This led to a growing number of complaints from residents living near public airports. Frankfurt airport began its noise abatement activities in small steps necessitated by its location within a highly populated area surrounded by large and small communities. A group with representatives from the local communities was founded and an aircraft noise commission was formed to fight aircraft noise. An aircraft noise commissioner was appointed to process complaints, a noise monitoring system was installed, a noise deflection wall was constructed and measures to use quieter aircraft were considered. The first Noise Abatement Program began in 1983. It targeted dwellings near the airport, that were significantly impacted by arriving and departing aircraft. As part of the program the airlines paid for installation of sound-insulated windows.

Fraport, through its Noise Abatement Program, would like to guarantee a good night’s sleep to residents living near the airport who are subjected to higher noise levels. In order to make this possible, specific noise abatement measures are carried out on qualifying houses and buildings.

High level of acceptance by the impacted community

“We were almost always the first ones to come up with ways to protect the public against aircraft noise,” stresses Dr. Patrick Neumann-Opitz, who is manager of Fraport’s ongoing Noise Abatement Program. “Many of our initiatives were later adopted by lawmakers and, as an example, incorporated into the aircraft noise laws. Aircraft noise is a controversial subject. However, because Germany has such high standards when it comes to fighting aircraft noise, it is also part of doing business. Many people do not want to hear that, but it’s true.”

And today? Dr. Neumann Opitz, as manager of the Noise Abatement Program, has a job that some of his colleagues are happy they do not have. Yet, he views it all quite calmly: “Discussions about aircraft noise are, to a large extent, highly emotional. The closer people live to an airport, the higher the emotions. At least that’s how it is right now. On the other hand,
the majority of the people are quite cooperative and friendly after our noise abatement team has paid them a visit. It makes a big difference whether people form an opinion about Fraport based on newspaper articles or through direct contact with Fraport representatives. I also feel that the old ways of promoting the airport as the enemy no longer work. People understand that the airport is an indispensable part of our economy and the job market. They also notice that we are doing things to control noise.”

The current Noise Abatement Program can be traced back to the recommendations, which Fraport immediately adopted, of the mediation due to the airport expansion program in 2001. About 17,500 households in 15 cities and communities around the airport, and a list of organizations warranting protection such as day care facilities, schools, and retirement homes, fell under the program. How do the noise abatement measures look? Using a house as an example, the rooms that are commonly used at night for sleeping are insulated against aircraft noise to guarantee quiet at night. The homeowners are reimbursed by Fraport for costs associated with the modifications.
The intention of the noise abatement is to keep maximum noise levels below 52 dB(A) as a rule in rooms with closed windows. To achieve this goal, sound-insulated windows are installed and insulation is added to the sliding shutter units located above the windows. In addition, a sound-insulated electric ventilation unit is installed to supply fresh air when needed. This allows the sound-insulated windows to remain closed and fulfill their purpose. To determine specifically what noise abatement is needed, members of the noise abatement team conduct an on-site tour. The information collected during this visit provides a foundation for the acoustical assessment and abatement planning. Based on this assessment, a list of abatement options together with a costs reimbursement agreement is provided to the occupant. Construction work is performed by construction companies chosen and hired by the building owner.

“Our noise mitigation program also serves as a regional economic stimulus program for middle-class commercial businesses”, explained Dr. Neumann-Opitz. “The precondition is, of course, that the occupant will enter into a contract to perform the mitigation work. We do everything possible to help the impacted residents understand the noise mitigation program and make it as easy as possible for them to arrange the work. All households receive a comprehensive brochure, and additional information can be obtained from our mobile information center or via the internet. We also have an information center in the Frankfurt Airport Conference Center that is open every Tuesday and Thursday from 2 to 7pm.”

Fraport covers the costs

As usual if it concerns environmental protection and money there is also controversy. The controversy is rarely over the costs of construction measures but more frequently over program participation. The decision about who is justified to participate in the program is made by the authorizing agency, the Hesse Ministry of Economics, Transportation and State Development. The decision is based on noise contours. In that way, it can be clearly determined whether or not a house lies inside or outside of the program boundary. Because Fraport was very generous when it defined the conditions of the program, it would like to avoid the creation of further exceptions. “We are not just responsible for the residents. We also have a responsibility to the airlines and the passengers who, in the end, fund the program through their contributions”, is how Dr. Neumann-Opitz described the conflicting goals. “So far, we have made 21 million euros in abatement commitments. Altogether the program budget is 76 million euros. That is a lot of money and our task is it to use these means as efficiently as possible for noise abatement.”

To date, more than 7,000 dwellings have requested to participate in the noise mitigation program. When the new north-west runway opens in a few years, the night flight situation will change again. At that time, the plan is not to allow flights between 11 pm and 5 am. Requests to participate under the current noise abatement program can be submitted up to April 26, 2006.
When a modern aircraft passes overhead at an altitude of over 30,000 feet it is not heard on the ground. That changes as soon as an aircraft begins its descent toward an airport. The closer an aircraft gets to the ground, the higher the noise levels become. In the final few thousand feet of descent, up to the time of touch-down, things can get loud. Therefore, it is no wonder that most people think the airport is responsible for aircraft noise.
A quick look behind the scenes shows it is not that simple. Aircraft that make the noise are owned by airlines. Airlines decide which aircraft fly the traffic routes defined by Air Traffic Control. “No one will agree that the airport should not get involved in the noise debate”, commented Executive Manager Airport Charges Rolf-Dieter Rolshausen about the aircraft noise problem. “We have an obligation as an airport to make a contribution in order to reduce aircraft noise effectively. And that is exactly what we do.”

Toll System creates ecological control

Rolshausen stands on the front line since he is the one responsible for the noise-based airport charge system of Fraport that at first glance looks like a pure business matter. Airlines whose aircraft use Frankfurt Airport have to pay airport charges. Worldwide, nearly all civil airports take in funds through this air traffic toll system and use the money to finance operating expenses. At Frankfurt Airport, the noise-based airport charge also creates an additional, ecological control. The noisy aircraft pay heavily. At the same time quieter aircraft, through lower charges, can use the airport services more cost effectively.

The airport charges at Frankfurt Airport have included a noise component for some time. However, as of January 1, 2001, the system was perfected. “We established our noise-based charges on years of experience, so that they are practical, can be calculated and still work when changing conditions are taken into consideration”, explained Rolshausen about Fraport’s noise mitigation strategy.

New aircraft are quieter

His biggest allies in the war against noise are technical advances. The airports are pressuring airlines to use quieter aircraft. And airlines are demanding that aircraft manufacturers develop quieter, more fuel-efficient, less polluting engines. Product development engineers working for aircraft manufacturing firms have been able to make turbine engines quieter and to optimize aerodynamics that affect noise. A rule of thumb according to the aircraft specialists is that every new generation of aircraft is quieter, less polluting and more economic than previous models.

People in Frankfurt are quite particular about the subject of noise mitigation. For this reason the experts at Fraport developed a classification system based on seven noise categories, to which the individual types of aircraft are assigned. The individual aircraft types are reclassified each year. Of great importance is the average noise level at take-off of the current aircraft. This value is documented in the Noise Report as the average level of take-off noise, which is based on measured noise. Rolf-Dieter Rolshausen: “The large amount of effort is worth it. Our measuring system is a lot closer to reality than the old ICAO-Principle where the aircraft type once was certified at the time it was placed into service. With our sliding payment scale, Fraport is recognized worldwide as a pioneer in the area of active noise protection.” Similar systems, based on this model, have since been introduced at other German airports. Aside from the different noise categories, the payment scale differentiates between flights during the day and flights at night. Night flights are computed with a substantially higher charge rate.

Field proven and aimed at the future

What are the practical implications? The percentage of low-noise aircraft (Category 1) is very high in Frankfurt and their numbers rose steadily during the past years. The number of high-noise aircraft (Category 5) movements have been cut in half since the introduction of the charging system. There is also movement within the other categories indicating a clear trend toward quieter aircraft. The fact that the charging system works can be seen by Lufthansa’s replacement of its cargo fleet of B 747-200s with MD-11s. Both aircraft models have the same ICAO rating (Chapter 3). Under the Fraport system, the B 747-200 is placed in Category 5 while the quieter MD-11 is in Category 3. That has clear financial impacts – in particular for night flights for which these heavy air freighters are frequently used. The MD-11 can transport freight at a more favorable unit cost. Since the summer season of 2002, a so-called noise quota in the form of a point system has been in effect to reduce noise at night between the hours of 11 pm and 5 am. Loud aircraft are assigned more points than quieter aircraft.
At night the MD-11 clearly gets fewer noise points (4) compared to the B 747-200 (16). This has an impact on the number of scheduled night flights per flight plan and season.

In view of these results, Rolf-Dieter Rolshausen looks optimistically into the future: “We are certain that technical developments related to active noise mitigation are far from over. A good example of this is the new Airbus A380 which should go into service in 2007. It will be the largest civilian passenger aircraft surpassing the B 747-400 in both payload and range. Due to its quiet engines and modern flight management system that includes a noise optimisation function, this new super bird will likely be more cost effective and thereby make Frankfurt Airport more competitive. In addition, the single-event noise level currently associated with departing flights will decrease.”
Air quality monitoring at Frankfurt Airport

“We are right in our element”

Markus Sommerfeld, Traffic and Terminal Management, Airport Expansion, Security, Realization Management Environmental Impacts, who is responsible for the air quality monitoring stations.

Fraport conducts a voluntary monitoring program that continuously measures air pollution at the airport. The results of this monitoring show that air quality on the airport property is better than in many city areas such as Frankfurt.
Unseen, seldom felt and usually unnoticed, yet, the air in our atmosphere is a crucial part of life for people: animals, plants, all nature. Apart from its complex biological function, it also offers a number of physical possibilities. Without air, aircraft could not fly and airports would be unnecessary.

Markus Sommerfeld takes care of Fraport’s two air quality monitoring stations at the airport. For him, it goes without saying that the airport company meticulously watch air quality at the airport. “We are right in our element”, he laughs. And quickly adds that his job is voluntarily performed by Fraport. In Germany, monitoring and reporting of air pollution levels is usually handled by the regulatory agencies. In Hesse, the regional environmental and geological authorities bear the responsibility. Why, then, does Fraport additionally collect data? “We want to have a complete picture”, stressed Sommerfeld. “Sporadic measurements just aren’t sufficient. From our point of view, it is important to be able to show continuity with the measurements. A complete data set is the best way to introduce effective, long-term measures to improve air quality.”

A systematic record of all relevant pollutants

The two measuring stations at the airport have been in use since July 2002. One station is permanently installed between the east side of the airfield and the A5 freeway. The second is a mobile station which is set up at varying locations. Each day, both stations generate a large amount of data that Fraport documents in real time and stores in a database. All relevant emissions are measured and documented including: NO, NO₂, SO₂, O₃, PM 10, CO, benzene, toluene, xylene and ethylbenzene.

Among the factors affecting air quality, in addition to aircraft, include: ground transportation vehicles used around the gates and on the apron; stationary facilities at the airport including boilers; automobile traffic at the airport; and traffic on the adjacent freeways. Wind and weather also play a large role. In order to ensure the accuracy of the data, the instruments in the two stations are checked three times every day and, if necessary, are recalibrated. For testing and calibrating services external specialists are responsible. Their firms are DIN EN ISO 17025 certified. This quality control standard is internationally recognized by a current national accreditation organization for laboratories. The objectivity of the data allows a direct comparison with other measuring points in the region.

The evaluation of the data is particularly informative. The pollutant levels at Frankfurt Airport are typical of a city environment. In comparison, pollution levels are actually higher in downtown Frankfurt. And the majority of air pollutants at the airport come from traffic on the adjacent freeways.

One other point of interest comes from the long-term measurements. Like clockwork, at the very beginning of each year, levels of dust rise sharply for a few hours. At New Year, fireworks set off in the surrounding countryside are readily picked up by the airport’s highly sensitive measuring system.
Question: Mr. Weber, you are the project manager of a field study that Fraport is carrying out at the airport with other industrial partners. The study includes trials with fuel cell vehicles. Why do we participate in this project?

Boris Weber: There are many reasons why we are doing this. From my point of view, there are two main ones. The fuel for fuel cell technology is hydrogen which has two unbeatable advantages: First, it is available in nearly inexhaustible quantities on this planet; and secondly, hydrogen burns with no emissions. Instead of gaseous pollutants, only water comes out the exhaust pipe. Since the topic of air pollution plays a huge role for us as airport operators, through participation in this project we would like to show our intentions to do more in the future than we are already doing now. Put simply: it is a way of practicing sustainability.

Isn’t pressurized hydrogen dangerous?

It is practically less than a car with a gasoline tank. In the event of an accident, hydrogen would be vented and burned through a pressure relief valve. The risk of explosion inherent to gasoline-powered vehicle does not exist.

What persuaded Fraport to take part in this current field test?

The field test is part of a project promoted by the European Union. The European Union promotes a specific list of future technologies. It is obvious that the automobile industry is extremely important to Europe, and therefore the promotion of high performance, emission-free, hydrogen-powered vehicles is a high priority. A goal of this project is to show that the technologies associated with hydrogen-powered vehicles are practical and safe and that the necessary infrastructure and related standards are put in place. What is important is not the individual pieces, but the entire technological spectrum of manufacturing and transporting the fuel, refueling the vehicles, as well as the overall usefulness of the vehicle in everyday life. On that note, the EU wants to make sure that there is a transfer and promotion of know-how within Europe in order to keep technologies from being confined to a specific region. Therefore, a coordinated project is simultaneously being run in northern Italy in the Lombardy region and here in the Rhine-Main region.

Why here?

The conditions here are particularly favorable. DaimlerChrysler is supplying the vehicles which are Mercedes A-Class passenger cars that use fuel cell technology. Nearby there is the Infraserve factory that generates hydrogen as a production by-product. Linde AG is another global player within the region. Linde has exemplary knowledge regarding the storage, transport and the refueling of liquid gases. TÜV Hessen is responsible for maintenance and repair of the vehicles. Fraport makes sure there is a realistic operational environment. On top of that, we are the optimal partner to use the cars effectively and in plain view of the public. Publicity is an important goal of the EU with this kind of project.

Nevertheless it all sounds so futuristic.

That can all change. For example, California has always been a leader when it comes to emission standards and it is planning a network of hydro-
gen service stations in the upcoming year. The EU thinks that by 2020 about 5 percent of cars in Europe will be powered by hydrogen. Things could move ahead a lot faster, too.

*When will the normal person get to see one of these “Wonder Cars”?*

Beginning in 2006 at Frankfurt Airport. We are going to start with 2 cars and by 2008 will have a fleet of 5, and we plan to display these cars to the general public. Frankfurt Airport is the perfect place to present them effectively to the public. We as Fraport want to promote the advancement and use of innovative technologies that offer clear ecological advantages. This project clearly does just that. It also fits seamlessly into our business philosophy. Not to mention, for my team and I it is an exciting and good thing to be involved with. There is always a lot of discussion about the future, technical innovation, and ecological advances. We have the ability to approach this project from a practical standpoint. And that is exactly what we are going to do.
Frankfurt Airport is developing interfaces with the traffic of tomorrow

Mobile. More Mobile. Intermodal

Hans Fakiner, Fraport’s Commissioner for Intermodality.
Hans Fakiner: Intermodality is a technical term borrowed from transportation engineering. It describes the networking of different kinds of traffic systems. Behind that answer is the question: how can road traffic, rail and air traffic be brought together in the most customer-friendly, market-oriented, economically and ecologically friendly way possible? That is a terribly important question, even though the word intermodality may not be very popular.

So Frankfurt Airport is more than just a normal airport?

Absolutely. Frankfurt Airport is, what we call an intermodal traffic port. Our central function is that of an air traffic portal, or as people in the trade refer to it, a hub airport. That means that a large number of passengers (53 percent) transfer between airplanes. They arrive, for example, on smaller aircraft from smaller airports from all over Europe. In Frankfurt, they transfer to long-range aircraft that fly to America or Asia. That example is what we call the standard version. There are more and more transfer passengers who arrive by high speed (ICE) train and use one of the two train stations located at the airport: One long distance station for high speed trains to remote cities and a regional train station for trains that travel within the region. Passengers also access the airport by car or bus. The Frankfurter Kreuz – Europe’s busiest freeway intersection – is located, literally, at the front door of the airport.

How is all this kept under control?

With professionalism, a lot of commitment, even more patience, and a clear strategic alignment.

And that would be?

Fraport’s new vision and business mission clearly defines our strategic approach. I quote: “We consider airports to be activity centers and intermodal hubs. We link transport networks systematically. We stand for efficient management of complex processes and innovations, maintain our position by providing competitive integrated services and respond flexibly to our customers’ requests”. Voilà.

But how does that look on the ground?

Right now we are mainly working on integrating the rail system seamlessly into the hub function of the airport in an effort to further strengthen our position as an intermodal portal. It’s simple. We want even more passengers to arrive by rail. I think we have a good chance to meet this goal.

Why a good chance?

For a number of reasons. Take for example our extremely favorable geographic location: 43 percent of the German population – 35 million people – live within a 200 kilometer radius of Frankfurt Airport. In that light, our potential to attract people is greater than Paris or London. Within this distance, the high-speed ICE train is nearly unbeatable. Another reason is our good planning. Fraport has always been a intermodal pioneer. We were the first airport to have our own train station. And our air-rail terminal, with more than 4.2 million passengers per year since 1999, has turned into one of the 10 most important long-distance German rail stations. Every day 163 high speed trains from outside the region travel to and from the station. That is more than twice the amount that operate out of Charles de Gaulle airport in Paris. There are more than 376 trains traveling to the airport every day when you add the regional trains. Last but not least, we have a lot of experience with the development of intermodal products. Specifically, we are actively searching for ways to make it very attractive for our passengers to transfer to rail. We depend on close cooperation with all carriers like airlines, rail and public transportation systems for local traffic.

So what is the breaking point?

That is very complex. I’m going to mention two key words: “Seamless Travel”. For our customers, the train trip to the airport, and of course the return trip, has to be fast and comfortable. Also, as an example, luggage check-in for the train ride and also for the connecting flight at the point of origin must also be seamless. This facilitates a rapid transfer between airplane and rail – automatic transfer of luggage between train and aircraft. Another phrase to mention: “Code Sharing”. Certain airlines and the German rail system offer integrated
ticketing. It simplifies making reservations, and hopefully soon, will also simplify reserving intermodal “products”. Under the motto “intermodal flight information” we are currently working with the local public transit authority (RMV – Rhein-Main-Verkehrsverbund) on a web site that contains airline and train schedules as well as public transportation routes and driving directions, maps of train stations and airports. All of this is integrated with traffic jam reports and schedule updates. Sometime in the future it will all be available for cellular telephones, pocket organizers (personal data assistants) and smart telephones.

What use is intermodality to the environment?

Many different uses. For example, we are providing optimized traffic flow. Or stated more concretely, an improved modal split, which means that a higher number of passengers and airport employees arrive by train resulting in a marked reduction of CO₂ emissions. Comprehensive surveys show clearly that the number of passengers traveling by rail and plane has risen.

How do you think the intermodality of the future will look?

The exciting part of our job is that the future has already arrived. I think it is important that what we have to offer — airport, airlines, the railway system and other modes of transportation — which our customers use, is very attractive. That means that we need to offer better products in every regard. In order to do that, Fraport has to take on the difficult role of intermodality managers, be fast and flexible and above all continuously innovative. An additional criterion is efficiency. Only when all involved parties make their own profitable intermodal products will we have a chance. If these two requirements (market success and efficiency) are present, then we can, with the necessary emphasis, do something to improve the environment. I think this is a realistic view. With regards to environmental protection, it offers a great deal of promise.

The Groundwater Monitoring Program at Frankfurt Airport

Fundamentally good

One of Frankfurt Airport’s undisputed advantages is its geographic location. Situated in the middle of a well-established traffic grid, it is the transportation center of western Europe. From a regional perspective it is also a favorable location in the heart of the Rhine-Main region, close to Frankfurt, without encroaching too closely upon the urban areas. From a more broad topographic perspective, the area is interesting. It is situated on a terrace that contains productive groundwater supplies used to supply drinking water to Frankfurt and the airport. This makes groundwater protection, in this case, very important.

No one knows this better than Dr. Wilhelm Forschner. He monitors groundwater quality on the airport and in the surrounding areas on behalf of Fraport AG. To do this, he uses a database containing measurements from 287 groundwater monitoring stations at the airport and 267 stations in the vicinity. Every month between 800 and 1,000 new data are recorded. Many different groundwater quality parameters are tracked and documented: Polynuclear aromatic hydrocarbons (PAHs),
Fraport built a database that incorporates data from 554 groundwater sampling points located on and around the airport. This ensures comprehensive groundwater quality monitoring across the entire area.

Left: Dr. Wilhelm Forschner, Company representative of water protection
Right: Jennifer Stienen, Environmental projects, secretary.

In addition to Fraport, Lufthansa, the corporation responsible for jet fuel distribution, and the municipal water supplier (Hessenwasser GmbH), also input information into the database.

Preventative environmental protection

Along with the meticulous establishment of groundwater quality, Fraport is also responsible for preventative environmental protection. Use of a new kind of nitrogen-free de-icing material is helping to clean up nitrate, petroleum hydrocarbons, heavy metals, potassium, acetate, formate and other chemical groups.

Teamwork creates transparency

The first systematic groundwater investigation in the vicinity of the airport was conducted in 1970 by the regional government. Beginning in 1981, Fraport’s technical experts began conducting their own analysis. This was at the same time that Runway 18 West was being constructed. Since then, more and more monitoring wells were installed to allow comprehensive monitoring of groundwater on and around the airport. Samples are collected at varying intervals depending on the speed of groundwater flow and the location of the monitoring wells. Accredited, ISO 17025-certified laboratories are used to collect and analyze the samples. The “big picture” is contained in Dr. Forschner’s database. It holds information about the condition of the groundwater together with changes in the water level since 1991. Regulators of the town and the county are able to access the data directly.
In and around Frankfurt, Rainer Gomolluch is someone everyone wants to talk to. Because in the context of caring for the neighborhoods, he is responsible for, among other things, Fraport’s Environmental Fund. His job is fun. However, it can become a burden. “We sponsor a lot of projects and we do it with a smile. Our mission is to apply our resources to projects that we feel are especially meaningful to the ecology. Sometimes we have to say ‘no’ even though it is often hard when we look at the proposed project and the enthusiasm of the applicant.”

** Millions for the area around the airport **

The establishment of the Environmental Fund in 1997 sprang from Fraport’s corporate philosophy that places a great deal of value on sustainability and corporate citizenship. To date, more than 350 regional projects within the realm of natural conservation, environmental protection and environmental education have been supported by the fund. The total amount of money spent to date on these projects has meanwhile reached 18.5 million euros. If we compare the costs of all the individual projects, one project stands out: the Rhine-Main Regional Park. Since the establishment of the fund, about 48 percent of the money spent has flowed into this...
Rainer Gomolluch, Corporate Communications, Public Affairs, care in the Rhine-Main Regional Park.

"The Rhine-Main Regional Park is clearly the center piece of our financial support", explained Gomolluch. "It is a poster project for the future of our region and it strengthens our global competitiveness and makes us more unique".

When we talk about worldwide competition and how it relates to global cities and global regions, hard economic factors like net value, income, profitability, net profits, market potential and investment incentives are discussed. Other topics include: infrastructure, security, scientific research, medical care, law and politics. There are also soft factors such as cultural offerings that play an important role.

And, finally, thanks to the city and regional governments, structures and facilities like green spaces, parks, recreational facilities, historical sites and well-cared-for cultural landscapes with healthy ecosystems all provide residents with a higher quality of life.

Fraport’s Environmental Fund is responsible for more than 350 projects in the vicinity of the airport that are significant in the realm of ecology. A large portion of the fund goes to Rhine-Main Regional Park. The park’s green spaces contribute to the region’s image.
A region with a unique profile

This is where the concept of the regional park started. People do not view Frankfurt and the Rhine-Main area as being in direct contrast with one another. They see it as a single unit with many centers. And that is true. If you look at the entire region, it is a densely populated area with more than 4 million residents, where traffic and economy are closely intertwined. In contrast to large cities like Berlin, Paris or London, the Rhine-Main region has a different pattern of settlement. What is clear is that vast green spaces reaching into the center of the heavily populated areas are maintained. The developers of the regional park see that as a clear advantage. Stephan Wildhirt the director of the federation and the person who started the project is certain: “The uniqueness of this region is due to a combination of the large city skyline and the charm and resources of the many smaller cities and small towns. As a whole, it is embedded in a modern landscape.” He makes the case for active, rather than passive development of green spaces wherever possible and for linking green spaces with bike paths and walking trails. The project is not just limited to wildlife conservation and overall ecological improvements. It incorporates recreational activities, playgrounds, restaurants as well as historical sights.

Cosmopolitan, aware of the past, and with an eye on the future

Rhine-Main Regional Park was founded in 1994. Some of the most important pieces are the Frankfurt Green Belt and The Green Ring in Offenbach. In the meantime, there are also green spaces and routes in the south along the line Aschaffenburg — Dietzenbach — Rüsselsheim — Mainz as well as to the north where it now runs from Hanau through Bad Homburg, and far into the Taunus. In the future, Wiesbaden will also be added. During the last 10 years an expanding green infrastructure has been created in the Rhine-Main region. In the not-to-distant future, it will be possible to travel along the regional park route by bicycle or by foot from Aschaffenburg to Mainz. Someday, there will be connections not only between adjacent German federal states, but between all of Europe.

Like the region itself, the regional park is characterized by its large variety. There are ancient fortresses, castles from the Middle Ages, baroque palaces and romantic villas. Adjacent to all this are sports fields, playgrounds and modern art centers from the 20th century, and ultra-modern observation towers. Newly planted green alleys connect the forests with reclaimed wetlands and orchard meadows. The economic history is also represented. The “Route of Industrial Culture” encompasses many historical factories, museums, facilities and transportation systems that are still in use.

The regional park is alive thanks to local initiatives, the involvement of associations, community fund-raising, the involvement of the Planning Association of the greater Frankfurt Region, state and EU grants, and fund-raising through sponsors. Fraport, with 27 percent of the total funding, is the top sponsor. “We can be proud of this”, commented Rainer Gomol-luch about his pet project.
Compensation with an ecological surplus

Fraport is bound by law to mitigate at another location for forest clearing that occurs as part of airport expansion. The airport goes beyond the legal requirements by replanting more and higher quality forest than what is required.

About 68,000 people work at Frankfurt Airport. More than 16,500 work for Fraport or one of its subsidiaries. The list of Fraport subsidiaries contains just about every occupation: Executives, businesswomen working for airlines, safety experts, computer information technology specialists, firefighters, pre-school teachers, ramp workers, cooks, cargo handlers, electricians, medical doctors, automobile mechanics, gardeners, travel agents, apprentices and one forester.
Why does Fraport need a forester?
Because Fraport owns large tracts of forested land that require care. The airport forester, Thomas Müntze, is well known within his professional circles. He is a specialist with a wide spectrum of assignments. Fraport owns forest that has to be managed like any other forest. He is also responsible for the care of the open grassy areas surrounding the runways. These areas are covered with a high quality type of neglected grassland and calluna heather. All the measures that are used in these areas have to be run by the bird strike management group to ensure that the risk of collision between birds and aircraft remains as low as possible. There is also the job of reforestation for which Müntze and his staff are active both in the field and behind the desk.

Fraport is required by law to take measures to avoid and reduce encroachment upon the forested areas when it is planning expansion or renovation projects. Simply put, planning at the airport has to ensure that as little forest as possible is impacted. If destruction of forest cannot be avoided, there are laws to ensure that where it is necessary to remove forest at the airport, an equal amount of forest or other natural habitat will be created within the same region as compensation for the loss.

But the Fraport forester’s work usually has more to do with fulfilling legal requirements and permits. His job is to plan and implement projects with an exceptionally high ecological value. His employer is just as ambitious. It is not enough just to do it right – but, wherever possible, to make it even better. Forester Müntze is certain: “Today, we are one of the firms in Germany that has the necessary experience associated with the development of high quality biotopes and can therefore show the best results. One thing is for sure: it does not fit into the rigid picture of the world that some of our contemporaries carry, but we can live with that.”

Natural conservation area
Hohenaue

A model project of the airport’s mitigation program is Hohenaue, a 100-hectare area close by the river Rhine at Trebur, acquired by Fraport in 1991 as a mitigation site to offset the CargoCity South development. Prior to purchase, the land was used intensively for farming. Today it is forest. Fraport’s reforestation goal was to create a continuous natural protection area that the local community could use for recreation. In the meantime, hardwood and soft wood forests have developed along the Rhine. The fence necessary for the development of the area was removed and a path around the area is marked and regularly maintained. For visitors there are information boards pointing out natural features of interest as well as plants and animals in the area.

In 1998, Hohenaue was designated as a natural protection area by the government body responsible for natural preservation seated in Darmstadt. Experts from the University of Gießen agree that the planning and implementation has paid off. Through care, the biologically-diverse mitigation site will continue to develop: “The studies have shown that planting the forest together with the extra measures taken by Fraport have, within a 10 year period, led to vastly improved habitats for native plants and animals.”

The experience gained from the design and development of the Hohenaue site will soon be flowing...
into planned development of the flood plain forests in the area of Langenau/Nonnenau, Kornsand-Nord and Rockenwörth/Rauchenau. As part of this development there are plans to create forests that are as close to nature as possible, to shape forest borders, to procure appropriate seeds for trees and shrubs and to create meadows and wetlands. The vision of the natural conservationists is focused on developing further stepping stones on the path to developing a biologically-diverse natural area along the canalized Rhine River.

**Voluntarily with vision**

Until that time, there is a lot to do at other locations. A majority of the mitigation requirements for reforestation and replacement of natural resources for the A380 maintenance hangar project are specified in the permits. The property selected for the mitigation, Schönau, is located near Mainz-Bischofsheim. In view of the proposed increase in airport capacity which includes the development of the north-west runway, Fraport has secured agricultural land to use for mitigation. Forester Müntze said: “Because Fraport wants to create a high quality mitigation site within a short time frame, we took a chance and acquired the first pieces of property which we will use after we receive approval of the regulators. We are also moving ahead with our voluntary measures under our agreement with the forest administration of Hesse. Our goal is to optimize and increase the quality of the forest in the region, for example the Mönchbruch Natural Conservation Area, which is quite close to the airport.”

The most common objection is that there is fundamentally no suitable land for mitigation available in a densely populated area like the Rhine-Main. The forest expert, however, disputes this: “Maps show the mitigation areas that are tied up in the lengthy finalization process with the regulators. It is common for purely agricultural land to be converted to forest. Plants and animals in the reforested areas as well as the entire region, reap the benefits.”
Fraport supports environmental education projects associated with the “Environmental School in Europe” contest.

The green classroom

In 2004 prizes were awarded for the “Environmental School in Europe” contest which was energetically supported by Fraport.

One of the prizewinners in Hesse was the Franz-Böhm-School, where classes on hot summer days beginning in 2005, also thanks to Fraport’s environmental fund, are held outside in the shadows of newly planted trees.
On the 5th of November, 2004, at Fraport’s Frankfurt Airport sport center, where airport employees normally work out, 350 schoolchildren and their teachers crowded in to present their prizewinning environmental protection projects. Central to the project are topics such as: sustainability, environmental management, networking of biotopes, energy and water conservation, waste separation, and endangered species.

The presentation of awards is prominently attended. Attendees include the Hessian Minister of State Wilhelm Dietzel, who is responsible for environmental protection, along with Fraport’s Executive Director for Labor Relations, Herbert Mai, the airport’s Vice President of Communication, Prof. Dieter Weirich, and the Vice President of Fraport’s Environmental Management, Dr. Peter Marx. This year more than 78 schools from Hesse will share the title of “Environmental School in Europe” and will receive a certificate, stamp and flag.

Ecology by and for children and young adults

The title is coveted. It brings the school positive publicity. It also increases the chance to receive financial support at a time when money is tight. One way is through Fraport’s Environmental Fund. The airport has become the most important environmental sponsor in the region. Of the 18.1 million euros made available to date, fifty schools and other organizations have profited by obtaining financial assistance to increase natural habitat around the schools. In addition, funds were appropriated for school gardens, educational trails, forest pre-schools, educational farms, backpacks with educational materials about plants and animals and also for leaflets and websites with ecological themes.

The competition to earn the title of “Environmental School in Europe” is a good example of what environmental education can accomplish. It is about making children aware of the ecological connections, opening their eyes to the project and to general questions about the environment. Across Europe, more than 9,000 schools in 25 countries participated in the competition. Worldwide, 38 nations were represented. “Eco-Schools” was initiated by FEE (Foundation for Environmental Education). In the future, FEE wants Chinese and Indian schools to participate.

How new ideas grow and prosper

Frankfurt am Main, Dornbusch district. The award-winning Franz-Böhm-School is housed in a 1970s vintage school building. The vocational school has about 80 teachers and 2,000 students. Some of the students have apprenticeships and class two days per week. Others are preparing for graduation examinations. On average, students attend the school for two years and the turnover is high.

These are not ideal conditions to help students identify with the school. Nevertheless, there is a friendly, dedicated atmosphere. The teachers and the students discuss together how to improve school services. This is how the idea of a green classroom was born. In retrospect, no one really remembers exactly how it began. There were students who suggested that class be held outside during the heat of summer. There were teachers, who together with students began to redesign the paving stones of the schoolyard piece by piece: Small green islands emerged, benches were placed in areas where it was enjoyable to sit and have discussions, trees were planted that cast shadows.

Harry Redlich, a chemistry, physics and political science teacher gets to the point: “It is not that important who came up with the idea first. What is important is starting the process and doing the work.” That leaves the problem of financing. In addition to other sponsors, Fraport also provides financial support to the school from its Environmental Fund.
Money well spent

In the spring of 2005, at the end of a long, cold winter, the green classroom is finally taking shape. For months more than 20 students from different classes and three teachers, with help from different specialists, plan, discuss, conceptualize, dig, hoe, plant and fashion wood and metal. Soil is dug, stones set, trees and bushes planted. When it is finished there are 30 work areas where people can read, study, have discussions and conceptualize on warm days: a large eight-sided table with matching benches.

Over the past few years, the Franz-Böhm-School has taken part in many competitions surrounding the topics of school, nature and the environment. They have won many prizes. Both teachers and students agree that it is good for the school. The contest takes place within the context of project weeks and project days and there is no formally scheduled time.

The school does not only become more attractive to the outside because of these activities. In the group atmosphere of planning and realizing the projects, all the participants see how things can change and move forward through individual initiative. That is without a doubt the best experience that young people, on the verge of entering the working world, can have today.

Preventative fire protection as an interface between environmental protection and emergency management

Best protection is prevention

Airport Fire Department, Frankfurt Airport. There are about 170 personnel in two shifts in readiness 24-hours-a-day. The core group has two firefighting units that adhere to the regulations of the International Civil Aviation Organization (ICAO) and the Hessian fire code. They have three huge Simbas (fire trucks), one additional fire engine, a rescue stairway truck and a command vehicle. Their job is to fight aircraft fires. They have a maximum three-minute response time to any point on the airport. They carry 32,500 liters of water, 3,750 liters of foam and one ton of chemical extinguishing powder for the so-called first response. They hope that all this equipment and personnel will never be needed. But in the case of an emergency, they will be prepared with superbly trained fire personnel, competent leadership and new technologies. There is also another firefighting group responsible for fire protection in the buildings. They have two fire trucks, a ladder truck and a command vehicle.

Fire prevention in buildings can save many lives

Deployment of fire vehicles with flashing blue light and siren – that is how the general public perceives the fire department. The perception is correct, and at the same time incomplete, because the view does not include many facets of the job. The daily routine is not just limited to training for the big emergency. There are a lot of other things to do; perhaps not as spectacular, but nevertheless just as important.
The airport fire department has as much responsibility as it has diversity. Aside from constant training, the most important things on the daily agenda are preventative measures against fire and environmental damage. This guarantees a seamless compliance with airport-specific safety standards.
For Karl-Christian Hahn, chief of the Frankfurt Airport fire department, fire prevention in the buildings and hazardous materials storage areas is not a second class job. “Fire prevention in buildings doesn’t sound very exciting, but it can save a lot of lives. That is the main point. When something happens, fire defense can only help up to a point. That is why fire prevention is better than extinguishing a fire.” Fire prevention is, not only in Germany, a classic act of government. All plans for new structures and renovations at the airport have to be reviewed by the airport fire department where they are scrutinized to ensure they meet applicable fire codes. If the plans do not meet codes, additional fire prevention measures are recommended by the fire department. Measures include installing sprinklers, smoke and heat ventilation and fire alarms. Speaking of fire alarms, the airport has more than 50,000 of these useful devices. That is more than are installed in some large German cities. All are connected via protected, dedicated lines to the operation center. An alarm is automatically triggered if a line is somehow damaged. The fire alarms are dependable and very sensitive. About 75 percent of the deployments are triggered by the alarms. Therefore, the fire department is often on the scene before anyone notices anything or reaches for a phone to report an emergency.

Fire prevention is defined precisely in the building codes. Incorporation of fire prevention measures is required for structures with more than 1,600 square meters. Why this amount? The fire chief and the fire department trainer Reinhard Göckes cannot hold back their laughter. The law apparently became active in the distant past and is thought to have originated with Prussian government. It was meant to protect factories and barracks made out of brick from catching fire. Back then, the fire department could not spray water more than 20 meters. It takes a simple calculation. Being able to reach 20 meters on each side means a building could have length of 40 meters which, as a square, equals 1,600 square meters. Nevertheless, fire prevention is the best and most economic way of saving lives and maintaining the functionality of the airport.

A great deal of caution is needed when dealing with the storage of hazardous materials that are present on every aircraft. There are certain materials that when ignited cannot be extinguished with water; or that water used to put out a fire may contain chemicals that could impact upon groundwater. Containment devices to hold water run-off from fires are being planned. There needs to be separate storage and labeling of special firefighting chemicals that are used to combat a fire. Fire inspector Göckes asserts: “In this case, prevention and emergency management are essentially the same thing. With such complex situations, it is crucial to have integrated approaches to cover fire protection, environmental protection, industrial safety and security.”
Changing job descriptions: higher levels of competency and more responsibility

In an area this large, with such a high density of structures and people, there is always a chance that some source of risk has been overlooked. Or that the natural enemy of every hazard prevention program – the everyday routine – surfaces. Chief Hahn is certainly aware of this threat and knows what needs to be done to prevent it: “In the last few years we had to re-learn everything. Even Fraport functions differently today than it did as the former organization.

It is crucial that we delegate responsibility in order to quickly, consistently and competently make on-the-spot decisions. We ask more from our employees. For that reason, to prepare our co-workers for their new responsibilities we also have to be ready to give them high quality training and motivate them on all levels. The fire department used to be a quasi-military organization and many of our technical terms still reflect that. With the way our jobs look today, that kind of organization does not work. A modern airport fire department is not a military unit. It is a competence center propelled by knowledge. That means we are not an isolated group of elitists aside the rest of the organization: we have a great deal of responsibility. In some cases, we take chances; on the other hand, we are professionals. We will minimize risk wherever we can do it without negatively impacting our objectives. You can also say: That through the new demands of our profession, we are forced to develop a new view of our jobs. Fire prevention and environmental protection as well as efficient emergency management all play a central role. Those that welcome change remain true to themselves. That is exactly how we started out.”

Training at Fraport’s Fire Training Center (TTC), at Frankfurt Airport.
Fraport’s environmental department developed an aircraft noise study at Lima Airport for the Peruvian government. Based on calculations by experts in Frankfurt, there is a good chance that aircraft noise in the urban area can be clearly reduced.

From left: Michael Faust and Daphne Goldmann, Traffic and Terminal Management, Airport Expansion, Security, Realization Management Environmental Impacts; Natalia Delgado Quiñones, Environmental Coordinator Lima Airport Partners S.R.L.
The Andes rise in the east, and in the west the Pacific ocean surges against the shore. In between is a dry coastal region with an average elevation of about 30 meters that has a climate similar to southern California. In 1535 the Spanish conqueror Francisco Pizarro founded the City of Kings – “Ciudad de los Reyes” – that we recognize today as Lima. Lima is not only the capital of Peru, but also the economic and commercial center of the country. Like other South American cities, Lima has grown in leaps and bounds during the past 10 years. The population in 1951 was 835,000. Today it is more than 6.75 million, not including the suburbs. The population density is 8,184 people per square kilometer. In comparison, Berlin’s population density totals 3,800 for the same area.

The name of Lima’s international airport is “Jorge Chavez International Airport”. In 2002 there were a total of 66,072 aircraft movements (take-offs and landings). By 2030 that number is expected to triple. Based on these expectations the airport is being expanded. A new terminal is already in use and by 2011 the airport (international code LIM) is supposed to have a second parallel runway.

Fraport is a 43 percent partner in the airport and brings its airport development and airport management skills to the table. In addition to the classic areas of airport business such as ramp management and passenger service, there are also jobs in environmental management. That is how Fraport was requested by the Peruvian government to propose an aircraft noise study at the airport. Since there are no comparable environmental regulations in Peru, previous studies were never conducted. For this reason Fraport was instructed to perform the study.

“It wasn’t easy”, reported Daphne Goldmann, who together with her co-worker Michael Faust is responsible for evaluating the necessary calculations. “The data were looked at completely differently than in Frankfurt because in Peru there are no guidelines for assessing aircraft noise and it was the first time such a study had been attempted in Lima.” Nevertheless, the experts from Frankfurt were ambitious enough to do a comprehensive job that was based on the German Calculation Rule (AzB 99).

**Complex tasks, concrete results**

The first step was to agree on a strategy with the client in Lima. Work plans were viewed, algorithms used in debated calculations, the scope of the study was agreed upon (including military aircraft considerations) and a work plan in German and English was agreed upon. With the help of the computer software “Cadna A” noise computations for three time periods (2002, 2008, and 2030 with the proposed expansion) were then carried out. The most important parameters used in the calculations were the geographic data, the specific orientation of the airport, descriptions of flight paths and aircraft models with their associated climbing pattern, as well as noise emission values. Finally, the day and night noise patterns of the three scenarios were illustrated in the form of a noise contour map.

In November 2002, the study was presented in Lima. The first consequence of the report was that the government, in cooperation with Peruvian Air Traffic Safety, established a new departure route that bypassed most of the city. The new departure route now directs traffic over the harbor area of Callao then directly out over the open ocean. The second study from April 2003 confirmed that the aircraft noise pollution in the city of Lima could clearly be reduced.

“TThere is no doubt that our work was worth the effort”, laughed Daphne Goldmann. And Michael Faust added: “We not only performed a study for the books, but came up with effective improvements for the population of Lima. We really could not ask for more from our jobs.”
Environmental Information

* Areas highlighted in yellow and blue are not included in the 2005 EMAS revalidation
Environmental Protection and Management

at Frankfurt Main Airport – Facts and Figures
FRA and Fraport AG

“We keep the hub moving”

Frankfurt Airport and its operator Fraport AG

Frankfurt Airport is Germany’s largest airport and is one of the most important hubs for passenger transfers in Europe. In 2004, Frankfurt Airport ranked eighth in the world in terms of passenger volume and sixth in cargo volume. In total, 51.1 million passengers and over 1.75 million metric tons of cargo (excluding mail) passed through the airport. With more than 68,000 workers, Frankfurt Airport is Germany’s largest single place of employment.

Historical airport development highlights

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1924</td>
<td>Südwestdeutsche Luftverkehrs AG (Southwest German Air Traffic Incorporation) was founded.</td>
</tr>
<tr>
<td>1936</td>
<td>“Rhine/Main” began flight operations, first Ju 52 landed, runway was still not fixed, airships (dirigibles) were a popular mode of transportation (Fig. 1).</td>
</tr>
<tr>
<td>1944</td>
<td>Airport destroyed during World War II.</td>
</tr>
<tr>
<td>1947</td>
<td>Verkehrsaktiengesellschaft Rhine-Main (V.A.G.) established.</td>
</tr>
<tr>
<td>1948</td>
<td>Berlin airlift occurred (Fig. 2).</td>
</tr>
<tr>
<td>1949</td>
<td>Parallel take-off and landing systems went into service.</td>
</tr>
<tr>
<td>1954</td>
<td>Airport operator renamed as Flughafen Frankfurt/Main AG (FAG).</td>
</tr>
<tr>
<td>1955</td>
<td>First post-war Lufthansa airplane touched down.</td>
</tr>
<tr>
<td>1959</td>
<td>Jet era started with the Boeing 707.</td>
</tr>
<tr>
<td>1961</td>
<td>Night mail network launched.</td>
</tr>
<tr>
<td>1970</td>
<td>The first jumbo B 747 landed at Frankfurt.</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1972</td>
<td>Terminal 1 inaugurated.</td>
</tr>
<tr>
<td>1980</td>
<td>Railway station came on line.</td>
</tr>
<tr>
<td>1984</td>
<td>Runway 18-West commissioned.</td>
</tr>
<tr>
<td>1990</td>
<td>Terminal 2 foundation laid.</td>
</tr>
<tr>
<td>1993</td>
<td>Basic agreement on the partial restitution of the US-Air Base drafted.</td>
</tr>
<tr>
<td>1994</td>
<td>Terminal 2 opened and the elevated rail link between the two terminals, dubbed Sky Line, became operational (Fig. 4).</td>
</tr>
<tr>
<td>1997</td>
<td>FAG handling facilities in CargoCity South opened, Concourse D linked with Terminal 1, Sky Line extended westwards.</td>
</tr>
<tr>
<td>1999</td>
<td>Long-Distance Train Station commenced operations (Fig. 3).</td>
</tr>
<tr>
<td>2000</td>
<td>Concourse A expanded, airport operator rebranded “Fraport AG Frankfurt Airport Services Worldwide”.</td>
</tr>
<tr>
<td>2001</td>
<td>Fraport AG the first airport operator to be listed on the German stock market.</td>
</tr>
<tr>
<td>2002</td>
<td>Newly-built, high-speed track connected to Cologne.</td>
</tr>
<tr>
<td>2007</td>
<td>New long-haul Airbus A380 aircraft introduced (Fig. 5).</td>
</tr>
</tbody>
</table>
### Fraport AG corporate data 2004

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees of Fraport Group</td>
<td>24,182</td>
</tr>
<tr>
<td>Employees (^1) of Fraport AG located at FRA</td>
<td>12,203</td>
</tr>
<tr>
<td>Employees of Fraport AG and associated companies</td>
<td></td>
</tr>
<tr>
<td>located at FRA</td>
<td>15,482</td>
</tr>
<tr>
<td>Group revenue ([\€])</td>
<td>1,998.1 mil</td>
</tr>
<tr>
<td>Group profit ([\€])</td>
<td>136.4 mil</td>
</tr>
<tr>
<td>Total dividend payment ([\€])</td>
<td>68.0 mil</td>
</tr>
<tr>
<td>Taxes on income ([\€])</td>
<td>120.9 mil</td>
</tr>
</tbody>
</table>

\(^1\) Excluding trainees.

### Traffic figures and basic data for 2004

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>2</td>
</tr>
<tr>
<td>Passengers</td>
<td>51.1 mil</td>
</tr>
<tr>
<td>Passengers per day (^1)</td>
<td>139,600</td>
</tr>
<tr>
<td>Air freight ([\text{t}])</td>
<td>1.75 mil</td>
</tr>
<tr>
<td>Mail ([\text{t}])</td>
<td>11.8 ths</td>
</tr>
<tr>
<td>Daily cargo volume (^1)</td>
<td>approx. 4,700</td>
</tr>
<tr>
<td>Aircraft movements (^2)</td>
<td>477.5 ths</td>
</tr>
<tr>
<td>Take-offs and landings per day (^1)</td>
<td>approx. 1,300</td>
</tr>
<tr>
<td>Passengers per aircraft movements</td>
<td>117</td>
</tr>
<tr>
<td>Seat load factor ([%])</td>
<td>71.0</td>
</tr>
<tr>
<td>Airlines 2005 (^3)</td>
<td>109</td>
</tr>
<tr>
<td>Destinations 2005 (^4)</td>
<td>304</td>
</tr>
<tr>
<td>Percentage of transfer passengers (^4)</td>
<td>53</td>
</tr>
<tr>
<td>Passenger railway stations</td>
<td>2</td>
</tr>
<tr>
<td>Trains per day (^3)</td>
<td>376</td>
</tr>
<tr>
<td>Total no. workers (at airport)</td>
<td>over 68,000</td>
</tr>
<tr>
<td>Total land area ([\text{km}^2])</td>
<td>approx. 19.25</td>
</tr>
<tr>
<td>Operational area ([\text{km}^2])</td>
<td>approx. 16.25</td>
</tr>
<tr>
<td>No. of companies and government agencies</td>
<td>over 500</td>
</tr>
</tbody>
</table>

\(^1\) Average.  \(^2\) Excluding military.  \(^3\) Summer scheduled flights.  \(^4\) Airplane to airplane.

### Ecological advantages of the hub function

Frankfurt Airport is a major transportation hub connecting the European and intercontinental air networks. In 2004, as much as 53 percent of all passengers passing through the airport facilities transferred to flights to other destinations. The prime environmental benefit derived from bundling air traffic is that it brings about a reduction in the number of direct flights between smaller airports and allows, at the same time, the deployment of larger aircraft on intercontinental routes. This creates a more favorable balance between structural weight, payload and fuel consumption. The planned use of new A380 long-haul aircraft should further reinforce this effect.

Another key aspect of the hub function is the increasing significance of intermodal transportation, which basically integrates air and rail travel. Because Frankfurt Airport boasts an excellent connection to the German high-speed train network at its AIRail Terminal, more and more passengers travel to the airport by ICE (InterCityExpress trains). In its effort to continue streamlining the schedules and services of Frankfurt Airport as an intermodal juncture, Fraport AG, the airport operator, has made this issue a central goal of its corporate strategy.

The major carrier serving Frankfurt Airport is Lufthansa, which currently employs over 32,600 people at its home base.

### Fraport AG the airport group

The owner and operator of Frankfurt Airport is Fraport AG Frankfurt Airport Services Worldwide. Fraport owns shares in more than 50 companies worldwide. The Fraport Group is primarily publicly owned by the State of Hesse, the City of Frankfurt am Main, and, up to October 2005, the Federal Republic of Germany. Its shares are traded on the Frankfurt Stock Exchange and are listed on the MDAX.

### Fraport AG corporate structure

The current organization of Fraport consists of:

- 3 Strategic business units
- 8 Central units
- 2 Service units
- 7 Staff departments which report directly to the Executive Board

The following units, detailed below, are important components of airport operations. They are especially significant to airport development and expansion as well as to efficient environmental management.

#### Traffic and Terminal Management, Airport Expansion, Security (FBA)

The strategic Traffic and Terminal Management, Airport Expansion, Security unit oversees the operation and development of the airport’s airside and landside infrastructure. This includes the runways, aprons and taxiways, both terminals, gate positions and parking positions. FBA is also responsible for the retail and service facilities. The most important area of business within the FBA is the so-called aviation segment. The airport charges that airlines pay to Fraport for the use of its facilities are managed under this area. FBA is also responsible for linking the air, rail and highway modes. Further core areas are security and customer care.
Within the context of Fraport’s environmental management system, FBA is in charge of operative environmental protection activities related to terminal management, airport security, airfield grounds, aircraft noise monitoring and parts of emergency management.

The business area within FBA called Expansion manages the entire planning and implementation process related to the expansion and increased capacity of Frankfurt Airport. Environmental prevention and environmental protection play a central role. Within the framework of the current approval process, internal and external experts research the general effects the airport, in its current configuration, has on the environment. Possible ecological impacts caused by airport expansion projects and operation of the new complex are also assessed in detail.

**Ground Services (BVD)**
The Ground Services unit (BVD) is the largest service provider for aircraft landing and taking off at Frankfurt Airport. This includes ramp services (ground handling, loading and unloading, lavatory and waste disposal services, push back, cargo and mail transport), baggage handling (baggage transportation) and passenger service (check-in, boarding, baggage checks, assistance, ticket sales etc.). BVD maintains its own fleet of vehicles to provide services on the apron. These include aircraft trucks, passenger buses, supply and disposal trucks. The BVD operates 67 kilometers of baggage conveyor systems. Within the context of Fraport’s environmental management, BVD is responsible for all the environmentally-related activities associated with BVD ground handling activities and the central BVD infrastructure.

**Real Estate and Facility Management (IFM)**
Real Estate and Facility Management (IFM) is responsible for the purchasing, planning, construction, maintenance and marketing of all floor space and buildings at the airport. IFM teams up with two subsidiaries: Energy Air GmbH, which supplies the airport with energy, and Flughafenservice GmbH, which specializes in waste disposal. Within Fraport’s environmental management system, IFM is primarily involved with buildings, energy and waste disposal management, landscape planning, workshop areas, equipment service and maintenance, service stations and goods receiving areas.

**Retail and Properties (HVM)**
The Retail and Properties business unit (HVM) combines the resources of commercial development, marketing and lease management at the airport. Innovative shopping and service experiences are created in balance with airport practices. In addition, the employees at HVM develop and market multi-purpose real estate, including exclusive office space close to the terminal, innovative real estate concepts – for example CargoCity – and suitable parking facilities. Within Fraport’s environmental management system, HVM is primarily responsible for matters related to traffic, parking and, to some extent (in agreement with IFM and BVD), contaminated sites and building design.

**Central Purchasing, Construction Contracts (ZEB)**
All purchasing and procurement is concentrated within this central unit (ZEB). This allows ecological criteria and targets to be implemented as early and as effectively as possible (for example, when purchasing operating materials).

**Human Resources (PSL)**
Human Resources (PSL) plans and implements training courses encompassing relevant environmental topics. Company representatives for dangerous goods and radiation protection, occupational safety, health protection, occupational medicine and the airport clinic are also assigned to this central unit.

**Staff department for Environmental Management (VAU)**
On November 29, 2004, the Executive Board resolved to reorganize responsibilities within Fraport AG. This new staff department for environmental management (VAU), established by the Executive Director of Labor Relations, is responsible for the coordination and strategic development of the environmental management program. Additionally, it provides services, planning and concepts for operative measures. VAU also acts as advisor and is the primary contact for environmental protection issues throughout the Fraport Group. Company representatives for waste and water protection are also included within this new group.
Goals and organizational levels

Fraport AG’s environmental management system was set up in 1999 in accordance with the environmental management and environmental audit standards of EMAS. Therefore, it conforms to the globally recognized ISO 14001 Norm (EMAS = “Regulation (EC) Nr. 761/2001 of the European Parliament and of the Council of March 19, 2001 allowing voluntary participation by organizations in a Community eco-management and audit scheme”). By being EMAS validated, Fraport confirms that it • operates its facilities and processes in accordance with applicable legal standards (legal conformity); • has introduced and implemented systematic procedures in operational environmental protection; • works to continually improve its environmental performance and makes these improvements provided there are no overriding economic reasons to prevent it from doing so; • informs the public in an adequate manner and to an appropriate extent about its environmental impacts and its environmental performance.

The Executive Board has objectives for the EMS which are stated in the environmental policy guidelines. The guidelines can be found in the following chapter of this publication. These general objectives are integrated into the environmental program and encompass the environmentally relevant areas of the company and the airport site (FRA).

The EMS carries out strategic as well as operative functions. The implementation of environmental objectives and measures within the respective business areas is as important as the maintenance and further development of the entire organization.

Structure and functions

The environmental management coordinator advises the Executive Board and senior management on all issues related to environmental management. He also deals with all required organizational and coordination tasks and authorizes the internal environmental audit and external auditing of the environmental management system (according to EMAS and ISO 14001). The Vice President of the environmental management division and the environmental management coordinator (VAU) report to the Executive Director of Labor Relations, who is one of the four members of the board at Fraport AG.

Environmental officers actively work to comply with legal requirements of environmental protection. Company representatives in charge of waste management and water protection are integrated in VAU. The company representative in charge of dangerous goods and radiation protection lies within the occupational safety department (PSL-A).

The responsibility for environmental issues is held by the directors of the business units. The organization of duties is delegated to different levels of management. The environmental coordinator and environmental officers provide additional support to the operating areas related to environmental issues. In addition to their advisory roles, the environmental management coordinator and company representatives monitor the progress made by the different business units to ensure that the legally-binding objectives of environmental management are met.

Components of the EMS

The key components of the EMS are:

The Environmental Program

The environmental program reflects the Executive Board’s environmental policy and contains the targets, measures, means, responsibilities and implementation deadlines.

Internal Standard Operating Procedures, Company Regulations and Work Instructions

Internal standard operating procedures, company regulations and work instructions provide clear guidelines which enable the transparent flow of work.

Internal Environmental Audits

Accredited environmental auditors are used to carry out internal audits. The auditors determine whether the business is in compliance with applicable legal and authority regulations. They also establish whether internal environmental management requirements are being met and that the stipulated targets and objectives are being pursued and attained. If not met, the required changes must be made within an established period of time.

The Assessment of Environmental Aspects

Environmental aspects are assessed on the basis of legislation, as well as benchmarks established by accredited institutions, the current state of technical and scientific
knowledge, and the wishes of groups with legitimate interests. When performing assessments, a distinction is made between direct and indirect effects. Direct effects are those that can be traced back to Fraport itself. In this case, the company has the option of deciding upon how it can best correct the impact caused. Conversely, if third parties are at fault, Fraport has only indirect, and therefore restricted, possibilities to rectify the situation.

The System of Environmental Indicators
The assessment of environmental aspects is supported by a system of environmental numerical indicators which provide fundamental information on emissions (pollutants and noise, for example); on resource utilization (energy, water and soil, for instance); and a series of other important parameters.

Management Review
The environmental management coordinator submits an annual report upon which the Executive Board conducts a management review. In connection with this, the need for adjusting the company’s environmental policy, goals and management system is evaluated.

Employee training
Employees need special knowledge and skills to perform environmental management tasks. Supervisors are required to ensure these skills are developed. The Human Resources central unit (PSL) is also responsible for training in this area. It offers legally imposed training for the transportation of dangerous goods and radiation protection. Along with worker training, special courses tailored to meet the needs of environmental auditors and managers are also offered.

Influencing third parties
With regard to the more than 500 companies and government agencies located at the airport, Fraport employs a range of instruments in a bid to influence their impact on the environment. These tools include the Airport User Regulations (conditions of airport use) and other applicable supplementary directives, including the General Airport Regulations. Any irregularities noticed by Fraport are brought to the attention of the management of the company concerned. The company is then presented with suitable solutions. Once a course of action is decided upon, Fraport can then offer appropriate support.
Fraport AG’s Executive Board has approved a new environmental policy. The new vision for Frankfurt Airport elevates environmental protection to a main goal. Sustainability, based on economic, ecological and social criteria is now a top priority. With its new corporate vision and goal, Fraport emphasizes its commitment to its stakeholders – customers, suppliers, shareholders, employees and neighbors – by making environmental management a key issue of future corporate strategies.

We acknowledge our responsibility to the environment
In order to maintain our connection with nature, we have made a special commitment to environmental protection and environmental sustainability. We believe that environmental protection does not stop at the airport’s boundaries and we go beyond what is legally required of us.

Environmental protection is everyone’s responsibility
Our employees understand the importance of commitment and participate actively to achieve common goals. They are willing to assume responsibility and stand by the results of their actions. Clear and decentralized management of responsibilities allows sound decision-making. Environmental awareness is promoted among our staff at all levels. Management and employees communicate with each other in a concerted effort to improve environmental protection in all areas of the company.

Continuous improvement to environmental protection
Our goal is to help conserve valuable resources for future generations. This is consistent with our environmental management system. We continually strive to improve the company’s environmental protection and prevent adverse impacts. Where this is not feasible, we seek solutions that cushion the impact on the environment and conserve natural resources. Whenever economically feasible, we give preference to the deployment of leading-edge and environmentally-friendly technology.

We develop mobility and make it an exciting experience for our customers. We see our airport as an intermodal hub where modes of transportation are linked systematically.

As an employer and driver of the economy, we are conscious of our corporate responsibility to our employees, to society and to the environment.

In managing our business we focus on sustainability and ensure that our corporate activities conform to economic, social and ecological standards.

Statement by the Executive Board of Fraport AG
Environmental Protection and Management at Frankfurt Main Airport

Environmental Aspects

Systematic environmental protection
Consistent with our environmental management system, we regularly conduct audits which determine whether our business practices conform to our environmental policy and objectives. Should any discrepancies arise, remedial action can be taken. Moreover, by ensuring compliance with all legal and regulatory requirements, environmental incidents and associated impacts can be prevented.

We monitor and evaluate our impact on the environment
By regularly collecting essential data, we are able to monitor, analyze and assess the effects that airport operations have on the airport site and surrounding areas. This enables us to determine and evaluate the effects of new activities, new products and new procedures in advance.

We are open to discussion
We pledge to maintain an open dialog with the surrounding communities. We are very aware of our social responsibilities to maintain partnerships and open lines of communication. One example is Fraport’s sponsorship of environmental projects. Furthermore, we strive to promote environmental awareness at the airport by making all pertinent data and information available to the public.

In our efforts to mitigate our company’s impact on the environment, we work in close cooperation with the regulatory agencies.
We conduct all our discussions concerning the environment in an open and honest way, in tandem with local businesses and our customers. We actively encourage all companies operating at the airport to apply the same environmental standards as we do.

Actively protecting the environment
This chapter reviews the environmentally relevant topics at Frankfurt Airport. It describes the environmental impacts associated with the airport and, where applicable, assesses them in the light of relevant legislation and regulations.
Goals and objectives are created, based on these evaluations. The primary goals and objectives are summarized again in the following chapter to provide a concise overview of environmental protection activities at Frankfurt Airport.
**Aircraft Noise**

**Increasing air traffic and noise**
After September 11, 2001, the ensuing worldwide economic crash and the SARS crisis caused long-term stagnation in global air traffic. Frankfurt Airport was also affected during that time and a slight decrease in air traffic was observed. Since 2004, the trend has been moving in the opposite direction. Both passenger and cargo traffic have recorded considerable growth. With this in mind, Fraport AG and other companies and institutions at the airport dealing with noise management continue to implement various measures in a bid to reduce noise levels in the areas surrounding the airport. Fraport’s long-term objective is to manage the rise in noise in a way that it is reduced relative to increasing air traffic.

**Development of aircraft movements**
The total number of aircraft movements at Frankfurt Airport has increased by over 42 percent in the last 15 years. Night flights are restricted by the Hesse Ministry of Economics, Transportation and State Development. After significant aircraft movement increases in 1998 and 1999, only small changes have been noted since 2000. One example is the increased number of military flights during the last few years related to logistical support for the Iraq war. However, after 2006, military aircraft movements will end because the U.S. Air Force is relocating to Ramstein. This will lead to a decrease in noisy night flights.
Environmental Protection and Management at Frankfurt Main Airport

Changes in aircraft noise at representative monitoring points

Noise levels at Frankfurt Airport have been measured continuously during the past 40 years. The aircraft noise monitoring system consists of 26 fixed stations, two mobile stations and a bus. The system was completely modernized in 2004. The current monitoring equipment is technically up to date and has a radar data link to the Federal Bureau for Air Traffic Control. Based on the collected measurements, the equivalent continuous sound level, $Leq(4)$, is calculated according to the Air Traffic Noise Act, which is used as a relevant benchmark for aircraft noise monitoring. $Leq(4)$ is composed of three variables: noise intensity, noise duration and noise frequency. These values, which refer to single noise events, are converted into a comparable continuous noise level in accordance with DIN 45643 (measurement and assessment of aircraft noise) guidelines.

In order to assess the historical development of aircraft noise, it is especially informative to draw on data generated at particular monitoring stations. The graph on page 52 shows the development of aircraft noise since 1988, for approach/departure routes and ground aircraft noise, measured at two representative monitoring points. The increase in aircraft movements, but the decrease in the equivalent continuous sound level, towards the end of the ’90s was due to the reduction in numbers of older aircraft types certified by ICAO whose noise levels were classified in Annex 16, Chapter 2. These relatively loud aircraft were replaced with quieter models over the years. Even with an increasing number of aircraft, the noise level on the ground was reduced.

The monitoring stations which measure the noise levels of departing flights, taxiways and ground operations, illustrate this development very clearly. These areas are predominantly influenced by engine noise. During the approach for landing, engines are working at reduced capacity. However, in addition to the noise produced by the engines, there are also noises caused by air flowing over the aircraft; for example, noise created by the landing gear and flaps. Correspondingly, the monitoring stations recorded little difference for approaches when the Chapter 2 aircraft were taken out of service. Since the end of the ’90s, the noise level has tended to rise due to the continued increase in aircraft movements. In the years from 2002 to 2004, there was a significant increase in military aircraft movements due to the Iraqi war.

Recognizing a general trend in the development of aircraft noise over a short period of time is made difficult by the fluctuations in the directions of approaching and departing flights. From a statistical point of view, on average 75 percent of flight operations at Frankfurt Airport are conducted in a westerly direction. In other words, aircraft take off towards the west and land from the east using the parallel runways in direction “two-five”. Twenty-five percent of flight operations are routed in an easterly direction, which means planes take off towards the east and land from the west using the parallel runways in...
Environmental Protection and Management at Frankfurt Main Airport

Considerable changes in aircraft noise management since 2002

The Hesse Ministry of Economics, Transportation and State Development (HMWVL) night flight restrictions clearly state which types of flight movements can take place and at what times.

Additionally, there are flight restrictions at night on certain routes for all aircraft, including those of the military. Aircraft with three or four engines are banned from flying along north-west departure routes, Masir and Tabum Golf, between 10pm and 7am. Instead, these aircraft follow south-westerly night departure routes. In this way, the residential areas along these routes are relieved of aircraft noise. Aircraft with three or four engines are banned from flying along north-south departure routes, 07-N-short and 07-S-short in direction “zero-seven” (eastern direction), 24 hours per day. Between 10pm to 7am, all aircraft traffic is banned from this route because a university hospital is located directly beneath it (07-N-short).

Both monitoring points that measure noise levels on departure (MP 12 in Bad Weilbach and MP 51 Wörwelden) are influenced by the direction of flight operation. MP 12 is situated under a departure route where aircraft only fly in one direction (25/western). MP 51 is located beneath a departure route for aircraft which take off from Runway 18-West. The use of this runway is independent of the direction of aircraft operations on the parallel runway system. The monitoring stations MP 03 in Zeppelinheim and MP 08 in Kelsterbach mainly record the noise caused by ground run-ups and taxiing.
Increasing altitude prior to en-route clearance

Departing aircraft must follow minimum noise routes. Only when an aircraft has reached a certain altitude are air traffic controllers at the DFS allowed to grant the flight captain a so-called direct en-route clearance. In the past, the minimum altitude for direct en-route clearance has been increased many times. The most recent change was based on a recommendation from the Aircraft Noise Abatement Commission. The minimum altitude is now:

- 6am – 7am: 8,000 feet (approx. 2,440 meters)
- 7am – 10pm: 6,000 feet (approx. 1,830 meters)
- 10pm – 11pm: 8,000 feet (approx. 2,440 meters)
- 11pm – 6am: 10,000 feet (approx. 3,050 meters)

Time data are local times. In the past, the minimum altitude from 7am to 10pm was 5,000 feet (approx. 1,525 meters) and from 10pm to 7am 8,000 feet.

Testing the new noise abatement procedure: the continuous descent approach (CDA)

Since early April 2005, aircraft approaching Frankfurt Airport at night have been using the continuous descent approach (CDA) procedure. The CDA is another way of reducing noise levels in addition to the noise abatement approach and allocation of departure routes. Basically, approaches are quieter than departures since only a small amount of engine power is required.

However, aircraft continuously moving at low altitude are a source of noise. With the CDA procedure, aircraft use an uninterrupted glide, requiring less engine power, during the approach. From a technical standpoint, this procedure is quite difficult, since it depends on the length of the approach route, the starting altitude, the rate of descent and the speed of the aircraft. A CDA procedure is occasionally implemented on a temporary basis under the following conditions: air traffic congestion is predictable; it will not lead to delays; and, there are no safety issues (such as aircraft separation) or limitations due to weather conditions. For this reason, the procedure can only be used at night.
Environmental Protection and Management at Frankfurt Main Airport

Air (Emissions and Pollutant Concentrations)

Sustained measures to control air pollution and reduce emissions

The public debate over the effects of global air traffic on the earth’s atmosphere and climate is ongoing. Scenarios extending into the year 2050, presented by the United Nations Intergovernmental Panel of Climate Change (IPCC), stress, on the one hand, that advances in aviation technology will lead to a reduction in both specific fuel usage and specific CO2 emissions; and, on the other, to an increase in nitrogen oxides (NOX). While the atmospheric effects caused by certain aircraft processes are clear, the impacts of other processes have not been sufficiently researched. The impact of air traffic, as a whole, on the atmosphere is small and estimated to account for 3.5 percent of the total. Experts, however, recommend that aircraft emissions be consistently reduced over time. And, in addition to technical innovations, they increasingly expect improvements in aviation management for take-offs and landings at airports. There are also opportunities for improving airfield traffic (taxiing) and streamlining start-up procedures. The airport can make a positive contribution through organizational and technical measures. This is especially important for air quality in the surrounding area. In addition, the airport plays a central role in the monitoring and documentation of emissions.

Sources of emissions at the airport

Air pollutants at Frankfurt Airport are produced by aircraft operations, as well as various vehicles and stationary machinery. Correspondingly, there are a variety of pollutants including: the airport operator (Fraport), the airlines, the fueling operators, businesses located at the airport, employees and suppliers, as well as passengers and visitors who travel to the airport by car. Fraport, as the airport operator and a cause of pollution, can exert direct influence on the emissions from ground support equipment and vehicles. These include aircraft tugs, trucks, cargo and baggage handling equipment, and buses – as well as stationary emission sources such as back-up generators, gas- and oil-powered heating systems and diesel-powered ground power units used to provide electricity on aprons where 400 Hertz power supply is unavailable.

Status of the Ten-Point Action Program

The Executive Board introduced Fraport’s Ten-Point Action Program in May 2000. It encompasses a range of recommendations and activities aimed at further reducing noise levels and preserving citizens’ right to a good night’s sleep. The program has progressed and some of the points have been completely implemented. Using other locations (Point 1) was implemented primarily through the expansion of Frankfurt-Hahn Airport and the improvements made to its traffic connections.

Increased usage of the railway (Point 2) has also proved to be a success. The number of passengers traveling to the airport by InterCityExpress (the high-speed train service) has increased as short-distance flights have declined.

Self-imposed night restrictions by airlines (Point 3) has ensured that noise levels have remained below the total number of points (noise quota system) allowed.

The possibility of rescheduling night mail operations (Point 4) is no longer a concern since the number of these aircraft movements has decreased from 26 per night in 2000 to only 4 in 2005.

The mandatory introduction and use of low-noise approach and take-off procedures at night (Point 5), as well as noise mitigation on approach and departure routes, were successful.

Fraport’s noise abatement program (Point 6) has been implemented in 11 communities since March 2002. The conditions of participation and further details of the program are detailed in the 2002 environmental statement. Further information can be gleaned from this environmental statement in the article entitled “Quiet all night long – Fraport’s Noise Abatement Program”. By May 2005, approximately 7,000 households had applied for financial support for noise abatement. A total of 21 million Euros has been assured in reimbursement agreements for sound insulation upgrades so far. Applications can be submitted up to April 26, 2006.

The amended airport charges went into effect in January 2001. These landing charges are based on actual noise levels (Point 7) and are even higher for night operations (Point 8). The charges were increased in 2004 and 2005. In the meantime, the proposed upgrading of the aircraft monitoring system (Point 9) was completed.

A free hotline for answering citizens’ inquiries about noise and the airport extension (Point 10) was established in 2000 and became one of the many communication channels for the surrounding communities.
Comparison of the different air pollutants generated at the airport

At the airport, carbon monoxide, nitrogen oxides and dust make up the largest part of the airport’s total environmentally-relevant emissions. Then come hydrocarbons, sulfur dioxide, PM10 (fine dust particles with a diameter less than 10µm), soot and benzo(a)pyrene [B(a)P].

Air traffic is the main source of emissions at the airport. Vehicles on the apron, as well as traffic on roads in and around the airport, constitute the second largest emissions source. In comparison, stationary sources including heating systems contribute only a small amount to these totals. On the other hand, PM10 and benzo(a)pyrene [B(a)P] are predominantly produced by traffic on the apron and the airport roads.

Comparison of airport emissions with the surrounding area

The development of emission levels at the airport between 1979 and 2000 was detailed in the 2002 environmental statement. During this time, the amount of carbon monoxide (CO) and hydrocarbons (HC) was significantly reduced, while the emission of sulfur dioxide (SO2) remained at nearly the same low level. In contrast, nitrogen oxide emissions rose.

The Hessian State Agency for Environment and Geology has meanwhile produced a state-wide emission register for the year 2000 which included research on the lower Main valley area. This area stretches 30 kilometers east to west and 10 kilometers north to south, and encompasses the following cities and communities: Frankfurt am Main (excluding Bonames, Harheim, Kalbach, Nieder-Erlenbach, Nieder-Eschbach), Offenbach am Main, Steinbach (Taunus), Eschborn, Sulzbach (Taunus), Hattersheim, Raunheim, Kelsterbach, Mühlheim am Main, Hainburg (excluding Klein-Krotzenburg district), Großkrotzenburg, Hanau and Maintal.

The emission register documents sources up to an altitude of 300 meters, as stipulated by the fifth administrative regulation in the Federal Emission Control Act. Emissions up to this altitude are the main contributors to air pollution near the ground. This reference level was adopted to include emissions from the airport. The following direct comparison between emissions from the airport and the surrounding area illustrates the significance of individual pollutant groups on the level of pollution in the region.

The graphs show that the total emissions produced by the airport, when compared to the lower Main river valley, are very low. The proportion of emissions produced by vehicle traffic and stationary sources at and around the airport is considerably less than that produced by aircraft traffic.

While a reference altitude of 300 meters is used when measuring air quality near the airport, other parameters are used to assess regional and global air quality. The parameters used to create national and global emission inventories (which bear no relation to local areas) are listed in the following table for the sake of completeness. For comparison with the Hessian Emission Register, for example, the CO2 emissions up to 300 meters are used.
Comparison of annual emissions up to 300 meters above the ground caused by aircraft traffic at Frankfurt Airport in 2003/2004

<table>
<thead>
<tr>
<th></th>
<th>t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NOx</strong></td>
<td></td>
</tr>
<tr>
<td>'03</td>
<td>2,382</td>
</tr>
<tr>
<td>'04</td>
<td>2,486</td>
</tr>
<tr>
<td><strong>HC</strong></td>
<td></td>
</tr>
<tr>
<td>'03</td>
<td>6.44</td>
</tr>
<tr>
<td>'04</td>
<td>6.54</td>
</tr>
<tr>
<td><strong>CO</strong></td>
<td></td>
</tr>
<tr>
<td>'03</td>
<td>2,599</td>
</tr>
<tr>
<td>'04</td>
<td>2,653</td>
</tr>
<tr>
<td><strong>SO2</strong></td>
<td></td>
</tr>
<tr>
<td>'03</td>
<td>16.6</td>
</tr>
<tr>
<td>'04</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Fleet mix

The movements of all aircraft both on the ground and in the air are registered in a database and can be evaluated on an annual basis. Individual aircraft in Fraport’s database are classified according to their engine types with the help of a special database (JP Airline Fleet).

Emission parameters

The emission specifications for the engines are based on the ICAO emissions database which contains information on HC, CO und NOx. The emission values for CO2, SO2, benzene, toluene, xylenes, B(a)P, soot and PM10 are established using methods outlined in the permits and zoning procedure for the airport expansion.

Phases of flight

The phases of flight are based on the stages defined in the ICAO-database: Idle, Take-off, Climb-out, Approach. These flight phases make up the “LTO” (Landing and Take-off) cycle. For emissions certification purposes, ICAO has defined a standard cycle with fixed allocated times for the individual stages. The ICAO standard covers the interval up to an altitude of 3,000 feet (914 meters) based on a reference climbing pattern. For the Fraport evaluation, the most emissions-relevant interval of the lower 300 meters must be reported as accurately as possible. Due to this, aircraft movements within the climb-out phase are grouped into classes. The reports are generated for an altitude of up to 300 meters. The grouping of climbing profiles is based on the respective German instructions for the modelling of aircraft noise.

Recording aircraft emissions

In the past, emission data were collected less often, using inconsistent methods. In comparison, emission data from surrounding areas were analyzed at great length in 2000 within the permits and zoning process associated with airport expansion. To ensure that the development of emissions is accurately monitored, a method was developed which uses operational data as the basis for calculations. At the moment, this is only useful for aircraft emissions since operational processes are uniformly and extensively documented. Collecting data from the various ground handling processes and vehicle traffic is extremely complex.
In addition, hydrocarbon contributions from the main-engine ignition sequence, and emissions from the auxiliary power units, are estimated according to the requirements of the zoning permit.

The results for 2003 were slightly lower than those of 2004 as a result of a temporary decrease in air traffic in 2003. In contrast, the proportion of auxiliary power units (APUs) used during the hot summer of 2003 was slightly higher. The results are based on an approximation of periods when the demand for heating or cooling is high especially during periods of high or low temperatures. Otherwise, the results are as expected.

**Emissions inventory details in the vicinity of Frankfurt Airport**

The EU directive 2001/81/EG (the so-called NEC directive from October 23, 2001) places limits on the following emissions beginning in 2010: sulfur dioxide (SO₂), nitrogen oxides (NOₓ), volatile organic compounds (VOCs) and ammonia (NH₃). The procedure for creating the emission inventory and forecast is outlined in the handbook produced by EMEP/CORINAIR (Emission Inventory Guidebook of the European Environment Agency). According to the available database, there are different options providing different degrees of reporting. In order to create a consistent database spanning all German states, the altitude at which emissions are calculated must be standardized. According to the NEC directive, the LTO cycle, as defined by the ICAO, applies to emissions produced by aircraft flying below 3,000 feet (approx. 914 meters). Therefore, using the methods described above, Fraport also evaluates respective emissions up to an altitude of 914 meters. In the larger context, carbon dioxide (CO₂) levels are also important and have therefore been included.

**Emissions from apron traffic**

Approximately 60 percent of the traffic on the apron and on the roads inside the airport is generated by Fraport. This traffic can be directly influenced. The emissions associated with it are directly related to the amount of diesel fuel consumed. Increasing diesel consumption is due to the rise in airport traffic. However, when based on a "traffic unit", consumption is actually remaining stable.

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**Emissions from air traffic at Frankfurt Airport**

<table>
<thead>
<tr>
<th>Emissions</th>
<th>Basis: up to 914 meters above the ground</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOₓ</td>
<td>t/year</td>
<td>3,569</td>
<td>3,803</td>
</tr>
<tr>
<td>SO₂</td>
<td>t/year</td>
<td>203</td>
<td>214</td>
</tr>
<tr>
<td>VOC (HC)</td>
<td>t/year (VOC (volatile organic compounds)</td>
<td>358</td>
<td>354</td>
</tr>
<tr>
<td>CO₂</td>
<td>t/year</td>
<td>799,941</td>
<td>843,207</td>
</tr>
<tr>
<td>CO₂</td>
<td>t/year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Engine exhaust does not contain NH₃.
2) VOC (volatile organic compounds) means HC (hydrocarbons).
3) VOC does not contain CH₄ (methane).
4) 914 meters.
5) 300 meters, for comparison with the emissions register.

---

**Total amount of diesel fuel for ground support equipment**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Amount of Diesel Fuel for Ground Support Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>18</td>
</tr>
<tr>
<td>2004</td>
<td>16</td>
</tr>
</tbody>
</table>

**Diesel consumption per "traffic unit"**

<table>
<thead>
<tr>
<th>Year</th>
<th>Diesel Consumption per &quot;traffic unit&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0.30</td>
</tr>
<tr>
<td>2004</td>
<td>0.25</td>
</tr>
</tbody>
</table>

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* A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.
Comparison of the yearly average emission of pollutants in 2003/2004

- **NO in µg/m³**
- **SO₂ in µg/m³**
- **PM 10 in µg/m³**
- **O₃ in µg/m³**
- **CO in mg/m³**
- **Benzene in µg/m³**
- **Toluene in µg/m³**
- **m/p-Xylene(s) in µg/m³**

1) Air monitoring system at Frankfurt Airport (SOMMI 1) and the surrounding HLUG monitoring stations.
2) Not all pollutants are recorded by these air monitoring systems, which are the property of Hesse State Agency for Environment and Geology (HLUG).
Air quality in the vicinity of the airport

As emissions originating from the airport reach the atmosphere, they combine with pollutants from other sources and produce the total concentration of pollutants in the ambient air. This determines the air quality around the airport. To evaluate the concentration of air pollutants, readings are continuously taken at the airport and compared to the results from the monitoring stations in Raunheim and the City of Frankfurt. The airport values lie in the range typical for urban areas and are well below the reference values stipulated by the 22nd Federal Emission Control Ordinance as well as the benchmark value of the Hessian State Agency for Environment and Geology (HLUG). Pollutant concentrations have only reached up to 25 percent of these permitted levels. In both years (2003 und 2004), PM10 was at 72 percent and 67 percent of the permitted level and NO2 was at 93 percent and 81 percent of the permitted level, respectively.

It is interesting to note that, due to meteorological conditions, all the monitoring stations recorded lower values in 2004 compared to 2003. 2003 was an extraordinary year with high temperatures and drought.

Measures for reducing emissions

The two most important starting points for reducing emissions are apron traffic and departure management. A system already in place, and which will be implemented in the future, is the regular upgrading of vehicles on the apron (ground support equipment). The new models comply with the latest exhaust emission standards (Directive 2004/26/EG). Between 2002 and the end of 2004, out of a total of 790 vehicles over 147 were replaced. The deployment of these vehicles will be optimized.

In the future, the more efficient Planning and Disposition System (Plandis) will control the traffic on the apron instead of the old Transport Deployment Control System (TESS). Also, Fraport is working to cut back on the use of 50 ground power units which supply power to stationary aircraft and are fuelled by diesel. By expanding the 400 Hertz ground power supply to 109 different aircraft parking positions, the use of aircraft auxiliary power units and diesel-engine ground power units was reduced.

Now additional aircraft positions (Positions F 231 through F 233) will be equipped with 400 Hertz ground power supplies. To furnish the A380 with power, additional mobile units will be used which can transform 50 Hertz power into 400 Hertz. Fraport is planning a pilot project beginning in 2006 to deploy vehicles which run on hydrogen-powered fuel cells.

Fraport has a limited influence on aircraft emissions. Indirectly, the charges levied against airlines for aircraft noise levels has promoted the use of cleaner, quieter and more fuel-efficient aircraft as they have become available. Management of departures at the airport will also be improved through the use of new software. Starting in 2006, this will result in fewer departure delays. As the aircraft depart with reduced waiting times, they will use less fuel. Fraport sees more opportunity for optimizing aircraft landings. The new Continuous Descent Approach (CDA) procedure will make landings quieter, more energy-efficient and less harmful to the environment.

Additionally, the planned airport expansion will reduce capacity bottlenecks and therefore significantly reduce the emissions produced by the departure queue.
Transportation

Advances in intermodal transportation
Frankfurt Airport is the hub with the world’s best railway connections. This is a decisive factor in its continued development towards becoming an “intermodal hub”, which is a priority of Fraport’s corporate vision. With this in mind, intermodal management is helping to create a seamless connection between transportation systems. This will allow passengers to transfer easily from train to airplane and to reap the benefits of both transportation systems. Fraport regards intermodal transportation as a strategic option that has great innovative potential for corporate development as well as for environmental protection.

In the early 1970s, Frankfurt Airport was the first airport with an underground railway station directly integrated into the airport terminal. In 1999, a new railway station with the AIRail terminal opened providing a direct link to the long-distance services of the European high-speed rail network. Since then, more and more passengers use the ICE (InterCityExpress) train to travel to and from the airport. In the period between 1999 and 2004, the volume of ICE traffic increased from 3 percent to 16 percent. 4.2 million passengers traveled to and from the long-distance railway station. In the meantime, the high-speed trains have developed into a full-fledged feeder system within the hub-and-spoke framework. Instead of passengers taking short flights to Frankfurt Airport and then transferring onto long-haul flights, more and more passengers now choose to travel by long-distance train to the airport. This system also works in the reverse direction. With a current transfer rate of 53 percent at the airport, and the planned introduction of new intermodal products, using the example set by AIRail where code sharing takes place between the German Railway and individual airlines, the chances are good that the number of intermodal passengers will continue to increase in the future.

Since 1998, rail traffic at the airport has grown by one third. This equates to an annual growth rate of 5.3 percent. During this time, the long-distance railway station, compared to the regional, was able to grow in popularity. Globally, it is a unique situation for an airport to have more traffic generated from the long-distance train than from the regional train. The percentage ratio is presently 62:38. In 2004, the high-speed traffic increased by 15 percent compared to 2003. This was due to the increased use of the new track between Cologne and Stuttgart. Passenger traffic through the regional train station also experienced strong growth (12 percent) during the same period.

Changes in the modal split
Frankfurt Airport’s excellent train connections have a positive effect on environmental protection. First, they create the conditions necessary to boost the use of public transportation: this is consistent with the transportation policy goal of the EU to reduce CO2 emissions. Secondly, they allow very short flights to be replaced by train trips. Improvements to the high-speed rail network have resulted in a shift of the modal split toward public transportation. Whereas in previous years the proportion of people traveling by public transportation increased to the disadvantage of personal and rented vehicles, the further rise in high-speed rail traffic between 2003 and 2004 had an impact on short-haul flights.
Employee passes protect the environment

Fraport strives to improve the modal split not only through its passengers, but also through its employees. There are around 68,000 workers at the airport and over 12,200 work for Fraport AG. The company provides them with free passes (known as a “job ticket”). As of April 2005, job tickets had been distributed to 7,145 Fraport employees. Fraport spends about 190,000 Euros each month subsidizing employee commuting. Thirty-five percent of commuters at Frankfurt Airport use public transportation. The increased use of public transportation over individual means of transportation by passengers and employees has resulted in a large reduction of pollutants such as NOx, CO, SO2, fine dust and soot. This reduction has a positive effect on air quality around the airport.

The future is intermodal

Fraport continues to develop Frankfurt Airport as a traffic hub, thus expanding its strategic competitive edge. Since 1999, intermodality has played a major role in Fraport’s environmental program. In 2001, the goal set in 1999 to reach public transportation use of 30 percent was exceeded by 3 percent. In 2004, the proportion of public transportation – aided by the new Cologne/Rhine-Main track – was 35 percent. A goal of 37.5 percent is targeted for 2005. The growing trend in public transportation use will continue due to constant improvements to the high-speed train system. In the future, new tracks will be opened and AIRail Service and code sharing agreements will be extended even further.

High-speed trains have expanded the area around Frankfurt Airport from which passengers are drawn. Since 1998, the catchment area equating to a traveling distance of more than 100 kilometers has increased by 9 percent. Frankfurt is situated in a geographically-favorable position compared to competing hubs. In the short-term – the next two years – there may be delays in meeting long-term environmental goals. In 2005, the German Railway reduced its number of hourly long-distance trains by 13 percent compared to 2004. Service to Düsseldorf is now limited, causing a delay in the further development of the AIRail Service. How public transportation will continue to develop in 2005 remains to be seen. On the other hand, intermodal products offered by Fraport, or offered in conjunction with other transportation providers, are being continuously developed. AIRail’s Cologne/Stuttgart service is being optimized further and rail/air code sharing is being expanded. Integrated ticketing is another important way in which the transportation network continues to develop and modernize its range of intermodal services. Fraport, the German Railway and an increasing number of airlines work together closely. One of the benefits of this partnership is that travelers/passengers obtain up-to-date travel information throughout the transportation system with the aid of Internet-based IT solutions. For this reason, Fraport and the Rhine-Main Transport Association (RMV) are in the process of developing an “intermodal flight information” web site.

A “Carpool Club” is also good for the environment

A new carpool management system will be introduced during the last quarter of 2005. In the first phase of the project, only employees from Fraport and Lufthansa will be able to participate. About 48,000 airport workers will be able to use this new system, which combines high standards of electronic data transmission with simple, straightforward operation. After registering with the database, every participant has the chance to advertise for wanted or available rides using a cellphone. The payment received by the driver of the carpool provides an economic incentive to offset transportation and maintenance costs of the vehicle. All payments are cashless and booked through the system. Accounts are settled regularly. Initial participation should demonstrate that a reduction in traffic through carpooling will not necessarily lead to restrictions in mobility, and that changes in behavior can benefit the environment.

The following table shows the development of the share of employees who use public transportation:

<table>
<thead>
<tr>
<th>Year</th>
<th>Public Transportation in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>'95</td>
<td>19%</td>
</tr>
<tr>
<td>'96</td>
<td>22%</td>
</tr>
<tr>
<td>'00</td>
<td>26%</td>
</tr>
<tr>
<td>'04</td>
<td>35%</td>
</tr>
</tbody>
</table>

1) Rapid-transit railway (S-Bahn), regional transportation, buses and long distance transportation.
Frankfurt Airport’s cooling supply is obtained via pipelines from auxiliary refrigeration facilities and a district cooling plant. Terminals 1 and 2, as well as other buildings, are supplied with chilled water for cooling purposes from a heating and cooling plant. The cold water is distributed through a cooling network. The heating and cooling plant was provided by the Stadtwerke Frankfurt GmbH, at Fraport’s request, and is operated by Mainova. Energy sources used to producing air conditioning are natural gas and electricity. When the demand for air conditioning is low, the maximum amount of heat possible is fed into the district heating network.

The demand for energy has increased

In the past few years, the infrastructure of the airport has been adjusted to facilitate a smooth-running cargo and passenger operation. There has been a significant increase in the number of companies and services available in CargoCity South, especially through the establishment of various cargo carriers. The airport’s improvement in infrastructure has led to a corresponding increase in demand for energy.

The energy use graph shows a large increase in district cooling in 2002. This was due to the decommissioning in 2002 of the large cooling plant, formerly located on the premises, that supplied Terminal 1. Terminal 1 is now connected to the district cooling system. Therefore, energy consumption decreased in 2002 compared to 2001 and has remained relatively steady since.

---

**Energy consumption at the airport by type**

<table>
<thead>
<tr>
<th>GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
</tr>
<tr>
<td>500</td>
</tr>
<tr>
<td>400</td>
</tr>
<tr>
<td>300</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

- **Electric power**
- **District heating**
- **Natural gas**
- **District cooling**
- **Heating oil**
Improving energy efficiency

The development of overall energy consumption during the past few years is shown below in terms of traffic units (excluding transit) for electric power, district heating and cooling, natural gas and heating oil.

Energy consumption decreased up to the year 2000. The establishment of various companies within Cargo-City South, led to a corresponding increase in energy consumption. Due to advances in traffic performance, the specific consumption decreased again last year to 15.7 kilowatt hours/traffic unit (kWh/TU).

If individual energy sources are viewed as part of the overall-consumption, we see that the consumption of electricity per traffic unit has significantly decreased within the last few years.

In addition, the consumption of heat (district heating, natural gas and heating oil) has also decreased since 1996. An increase in 2001 was due to the fact that Lufthansa stopped using its own heating supply and started using that provided by Fraport. Furthermore, temperatures were lower during 2001 in comparison to 2000. Since 2002, the consumption of heat has remained steady at around 6 kWh/traffic unit, despite the completion of new buildings.

The specific consumption of cooling units remained almost the same in 2002 in spite of a significant expansion of Terminal 1 and a hot summer. The peak value in 2003 corresponds to the hotter than normal summer.

In general, it can be said that, during the past 10 years, energy efficiency has improved despite increasing demand. Traffic units have risen by a third since 1995, while energy consumption has increased by merely a quarter.

The original energy consumption goal of 13 kWh/traffic unit set by the environmental program in 2002 could not be achieved. The ambitious goal of saving energy throughout the airport is no longer considered realistic because Fraport is unable to influence directly the energy consumption of external companies located at the airport.

Developments in jet fuel consumption

The refueling of an aircraft is one of the services airports provide. Frankfurt Airport has a large fuel farm as well as an underground fueling system (hydrant system) operated by the company Hydranten-Betriebs-Gesellschaft (HBG). From the storage tanks, the fuel is pumped via the hydrant network to the individual aircraft parking positions. Aircraft are fueled by a so-called “servicer” (hydrant measuring vehicle) that connects to the fuel pit (hydrant outlet). The servicers filter, regulate and meter the quantities of jet fuel pumped into the aircraft. The entire hydrant system at the Frankfurt Airport is constantly monitored by an operator-run control station.

<table>
<thead>
<tr>
<th>Total energy consumption per traffic unit*</th>
<th>kWh/TU</th>
</tr>
</thead>
<tbody>
<tr>
<td>’95</td>
<td>’96</td>
</tr>
<tr>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total energy consumption per traffic unit*</th>
<th>kWh/TU</th>
</tr>
</thead>
<tbody>
<tr>
<td>’95</td>
<td>’96</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

- A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.
In the future, we need to have the ability to adjust to the changing requirements of Terminal 1. In the public areas, as well as in the retail shops, an optimum supply of fresh air – warm in winter and cool in summer – should be provided. Thermal system calculations will be used to simulate and improve the operation of machinery so that potential energy saving potentials may be realized. This in turn leads to new concepts within the central technology of Terminal 1. Furthermore, alternative concepts related to indoor air management are being examined within the scope of the project.

The application of standardized technology will simplify operations and guarantee the flexibility needed to serve customers in the future. As part of this, technology standards are currently being compiled by specialized divisions. Additionally, further items, such as centralized energy management and building management programs using current data and communications technology, should help improve customer services.

Since current construction work has not yet been completed and further expansion is planned, the overall demand for energy at the airport is expected to increase during the next few years. In spite of this, Fraport nevertheless strives to achieve its goal of reducing relative energy consumption through the implementation of appropriate measures.

### Conservation concepts and targets

When the entire area of the airport is taken into consideration, the efficiency of energy usage has constantly improved during the past few years. Based on the overall consumption at the airport (1,088 million kWh), the largest consumers are Terminal 1 and Terminal 2. The terminals account for nearly 50 percent of the overall amount of energy consumed. Of that, a third of the energy is used through the operation of Terminal 1.

Therefore, improving the energy efficiency of both terminals appears to offer the most promise. Research is being carried out to determine what improvements can be made to Terminal 1 and 2 to make them more efficient. Beginning in the summer of 2005, for example, the air conditioning units that cool terminals and offices will be controlled in order to provide Terminal 2 with optimal supply during operations. This will result in potential savings of approximately three million kWh per year, according to initial estimates.

Furthermore, an essential energy conservation measure is the optimization of the technology control centers located within Terminal 1. A detailed plan is currently being developed. In total, 38 air processing units and 314 individual ventilation systems are in operation, transporting and regulating 22.55 million m³/hr of air.

Primary project goals are:
- Updating/replacing technology control center equipment up to 35 years-old.
- Implementing an economic and energy-saving technological standard for the future.
- Developing standardized technology to be applied throughout Fraport.
Potable and Non-Potable Water

The airport maintains its flexibility
Frankfurt Airport’s potable water network is supplied by the Hinkelstein municipal drinking water treatment plant, which is located about three kilometers from the airport. The water is routed via two separate sources into a chlorination plant and distributed throughout the airport with the help of an internal looped system. In emergencies, two additional supplies increase the amount of water fed into the airport’s internal water network. Water pressure to the fire hydrants for fire suppression can be increased to the required level using internal or external booster stations.

Potable water
Potable water is an essential and precious resource that should not be wasted. Therefore, Fraport is in the process of expanding its non-potable water supply system. Non-potable water is produced by blending fresh water, rain water and water from the River Main in a treatment plant located in Terminal 2. This water is channeled through a separate network and is mainly used for fire suppression sprinklers, toilets and irrigation of the airport’s green areas. The area of the former US-Air Base currently obtains its potable water from five wells. After Fraport regains full possession of this area, the wells will be connected to the potable water network. Additionally, a non-potable water infrastructure is being established which will supply the entire new construction area located on the south side of the airport.

Long-term potable water consumption is decreasing
Frankfurt Airport consumed 1.5 million cubic meters of potable water in 2004. While the demand for potable water has fallen, the use of non-potable water is on the rise. Between 1996 and 2004, the consumption rate of non-potable water increased from 3 to 8 percent. When compared to airport traffic performance (measured in traffic units, one of which = one passenger or 100 kg of cargo/mail), the water conservation efforts that have been made over previous years are evident. The slight increase in water consumption per traffic unit in 2001 and 2002 was due to new buildings being connected to the network and a rise in the number of employees. A temporary decline in air traffic volume precipitated by the events of September 11, 2001, led to a calculated increase in specific total water consumption. Use falls again in 2004 with increasing traffic.

Ongoing water conservation efforts
Fraport was able to reduce potable water consumption to 21.8 liters per traffic unit in 2004. This reduction exceeded the goal of 22 liters per traffic unit, set as part of the environmental program for 2002. This value is a result of newly-constructed cargo buildings being connected to the non-potable water system.

<table>
<thead>
<tr>
<th>Potable and non-potable water consumption</th>
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<tr>
<td>m³ in ths</td>
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<tr>
<td>1,800</td>
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<p>| Year | Potable water | Non-Potable water |</p>
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<th>m³</th>
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New water treatment plant saves potable water
Since January 2000, Fraport has been using a diaaphragmalysis plant to disinfect its potable water supply, which is also used for supplying aircraft. In comparison to the old plant, which used chlorine gas, this method of disinfection is much safer. Potable water tanks can be reliably disinfected every three days using disinfectant produced on-site. Before the new plant began operations, chlorine bleach was regularly added to 4,000-liter batches of water. An additional 4,000 liters was required to clean out the tanks following each 12-hour application. Thanks to this new plant, approximately 16 million liters (4.2 million gallons) of potable water is conserved each year.

Non-potable water use is on the rise
Future plans show that the non-potable water network will be extended to all appropriate areas of the airport. With the current restructuring of Terminal 1, a pipeline network will be constructed to supply toilets and urinals with non-potable water. In contrast to the potable water network, the pipelines for non-potable water are made of stainless steel. Collected rainwater is the source of non-potable water in Terminal 2. It is used for fire-suppression systems, sanitary facilities and air conditioning. In the future, processed water from the River Main will be used to replace potable water for fire suppression sprinklers and sanitary purposes.

### Potable water consumption per traffic unit*

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<tr>
<th>Year</th>
<th>Consumption (l/TU)</th>
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<td>'95</td>
<td>35.8</td>
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<td>'96</td>
<td>23.6</td>
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<tr>
<td>'97</td>
<td>21.6</td>
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<tr>
<td>'98</td>
<td>24.8</td>
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<tr>
<td>'99</td>
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<td>'00</td>
<td>22.9</td>
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<td>'01</td>
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<td>'03</td>
<td>24.6</td>
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<tr>
<td>'04</td>
<td>21.8</td>
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</tbody>
</table>

* A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.

### Waste Water
Constant development through changing measurements
To a large extent, Frankfurt Airport’s sewage system reflects the basic structure described in the 2002 Environmental Statement. For the northern section of the airport, this includes separate drainage systems for sewage, storm water and aircraft service water. Treatment plants in Frankfurt-Niederrad and Frankfurt-Sindlingen are used for sewage. Storm water is discharged into the River Main. In the southern portion of the airport, there is a treatment plant for sewage and heavily-soiled, runoff water which, after treatment, is fed into a local stream (Gundbach). Useful storm water is allowed to seep into the ground at a special infiltration facility. Through changes in measuring techniques, the volume of waste water produced by the entire airport has been recorded since 2002. Separate readings are no longer collected from the former US-Air Base and the Lufthansa Base. As a result, data are different from the years prior to 2001.

The waste water system at Frankfurt Airport is approximately 60 km long and is monitored by automatic measuring and sampling devices. In 2004, the measured volume of waste water was approximately 1.55 million cubic meters. In addition to quantity, the environmental impact in 2004 of this waste water was found to be equal to the pollution generated by approximately 37,860 inhabitants (= population equivalent). The term “population equivalent” is used to calculate the pollution load – defined as the BOD, Biochemical Oxygen Demand – produced by one inhabitant per day. Considering that the airport has more than 68,000 employees, as well as an average of about 140,000 passengers per day, this is without doubt good value.

### Quantity of sewage

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (m³)</th>
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<td>'95</td>
<td>1,800</td>
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<td>'96</td>
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<tr>
<td>'03</td>
<td>800</td>
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<tr>
<td>'04</td>
<td>700</td>
</tr>
</tbody>
</table>

Fraport only until 2001. From 2002 Lufthansa and the US-Air Base are included.
Because of the change in measurement techniques in 2002, since then a detailed view of the airport site, excluding the areas of Lufthansa and the former US-Air Base, has not been available. The amount of sewage per traffic unit has decreased since 2002. This trend is similar to the absolute volume of sewage generated by the airport. Since then, the decline has exceeded 11%. A further reduction is expected by the beginning of 2006 when the US-Air Base closes.

**Regular monitoring of waste water facilities**

Waste water systems are regularly monitored. Quality control measures are performed in compliance with the waste water regulations issued by the City of Frankfurt. They include the analysis of samples collected from the confluence points at which sewage flows into the public sewer system or into the treatment plant on the former US-Air Base. Additional monitoring of discharges from oil/water separators before they enter Fraport’s sewer system is taking place. Of great importance is the monitoring of discharges of plant and animal fats generated from restaurants and kitchens. The program to monitor and control these types of discharges continues to move ahead.

Thanks to numerous upgrades to existing oil/water separators and the incorporation of proper purification stages, the amount of plant and animal fats (cooking grease) found in waste water will continue to decline in the future. Fraport operators, as well as airport tenants and concessionaires, are regularly consulted by the company representative for water protection.

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* A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (<1% of passengers). ADV = German Airports Association, ACI = Airports Council International.

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**Storm water treatment**

Storm water run-off is collected at many areas of the airport by the airport’s storm sewer system, where it exists. Storm water run-off may contain varying amounts of contaminants depending on where and when the precipitation occurs (roofs, parking lots or roads, for instance, as well as aircraft operational areas during the summer and winter seasons).

During the winter season, de-icing of aircraft is performed on the apron using biodegradable propylene glycol. It is sprayed on the plane’s outer skin by highly-experienced and specially-trained personnel in precise amounts. It is applied according to current temperature, type of precipitation and substance coating the aircraft (ice, snow, snow slush or hoar frost). De-icing materials are selected and used in accordance with the relevant criteria established by the environmental protection agencies.

Snow removal from aircraft operating areas is primarily performed using mechanical methods or, if necessary, by applying a potassium formate solution. A maximum amount of 25 g of potassium formate per square meter may be applied.

Because it is more likely to be contaminated by harmful materials stemming from maintenance operations and fueling activities, run-off from paved sections of the airfield is routed directly into the storm sewers. This run-off flows through large-scale oil/water separators and sludge removal tanks before being discharged directly into the River Main. In the southern area of the airport, part of the run-off is routed directly into the infiltration system, either from the local treatment plant or via the newly-installed rainwater retention basins. In an effort to improve its environmental performance, Fraport plans to separate run-off, generated in the northern section of the airport and containing de-icing substances, and route it to a waste water treatment facility.
Environmental Protection and Management at Frankfurt Main Airport

Soil, Contaminated Areas and Groundwater

Remediation where necessary

Although there are still areas with native soil types, some of the airport soil was contaminated by intensive land usage and damage during the Second World War. The US-Air Base, which was turned over to Fraport at the end of 2005, is one of the areas with contaminated soil and groundwater.

On the airport site and in the neighboring region, there is a dense network of groundwater monitoring wells and stations. Data collected at these wells and stations are fed into a database. Fraport is able to ensure high levels of groundwater control through this monitoring. The contaminated groundwater beneath the airport site has been comprehensively documented as part of the zoning and permits process for the planned airport development.

CargoCity South (part of former US-Air Base)

Historical research conducted on the first parcel of the US-Air Base that was vacated (the present CargoCity South) identified some contaminated areas. Detailed investigations were carried out as a result of this research. The required remediation measures related to soil contamination have been, to a large extent, conducted. However, groundwater contamination beneath the area is still being investigated. Eventually, the required clean-up measures will be implemented.

Former US-Air Base

Extensive historical research was carried out on the former US-Air Base area. Subsequent investigations, which are still ongoing, have identified only a limited number of contaminated areas (for instance, at the location of the jet fuel tanks). At the conclusion of the investigation, if necessary, detailed analysis will be carried out in order to pinpoint actual contamination levels as well as implementing necessary measures in agreement with the authorities.

Groundwater contamination originating from other sources

Volatile chlorinated hydrocarbons

Five groundwater extraction wells are used to control and remediate groundwater contaminated by volatile chlorinated hydrocarbons used during the 1970s. The wells are spread out between the Lufthansa base and the Kelsterbach area.

Arsenic/Nitro-aromatics

Soil was contaminated through the destruction of ammunition and chemical weapons after the First World War. The most significant contamination was present in the areas where Hanger 9 (building 505) and Cargo Center 2 (building 530/531) are located. The soil was cleaned up within the framework of the Cargo Center 2 construction project. Groundwater in the area continues to be monitored for relevant pollutants.

Nitro-aromatics in the area of the Lufthansa base

While testing the groundwater between 1991 and 1993 directly at, and to the north of the Lufthansa base, between the B43 highway and A3 freeway, traces of trinitrotoluene and its degradation products were found.

Investigation and evaluation

Beginning in 1996, data associated with the investigation and clean-up of the contaminated areas of the former US-Air Base and CargoCity South were compiled using a Geographic Information System (GIS). Old contaminated sites, those suspected of contamination, restoration and other programs are all defined pursuant to the German Soil Conservation Act (Bundesbodenschutzgesetz), as well as other legal requirements and guidelines. Known contamination will be addressed during site development in consultation with the responsible environmental agencies.

Contribution to potable water extraction

Frankfurt Airport is situated within the Hinkelstein and Schwanheim potable water supply districts well field. The eastern section of the airport has been listed as a water conservation area (Zone III B). In the southeastern section of the airport, the groundwater flows to the northwest at a velocity of 0.5 to 1.0 meters per day, towards the pumping stations. In the south section, the depth to groundwater is between 2 and 6 meters below the surface, whereas in the north its depth ranges from 10 to 15 meters. In parts of Runway 18 West, the groundwater table may be even less than two meters beneath the ground surface.
Nitrate removal from groundwater
In the past, de-icing chemicals containing nitrogen were used at the airport. This practice led to contamination of the groundwater with nitrates. A denitrification plant was erected to treat 300 cubic meters of nitrate-impacted water per hour. This facility has been in operation since February 1999. It is estimated that it will take approximately 10 years for all the nitrate to be removed from the water. Since 1990, Fraport only uses nitrate-free substances (potassium acetate and potassium formate) for de-icing airfield surfaces. The regulatory agency of the State Government of Hesse, based in Darmstadt, has established a clean-up goal of 25 milligrams per liter of nitrate concentration in groundwater. The following graph shows the average annual nitrate concentration from a monitoring station in a highly contaminated area:

Dangerous Goods and Hazardous Materials

Safety first
When dealing with the transportation and storage of dangerous goods as well as the handling of hazardous materials, Frankfurt Airport applies the most important general rule within international aviation: “safety first”. First priority is given to the strict observance of national laws and international regulations. Elements crucial to the implementation of such laws and regulations are, above all, practically-oriented courses and regular training of employees in order to minimize the risks.

Dangerous goods, seamless safety
The legal basis in Germany for transporting and storing dangerous goods is the so-called Dangerous Goods Transportation Act (Gefahrgutbeförderungsgesetz, GGBeG), which is complemented by the rules of the International Civil Aviation Organization (ICAO). In order to train all the personnel involved, Fraport conducts regular training courses for approximately 5,000 employees to ensure that they adhere to all relevant provisions and regulations. Furthermore, company representatives for dangerous goods and radiation protection are responsible for observing regulations and overseeing the transportation, acceptance, delivery, temporary storage, packing, unpacking, loading and unloading of dangerous goods.

Regarding the shipping of dangerous goods, all companies involved are considered part of one transportation chain. Airlines as well as freight forwarding companies employ an adequate number of specialists and equipment. The handling and trading of such goods can be carried out by Fraport Cargo Services GmbH (FCS), airlines or cargo handling companies acting on behalf of airlines. In 2004, FCS alone handled 2,378 tons of dangerous goods. The use of special central storage facilities is mandatory for radioactive substances and explosives (Class 1.3 and 1.4 dangerous goods). Additional dangerous goods are stored by FCS within CargoCity South, where a dangerous goods warehouse facility, approved by the Federal Ambient Pollution Control Act, is operated. Employees at this facility check both the physical properties and the documentation of each dangerous goods consignment. In addition, the dangerous goods specialists are also responsible for ensuring the safe transfer of the dangerous goods to the receiving airport.
Well prepared for an emergency
As soon as even minor external damage is detected in dangerous goods packaging, both Fraport security and the airport fire department are alerted. They possess the necessary knowledge and special equipment to respond adequately. Every month, a so-called dangerous goods committee holds a meeting. Its members include Fraport employees, airline representatives, the appropriate authorities, freight forwarders and cargo handling companies. Emergency procedures associated with the transportation of dangerous goods are outlined in Fraport’s operations manual (NOT). Emergency plans have been compiled and emergency exercises, based on this manual, are held regularly. Thanks to regular employee training and increased awareness of the potential risks of dangerous goods, as well as an ongoing exchange between German airports and cargo handling companies, 20.5 percent fewer dangerous goods incidents were recorded in 2004 compared to 2003.

Hazardous materials: less is more
Hazardous materials are materials that possess hazardous characteristics or may develop hazardous characteristics during use. Fraport AG makes use of a variety of hazardous goods: within motor vehicle shops, for instance, the paint shop, the airport print center and the airport’s market garden. The spectrum of hazardous substances varies from de-icing chemicals to motor oils, coolants, transmission and hydraulic oils, paints, lacquer, soap cartridges and heating oil.

Since 1990, Fraport has implemented a so-called product evaluation procedure that examines all available options for either replacing a particular hazardous material with a less harmful one, or assessing whether an operational process should be abandoned or modified. Since 1999, the amount of hazardous material has been reduced by 28 percent. Out of 700 substances, 506 are currently being utilized. Furthermore, the amount of hazardous material (not including diesel and gasoline) delivered to and used by Fraport AG has decreased since 1999 and in the last three years has increased less than proportionally compared with traffic numbers.

![Amount of Hazardous materials](image)

1) Delivered to and used by Fraport (excluding fuel).
Waste Management

On the safe side
Fraport works exclusively with waste management companies that employ the highest environmental standards. Recognition as a certified waste specialist, and proof of regular inspections made by external experts, play an essential role.

Fraport regularly checks to ensure that these objectives are adhered to. Audits are carried out at the waste facilities for this purpose. Accurate assessment of the contracted companies to document the extent to which they have implemented environmental and safety standards can only be accomplished accurately through site visits.

Waste management procedures reflect the priorities of the legislators
Fraport strives to minimize the amount of waste produced or, where possible, avoid its production in the first place. All waste is appropriately recycled if it makes ecological and economical sense. Despite these efforts to recycle waste wherever possible, there are unavoidable instances where waste cannot be recycled and must be disposed of in an environmentally-friendly way, according to state and federal regulations.

Recycling rate still high
In 2004, Fraport disposed of approximately 21,500 tons of waste (excluding soil and rubble) – a slight increase. The recycling rate for waste produced on the site has remained very high, at a level of about 90 percent. In 2004, the total amount of waste was 0.31 kg per traffic unit. This is still a very good result when compared to the previous year.

The largest category of waste (70.4 percent) requires no special monitoring or permits. It is not subject to any monitoring standards or detailed inspection by government agencies. The different waste categories have remained at much the same ratio over the past few years, especially hazardous waste.

Adherence to legal requirements, effective operative waste management, and internal monitoring carried out by the company representative for waste management, has all meant that the airport has been able to further strengthen and sustain its waste management processes.
More green spaces at the airport and surrounding area
In the past few years, the airport “biotope complex” (ecologically significant areas) was evaluated by a group of experts. About 60 percent of the complex—which includes the runways, taxiways, the apron, parking spaces and operational facilities—was rated as having low to very low biological value, while 36 percent of the airport site was given a moderate rating (this included green tracts of land found in the vicinity of the runways and taxiways). However, the ecological potential of some areas, especially the development in the area flanking Runway 18-West, was given a high rating by the experts. These green areas, which make up only 4 percent of the biotope complex, feature extensive meadows, neglected grassland, dry sandy grassland and calluna heather. This is the largest area of heather, dry grassy area and neglected grassland in the region.

Long-term observation by Fraport’s ecological specialists have shown that this area has become a sanctuary for many different types of animals and plants endangered elsewhere. They include rare birds, amphibians and over 300 types of plants, including rare species. Most of the meadowland has been registered, evaluated and ecologically rated in the State of Hesse’s biotope catalog.

Increasing green spaces and managing bird strikes
Open areas, courtyards, roofs and building fronts are converted into green areas as often as possible within the framework of the airport’s continuous development. The airport also maintains a nursery and most of the plants decorating the terminals and offices have been cultivated in the airport greenhouse.

One area of special importance for aircraft safety is the prevention of bird strikes. Bird strike management, as well as the protection of high-quality biological areas, is closely followed by the airport’s forester. The main focus of these activities lies in biotope management—designing and maintaining the airport site and the surrounding area in such a way that the large, heavy birds, which are a threat to aircraft, find no suitable nesting, resting or feeding grounds. The number of bird strikes at Frankfurt Airport lies well below the international average and for this reason the airport’s specialists are in high demand at other airports.
Fraport’s environmental fund
The Fraport environmental fund was established in 1997 to promote ecologically-significant projects in the Rhine-Main region. To date, more than 350 projects totaling over 18.5 million Euros have received financial support. The money is voluntarily donated and is used exclusively to support the ecological programs of other organizations. The cost of mandatory mitigation measures for reforestation and nature conservation projects due to the airport expansion is funded by Fraport through a different source. About 48 percent of the environmental fund was used for the regional park in the Rhine-Main area, to protect, develop further and connect isolated green spaces in the lower Main valley (Frankfurt, Taunus, Wiesbaden, Hanau). The regional park contributes a great deal to the region’s image and improves the quality of life of those living there.

Through Fraport’s environmental fund, numerous projects are promoted including nature and environmental conservation, environmental education and ecological research. Fraport’s voluntary initiative has allowed many communities and nature conservation associations to realize projects that, due to a lack of public funding, might have otherwise been deferred or not even begun.

Planning and Construction

Expansion from an ecological perspective
Fraport’s environmental goal is to carry out future planning and activities related to airport expansion with the maximum technical efficiency and with the minimum impact to the environment. The following criteria will be taken into consideration when selecting construction materials used for the planned renovation and expansion of the airport:

- Positive impacts on health and well-being.
- Produced by clean, efficient energy-saving manufacturing processes.
- Free from harmful substances.
- Ability to recycle or regenerate.
- Suitability of material and costs.
- Short transportation routes (regional procurement of construction materials).

The environmental impact of the airport expansion is the main focus of the regulated permits framework. Numerous reports have been compiled as part of the zoning and permit process. The expert-written reports were predominantly concerned with the following three aspects:

- Construction-related project impacts. Environmental impacts caused by construction of the new runway and other planned expansion projects.
- Project-related influences caused by the necessary deforestation, soil removal, creation of impervious surfaces, potential impacts to groundwater and drinking water, and the effects of isolation on the area.
- Operation-related project impacts, including factors which have a significant environmental impact on the surrounding area: aircraft noise, noise from other vehicles and air pollution. Additionally, issues such as electromagnetic fields, bird strikes and possible accident scenarios are explored.

The experts concluded that the airport expansion is compatible with strict environmental requirements due to extensive and costly mitigation measures, which include noise abatement and reforestation.

Discussions about the need to increase capacity at Frankfurt Airport go back to 1997. The Hessian Government initiated public hearings on this subject in recognition of the importance of the airport expansion. This dialog resulted in recommendations for a range of noise reduction measures. In 2000, in response to this proposal, Fraport’s Supervisory Board declared that it would implement a ban on night flights. The ban will go into effect when the proposed runway is operating.
The adopted zoning plan for the A380 aircraft hangar has been approved

In a separate Zoning Plan and permit procedure, approval for the construction of a Lufthansa aircraft hangar for the Airbus A380 and the Boeing B 747 was applied for in January 2003. A separate permit was necessary because the deployment of these large aircraft is independent of the construction of the new runway system and terminal. The official approval of the Zoning Plan was granted on November 26, 2004.

On June 28, 2005, the Hessian Administrative Court in Kassel rejected numerous appeals launched against the construction of the new aircraft hanger.

The Executive Board presented several measures (the Fraport Ten-Point Action Program) to improve noise and traffic levels. In the first part of the permits process, which addressed regional land use, an environmental impact assessment was completed in which three runway configurations were evaluated. The regional land use planning process, governed by the Hesse Ministry of Economics, Transportation and State Development, formally commenced in October 2001 and concluded on June 10, 2002. Of the three options, the north-west runway was preferred because it was the most environmentally-friendly version regarding noise, pollution and deforestation (approximately 162 hectares). At the same time, that option allowed attainment of the 120 aircraft movements per hour benchmark at Frankfurt Airport.

In the procedure to obtain a Zoning Plan that followed, Frankfurt Airport submitted all the necessary documentation, current as of November 2004, to the regional board in Darmstadt. The documentation consisted of 60 binder, including approximately 17,500 pages of text, 900 blueprints and maps, all required for the technical planning of the airport expansion. Additional documentation included 39 reports mainly related to ecological issues. At the beginning of 2005, these files were made available to 57 local, and 327 public, agencies and associations. Official approval of the Zoning Plan for the new runway and Terminal 3, to be built in the south of the airport site, where the former US-Air Base was located, is expected in 2007.
### Safety and Emergency Management

**Continuous improvements to security**
The terrorist attacks of September 11, 2001 greatly sensitized the public and politicians to the subject of aviation and security. This has led to a further tightening of security measures by airports and airlines. Security standards which include equipment, organization and security training at the airport have always been highly regarded. In addition, improvements to security are carried out as a regular part of daily business due to the demands of growing traffic and changes in technical regulations. Meanwhile, there are more than 7,000 employees at Frankfurt Airport in various companies and governmental agencies who all play a role in maintaining airport security.

Airport security is mandated by the Air Traffic Act as well as the Air Security Act, which became effective on January 15, 2005. These acts regulate airport and airline security and include defense from external dangers as well as the security obligations of airport operators and airline companies. In the event of a significant emergency, the strategic business unit FBA (Traffic and Terminal Management, Airport Expansion, Security) takes over emergency response operations.

**Fire and environmental protection by the airport fire department**
The airport fire department is responsible for a wide range of duties, including protecting aircraft and buildings from fire, fire prevention at buildings and technical installations, and fire prevention services (firefighting training center, maintenance of fire suppression equipment and aircraft salvage and recovery). The fire department also handles incidents involving the transportation of dangerous goods and handling of hazardous materials, as well as issues related to water conservation. There are currently over 170 firefighters and more than 48 vehicles spread between three fire stations to aid deployment in an emergency. The 2002 Environmental Statement described the fire training center and the apparatus used for emergencies within the framework of environmental protection. Since then, the airport fire department has acquired a new less-polluting natural gas-powered training facility for firefighting equipment. They also have and a new type of mobile unit that is used as an initial point of decontamination for people who have, for instance, come in contact with hazardous materials.

**Ambulance and rescue services**
The ambulance and rescue services (medical services) are responsible for first-aid treatment of the sick and injured. Approximately 100 employees work in this area. Responsibility for this unit is shared between Fraport’s head emergency physician and the rescue service coordinator. Medical services work closely with the airport fire department and external rescue services. If needed, airport security can be called upon to provide additional security and transportation support. Officers from the German Federal Police or the Hessian Police stationed at the airport can also provide additional emergency support if needed.

**Integration of security and safety services**
The activities of the airport security department, the fire department and rescue services are coordinated by the Safety and Security Operations Center, which is staffed around the clock. This command center monitors a large part of the airport premises in order to be able to address dangerous situations immediately. The equipment includes 700 video cameras.

In the event of a crisis, the Security Operations Center alerts the Emergency Response and Information Center (ERIC), the central control unit of crisis management at Frankfurt Airport. The team is made up of Fraport employees, the fire department, police, federal authorities and other organizations. In a crisis situation, all available information can be quickly collected and analyzed. In this way, necessary decisions can be made almost immediately.

The emergency information center (NIZ) acts as a link between the organizations directly involved in the emergency, the family members of those involved and the authorities. It has a call center where the latest information technology is used to answer phone calls from relatives and to collect information. The 90 people working in the NIZ are supported by psychologists and 130 volunteers.
Communication

Information and discussions about environmental protection

In 2004, Fraport restructured its corporate communications department and integrated numerous communications activities into a central unit. Environmental communication is a core focus. The message Fraport wants to give its neighbors is: “We want an environment worth living in”. With this in mind, the “environmentally-friendly airport” strives to keep people living in the surrounding areas informed through activities, events and the media. The intention is to inform the target audience as comprehensively and precisely as possible. Communication should not be seen as a one-way street. Residents and airport employees are encouraged to participate in a dialog with the company to help find solutions to complex environmental issues. Most people agree that the most complex environmental issues currently facing the airport are aircraft noise management and the ecological effects of airport expansion.

It is Fraport’s responsibility to inform all its stakeholders about environmental protection. It does this through its website and through publications. Fraport supplements this information through special corporate programs and the airport information bus that visits surrounding areas. It also informs through other channels, such as a regional dialog forum. In 1997, Fraport created an environmental fund which promotes numerous educational initiatives and ecologically-significant programs in the region. This includes a range of activities for young people. As an example, within the framework of the project called “Newspaper in the school”, children were involved in writing about environmental topics. A forester teaches small groups of children attending kindergartens and schools about the forest. In the near future, Fraport plans to offer more dialog forums and tours where the airport’s environmental activities can be explained directly to residents in order to encourage open lines of communication.

Government and EU safety and security audits

In order to maintain appropriate safety standards at Frankfurt Airport, security, safety and emergency management is regularly audited. The German supervisory agency carries out a complete audit every three years. The audit looks at safety and security at the airport, and also takes in the airlines and federal agencies. In addition, EU civil aviation security regulations stipulate that regular checks be made by EU inspectors. In 2004 and 2005, the EU inspection at Frankfurt Airport was carried out in three stages. Once these initial EU security and safety audits are complete, the data collected will serve as guidelines for safety management in the future. ICAO (the International Civil Aviation Organization) and ECAC (the European Civil Aviation Conference) have developed security audit systems for airports. These audits are currently voluntary and not enforced by law.
Goals and Outlooks

Environmental goals and objectives are presented as part of the environmental program. Attainment of these goals is continuously monitored by Fraport and documented in each environmental statement. Together with audits, environmental indicators are key instruments available to evaluate current conditions and to identify opportunities to make improvements.

Environmental indicators

The following tables provide an overview allowing the evaluation of the airport’s environmental impacts and Fraport’s environmentally-relevant business processes. Wherever possible, the most important information is presented in the form of indicators.

### Environmental indicators for 2003 and 2004

<table>
<thead>
<tr>
<th>Transportation figures</th>
<th>2003</th>
<th>2004</th>
<th>Δ 03/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passengers</td>
<td>48,359,320</td>
<td>51,106,647</td>
<td>+ 5.7%</td>
</tr>
<tr>
<td>Air cargo</td>
<td>1,548,014</td>
<td>1,750,996</td>
<td>+ 13.1%</td>
</tr>
<tr>
<td>Airmail</td>
<td>126,726</td>
<td>117,825</td>
<td>− 7.0%</td>
</tr>
<tr>
<td>Traffic units</td>
<td>64,621,319</td>
<td>69,166,965</td>
<td>+ 7.0%</td>
</tr>
<tr>
<td>Aircraft movements</td>
<td>472,437</td>
<td>487,810</td>
<td>+ 3.3%</td>
</tr>
<tr>
<td>Aircraft movements w/o military flights</td>
<td>458,865</td>
<td>477,475</td>
<td>+ 4.0%</td>
</tr>
<tr>
<td>Night aircraft movements incl. military flights</td>
<td>47,425</td>
<td>50,530</td>
<td>+ 6.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aircraft Noise</th>
<th>2003</th>
<th>2004</th>
<th>Δ 03/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach: Monitoring point 01 Offenbach-Lauterborn</td>
<td>[dB(A)] 61</td>
<td>61</td>
<td>+ 11</td>
</tr>
<tr>
<td>Approach: Monitoring point 06 Raunheim</td>
<td>[dB(A)] 62</td>
<td>61</td>
<td>− 1</td>
</tr>
<tr>
<td>Departure: Monitoring point 12 Bad Weilbach</td>
<td>[dB(A)] 57</td>
<td>59</td>
<td>+ 2</td>
</tr>
<tr>
<td>Departure: Monitoring point 51 Worfelden</td>
<td>[dB(A)] 58</td>
<td>59</td>
<td>+ 21</td>
</tr>
<tr>
<td>Ground noise: Monitoring point 03 Zeppelinheim</td>
<td>[dB(A)] 52</td>
<td>51</td>
<td>− 21</td>
</tr>
<tr>
<td>Ground noise: Monitoring point 08 Kelsterbach</td>
<td>[dB(A)] 54</td>
<td>55</td>
<td>± 01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air</th>
<th>2003</th>
<th>2004</th>
<th>Δ 03/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>[t] 2,382</td>
<td>2,486</td>
<td>+ 4.4%</td>
</tr>
<tr>
<td>HC</td>
<td>[t] 644</td>
<td>653.6</td>
<td>+ 1.5%</td>
</tr>
<tr>
<td>PM 10</td>
<td>[t] 11.2</td>
<td>11.4</td>
<td>+ 1.8%</td>
</tr>
</tbody>
</table>

Aircraft emissions measured up to an altitude of 300 m (idle, take-off, climb-out, approach incl. roll-out, engine ignition, auxiliary power units)

### Air

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ 03/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>[g/TU*] 36.86</td>
<td>35.84</td>
<td>− 2.8%</td>
</tr>
<tr>
<td>HC</td>
<td>[g/TU*] 9.97</td>
<td>9.45</td>
<td>− 5.2%</td>
</tr>
<tr>
<td>PM 10</td>
<td>[g/TU*] 0.17</td>
<td>0.16</td>
<td>− 5.9%</td>
</tr>
</tbody>
</table>
### Environmental Protection and Management at Frankfurt Main Airport

#### Transportation 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of passengers using public transportation [%]</td>
<td>33</td>
<td>35</td>
<td>+ 6.1 %</td>
</tr>
<tr>
<td>Share of passengers using high-speed trains [%]</td>
<td>14</td>
<td>16</td>
<td>+ 14.3 %</td>
</tr>
<tr>
<td>Share of employees using public transportation [%]</td>
<td>26.4¹</td>
<td>35</td>
<td>+ 32.6 %</td>
</tr>
</tbody>
</table>

#### Energy 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total energy consumption [mil/kWh]</td>
<td>1,084.6</td>
<td>1,088.1</td>
<td>+ 0.3 %</td>
</tr>
<tr>
<td>Relative total energy consumption [kWh/TU*]</td>
<td>16.8</td>
<td>15.7</td>
<td>– 6.5 %</td>
</tr>
<tr>
<td>Electricity [mil/kWh]</td>
<td>579</td>
<td>579</td>
<td>± 0 %</td>
</tr>
<tr>
<td>Heating [mil/kWh]</td>
<td>406</td>
<td>415</td>
<td>+ 2.2 %</td>
</tr>
<tr>
<td>Cooling [mil/kWh]</td>
<td>121</td>
<td>118</td>
<td>– 2.5 %</td>
</tr>
</tbody>
</table>

#### Potable and non-potable water 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potable water [mil/m³]³</td>
<td>1,591</td>
<td>1,511</td>
<td>– 5.0 %</td>
</tr>
<tr>
<td>Relative potable water consumption [l/TU*]³</td>
<td>24.6</td>
<td>21.8</td>
<td>– 11.4 %</td>
</tr>
<tr>
<td>Non-potable water [mil/m³]³</td>
<td>0.110</td>
<td>0.131</td>
<td>+ 19.1 %</td>
</tr>
<tr>
<td>Share of non-potable water in total water consumption [%]³</td>
<td>6.5</td>
<td>7.9</td>
<td>+ 21.5 %</td>
</tr>
</tbody>
</table>

#### Waste water 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage [mil/m³]⁴</td>
<td>1,582</td>
<td>1,547</td>
<td>– 2.2 %</td>
</tr>
<tr>
<td>Relative sewage [l/TU*]⁴</td>
<td>24.5</td>
<td>22.4</td>
<td>– 8.6 %</td>
</tr>
</tbody>
</table>

#### Groundwater 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate content at measuring station 45 [mg/l]</td>
<td>152</td>
<td>145</td>
<td>– 4.6 %</td>
</tr>
</tbody>
</table>

#### Hazardous materials 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous materials delivered to Fraport and consumed (w/o fuel) [t]</td>
<td>718</td>
<td>754</td>
<td>+ 4.9 %</td>
</tr>
</tbody>
</table>

#### Waste 2003 - 2004 03/04

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling per year (w/o soil and construction debris) [t]</td>
<td>18,500</td>
<td>19,426</td>
<td>+ 5 %</td>
</tr>
<tr>
<td>Disposal per year (w/o soil and construction debris) [t]</td>
<td>1,725</td>
<td>2,157</td>
<td>+ 25 %</td>
</tr>
<tr>
<td>Recycling rate [%]</td>
<td>91.5</td>
<td>90</td>
<td>– 1.5 %</td>
</tr>
<tr>
<td>Excavated soil/construction debris [t]</td>
<td>14,857</td>
<td>2,848</td>
<td>– 80.8 %</td>
</tr>
</tbody>
</table>

---

¹ A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.

² The level is rounded up according to the Aircraft Noise Act. A change in magnitude of 1 dB(A) is due to truncation.

³ Figure from 2000.

⁴ Figure w/o former US-Air Base.

⁵ Figure includes former US-Air Base.
Achievement of goals proposed in the 2002 Environmental Statement

Fraport’s objectives and targets related to environmental protection are part of its environmental program, which is structured to span a period of three years. Environmental planning and the setting of goals is based on the results of internal audits and the review of general environmental issues. In its 2002 Environmental Statement, Fraport set a number of goals for the following three years. The status of these goals are documented in the following diagram.

Environmental program 2005

The 2005 environmental program describes the most important goals that Fraport has set for Frankfurt Airport for the period between 2005 and 2008. The 2005 program also defines which measures will be used to achieve the goals over what period of time (page 82).

<table>
<thead>
<tr>
<th>Sphere of activity</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Mitigate noise levels for residents by ensuring that a maximum of 52dB(A) is not regularly exceeded. This applies to people sleeping in bedrooms with closed windows.</td>
</tr>
<tr>
<td></td>
<td>Enhance transparency of the aircraft noise issue through: • improving aircraft noise monitoring • providing better information sources for interested members of the public.</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>Upgrade air quality at the airport and in surrounding areas by reducing soot emissions on the apron through annual replacement of up to 10 % of the 790 vehicles on the apron (mobile work machines).</td>
</tr>
<tr>
<td>Energy</td>
<td>Lift the efficiency of energy to 13 kWh per traffic unit* (modified goal from 1999).</td>
</tr>
<tr>
<td>Water</td>
<td>Reduce water consumption to 22 liters per traffic unit* (goal from 1999).</td>
</tr>
<tr>
<td>Transportation</td>
<td>Raise slice of passengers using public transportation to 37.5 % by 2005 (goal from 1999 extended).</td>
</tr>
</tbody>
</table>
**Table: Environmental Protection and Management at Frankfurt Main Airport**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Deadline</th>
<th>Goal achievement</th>
<th>Status of measures (May 2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Implement a static noise abatement program for residents within the</td>
<td>Ongoing until</td>
<td>Goal still valid</td>
<td>• To date, 3,400 requests for soundproofing for approx. 7,000 dwellings have been filed.</td>
</tr>
<tr>
<td>defined protection zone.</td>
<td>April 2006</td>
<td></td>
<td>• For around 2,700 requests over 5,500 households were reimbursed. (A request can relate to several households).</td>
</tr>
<tr>
<td>• Installation of a new state-of-the-art aircraft noise monitoring</td>
<td>Middle of 2003</td>
<td>Achieved</td>
<td>• Noise abatement measures were implemented in two nursing homes for the elderly and seven kindergartens. Construction work has begun at one school.</td>
</tr>
<tr>
<td>system that includes radar data from DFS Deutsche Flugsicherung GmbH</td>
<td></td>
<td></td>
<td>• The noise monitoring system has been operating fully since December 1, 2004.</td>
</tr>
<tr>
<td>(German ATC).</td>
<td></td>
<td></td>
<td>• Aircraft noise reports have been published twice-a-year since the beginning of 2002.</td>
</tr>
<tr>
<td>• Issue aircraft noise reports twice a year.</td>
<td>Ongoing from 2002</td>
<td>Achieved</td>
<td>• Since December 16, 2003, the information service “Infoservice Fluglarm” at <a href="http://www.fraport.de">www.fraport.de</a> has become available.</td>
</tr>
<tr>
<td>• Publish key aircraft noise data on the Internet each month.</td>
<td>Ongoing from the end of 2002</td>
<td>Achieved</td>
<td>• 147 vehicles on the apron (mobile work machines) were upgraded in the period between middle of 2002 and end of 2004.</td>
</tr>
<tr>
<td>• Replace the current stock of vehicles on the apron (mobile work</td>
<td>Ongoing from 2002</td>
<td>Achieved</td>
<td>• The organization and allocation of staff was implemented.</td>
</tr>
<tr>
<td>machines) by purchasing models which comply with the COM II-Norm</td>
<td></td>
<td></td>
<td>• See goal in the environmental program for 2005.</td>
</tr>
<tr>
<td>(EU directive 97/68/EC) for exhausts.</td>
<td></td>
<td></td>
<td>• Water consumption was 21.8 l/traffic unit* in 2004.</td>
</tr>
<tr>
<td>• Broaden the organization and allocation of energy management staff.</td>
<td>End of 2003</td>
<td>Modified goal is still</td>
<td>• Between the middle of May 2002 and May 2005, eight buildings involved in cargo handling in CargoCity South were connected to the non-portable water supply.</td>
</tr>
<tr>
<td>• Optimize the energy efficiency of buildings.</td>
<td></td>
<td>valid</td>
<td></td>
</tr>
<tr>
<td>• Supply non-potable water to more buildings.</td>
<td>End of 2004</td>
<td>Achieved</td>
<td></td>
</tr>
<tr>
<td>• Provide support to Lufthansa and GermanRailways for broadening scope</td>
<td>End of 2005</td>
<td>Goal still valid</td>
<td>• In 2004, the share of passengers using public transportation (long- and short-distance trains, buses) was 35 %.</td>
</tr>
<tr>
<td>of services in the transportation chain (flight check-in at railway</td>
<td></td>
<td></td>
<td>• The share of using high-speed trains was 16 %.</td>
</tr>
<tr>
<td>stations, transportation of air passenger-luggage in ICE trains,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>integrated ticketing, establishment of a 45-minute minimum connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>time between trains and flights).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.

1) For a free copy: Fraport AG, FBA-RU, 60547 Frankfurt am Main, Germany.
### Environmental program 2005

<table>
<thead>
<tr>
<th>Sphere of activity</th>
<th>Goal</th>
<th>Measure</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>• Mitigate noise levels for residents by ensuring that a maximum of 52 dB(A) is not regularly exceeded for people sleeping in bedrooms with closed windows.</td>
<td>• Implement a static noise-abatement program for residents within the defined protection zone.</td>
<td>Residents can make requests up to 26 April, 2006</td>
</tr>
<tr>
<td></td>
<td>• Enhance the transparency of the aircraft noise issue.</td>
<td>• Inspection of the newly-installed aircraft noise monitoring system by an independent expert.</td>
<td>Mid-2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improve web site with regard to aircraft noise.</td>
<td>Mid-2006</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>• Improve air quality at the airport and surrounding areas as measured on a per traffic unit* basis.</td>
<td>• Replace the current stock of vehicles on the apron (mobile work machines) by purchasing up-to-date models that comply with directive 2004/26/EC.</td>
<td>Ongoing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Supply three aircraft positions with 400 hertz ground power.</td>
<td>By the 4th quarter, 2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop and update departure management to reduce waiting times on the taxiways.</td>
<td>4th quarter, 2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Optimize ground handling processes to avoid empty runs by developing and implementing new software (Plandis).</td>
<td>By the end of 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Utilize fuel cell-powered cars within framework of European Union’s project “Zero Regio”.</td>
<td>From the end of 2006, will take approx. 3 years</td>
</tr>
<tr>
<td>Transportation</td>
<td>• Increase the share of passengers using public transportation to 37.5 % (ongoing target from 1999).</td>
<td>• Support Lufthansa and German Railway in efforts to improve the chain of services in the transportation chain (flight check-in at railway stations, transportation of air passenger-luggage on ICE trains, integrated ticketing, establishment of a 45-minute minimum connection time between trains and flights).</td>
<td>End of 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduce the number of employees traveling to work with their own vehicles.</td>
<td>From 2006</td>
</tr>
<tr>
<td>Energy</td>
<td>• Improve the efficiency of energy use 1).</td>
<td>• Creation and testing of a new traffic concept (Carpool Club) for employees at Frankfurt Airport.</td>
<td>2005 to 2007</td>
</tr>
<tr>
<td>Water</td>
<td>• Further reduce the consumption of potable water 1).</td>
<td>• Expand the use of non-potable water in Terminal 1 within the framework of upgrading the restrooms.</td>
<td>End of 2007</td>
</tr>
</tbody>
</table>

*A “traffic unit” (TU) is a passenger with baggage (excluding transit passengers, according to ADV and ACI) or 100 kg cargo or mail. Transit passengers are those who do not leave the aircraft (< 1% of passengers). ADV = German Airports Association, ACI = Airports Council International.

1) The goal will be quantified during the project.
Additional Information – opinions, media and opportunities

Information hotline
Fraport provides the following telephone number +49 (0) 800 2345679 (toll-free within Germany) for inquiries and complaints about aircraft noise and the airport expansion.

Brochures and documentation
The following publications can be ordered from:
Fraport AG, UKM-IK, 60547 Frankfurt am Main, Germany.
- Further examples of this 2005 Environmental Statement
- The information brochure FRA 2000 PLUS (available only in German) explaining Fraport’s position on the airport expansion. It includes expansion concepts, transportation-related aspects, environmental protection information and details of the economic consequences for the local labor market and the Rhine-Main region.
- The Sustainability Report (available only in German, English end of 2006) is an informative overview on the theme: “Economies compatible with the future”. In addition to environmental management, it takes up issues like social responsibility, safety and security management, and governance structures.
- Teaching Materials for the airport expansion comes in a binder and is designed for pupils attending elementary and secondary schools (Levels 1 and 2). The binder, which is distributed to schools within a 50-kilometer radius of the airport, presents the airport’s perspective on the proposed expansion plans and related environmental issues in a format that is intended for children of various ages.

The following publications can be ordered from:
Fraport AG, FBA-RU, 60547 Frankfurt am Main, Germany.
- The biannual Aircraft Noise Report (available in German only) provides information about the current status of aircraft noise issues within the Frankfurt Airport area.
- The annual Air Quality Annual Report (available in German only) documents the results of air quality monitoring at Frankfurt Airport.

Internet
The web site www.fraport.com provides an overview of all the important topics pertaining to the Fraport Group: traffic development at Frankfurt Airport, environmental protection, employment, business units, international corporate strategy and many others.

At www.fraport.com/cms/presse_center/rubrik/13/13813.downloads.htm – or by selecting the menu item “Press Center/Downloads” – you will find PDF versions of Fraport informational brochures, Fraport’s current annual report, as well as the aircraft noise newsletter.

At www.fraport.de/cms/infoservice_fluglaerm/rubrik/2/2591.infoservice_fluglaerm.htm (only in German) you will find monthly figures pertaining to route allocation, distribution of operations and aircraft noise monitoring.

At www.ausbau.fraport.com you will find detailed information on the background, design concepts and discussions about the planned airport expansion. There is also a schedule of planned discussion events at the airport and in surrounding areas.

www.airportcity-frankfurt.com provides up-to-date travel and airport information for passengers and visitors.

Visitors Service
Fraport’s Visitors Service offers interested parties an opportunity to learn about relevant airport facts and issues at the airport. A central topic is environmental protection. Presentations covering the environmental problems facing the airport and what is being done to solve them can be arranged.

Visitors Service offers airport tours lasting between 45 minutes and 3 hours. For groups with special interests, Visitors Service offers individually-tailored programs. These range from tours of special facilities to presentations and discussions about all aspects of environmental protection and management at Frankfurt Airport.

Contact
- Tour Booking Service:
  Telephone: +49(0)69 690-70291, -92, -93, -94,
  Telefax: +49(0)69 690-53341
- Written inquiries should be addressed to:
  Fraport AG, Unternehmenskommunikation,
  Besucherservice, 60547 Frankfurt am Main, Germany
- E-Mail: events@fraport.de
- Registration for specialist programs:
  Fraport AG, Unternehmenskommunikation,
  Public Affairs, Telefax: +49(0)69 690-59974
The Airport Forum information center
The Airport Forum is located in the pedestrian connector between Terminal 1 and the long-distance AirRail Terminal. It caters to visitors and passengers at Frankfurt Airport. Its main focus has been to provide answers to any questions concerning the operation and expansion of the airport. This includes topics related to environmental protection and noise abatement. Using interactive media, passengers and visitors alike can gain a thorough understanding of all the parts that make the airport tick. A room for presentations and group discussions which, among others, is also used by the Visitors Service, rounds out the variety of facilities and services available at the Airport Forum.

Airport Infobus
Frankfurt Airport’s Infobus is constantly touring the surrounding region in an effort to update local residents about the airport itself, the noise issue and the expansion plans. For the Infobus tour schedule, consult the local press or go to www.ausbau.fraport.com.

Regional Dialog Forum (RDF)
The Regional Dialog Forum was instituted in the wake of demand created during the airport expansion mediation procedure. Its main intent is to promote wide-scale public participation in the ongoing approval process. The panel includes representatives of all relevant social classes from the communities affected by the airport and its expansion. One of the issues being debated within both the scope of the Regional Dialog Forum and public hearings is Frankfurt Airport’s environmental impact. To learn when and where these events take place, please refer to the local press or visit www.dialogforum-flughafen.de.
The next two abridged environmental statements will be issued in June 2006 and June 2007. The next validation will take place in June 2008.

The official German version of the Environmental Statement has been validated by Dr. Kühnemann und Partner, Institut für Umwelttechnik, Lange Laube 28, 30159 Hannover, Germany.
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Validation

Fraport AG’s Environmental Management System comprising environmental policies, environmental objectives and programs as well as environmental and audit schemes (EMS) procedures and the environmental statement - for the location Frankfurt Airport - were accredited under EMAS (EG) Nr. 761/2001. The facts and figures presented in this environmental statement give a fair and accurate picture of the environmental relevance of all on-site activities.

Frankfurt, 30 June 2005

Dr. Burkhard Kühnemann
Experts

The authorized independent experts are from the environmental organization, Institut für Umwelttechnik Dr. Kühnemann and Partner.

Business address: Lange Laube 28, 30159 Hannover
Registration number: D-V-0103

Schedule

The next abridged environmental statement will be validated and then published in June 2006.

Unless otherwise identified, the details of this Environmental Statement are based on internal data that has been directly or indirectly collected by Fraport.