Environmental Statement 2011 – 2014

hamburg-airport.de

Hamburg Airport

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Foreword

Dear Readers,

Hamburg Airport celebrates its 100th birthday in 2011. It is the oldest airport in the world to still be operated from the same site where it was originally built. What began on a grazing meadow for sheep, far from the gates of Hamburg, is now an inner-city airport and an important part of the city's metropolitan region.

For us, this proximity to the city, combined with effective environmental protection, is both proof of the success of our efforts to date and an obligation to meet the special demands posed by the location and the environment. Our goal therefore continues to be the decoupling of the commercial development of the airport from environmental impact.

Michael Eggenschwiler and Claus-Dieter Wehr

With our tested environmental management programme, we have been working towards this for more than a decade now. Hamburg Airport has set itself a similarly ambitious environmental programme for the next three years, just as we did for the previous twelve years. Environmental management is one of the pillars of sustainable development at our location.

In 2011, Flughafen Hamburg GmbH achieved validation by EMAS and was also successful in attaining certification with the Airport Carbon Accreditation. This programme, highly regarded around the world, offers certification at different levels and requires participating airports to provide a thorough calculation of there CO_2 footprint and (for certification at the higher levels) demonstrable reductions in there own greenhouse gas emissions. The fact that Hamburg Airport has selected and achieved the "Reduction" level for its certification testifies to our commitment in this area.

Happy reading!

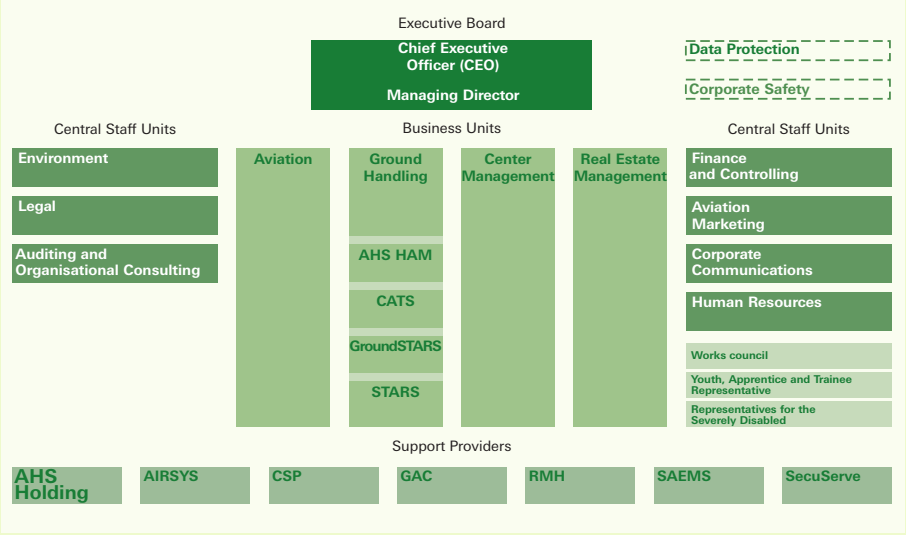
Michael Eggenschwiler
Chief Executive Officer,
Flughafen Hamburg GmbH

Claus-Dieter Wehr
Managing Director,
Flughafen Hamburg GmbH

Activities and Organisation of the Hamburg Airport Group

Hamburg Airport is Germany's fifth-largest airport. It was used by 12,960,000 passengers in 2010. In the same period, around 71,000 tonnes of air cargo and airmail were transshipped. The airport is operated by Flughafen Hamburg GmbH and its subsidiaries and holdings.
The airport is an important site and workplace for numerous other companies. More than 70 individual shops, bars and restaurants, for example, are located in the terminals and the Airport Plaza. Many airlines, security service companies and official agencies such as Customs and the Federal Police are also active in the terminals. Lufthansa Technik's maintenance, repair and overhaul base is also located within the airport premises, with more than 8,000 employees. Taken together, this makes the airport one of the most important employers in the Hamburg Metropolitan Region, with around 15,000 people employed at the site.

Organisational Structure



Organisational structure of Flughafen Hamburg GmbH and its subsidiaries and holdings.

Activities with Environmental Impact

Activities necessary for airport operation are associated with a whole row of environmental effects, each of which may be very pronounced or less pronounced. The reduction of these forms of environmental impact is the most important aim of the airport's environmental management.

Aircraft movements

Landings and take-offs represent the most obvious environmental impact for the neighbouring community. They are characterised, among other things, by the fact that the airport's runway system consists of two intersecting runways. This results in four areas adjacent to the airport where aircraft and the noise they cause are perceptible. The approach and departure routes are determined by German Air Traffic Services in agreement with the airport and the City of Hamburg. The runway system makes it possible for the airport to respond to the various wind and weather conditions which occur in the Hamburg area so as to guarantee safe flight operations. The aircraft most frequently deployed in Hamburg are the Airbus A320 and Boeing 737 families.

Noise is also generated at ground level: Aircraft use their own engines for the journey between the handling position and the take-off point and /or the rollout point. The length and duration of these movements depend on the positions selected, the take-off or landing heading and the number of aircraft present at the airport at the time. On average, these so-called taxiing times last six minutes in Hamburg, including waiting times at the end of the runway in question.

The timing and distribution of aircraft movements depend on both the time of year and the time of day. Up to 580 aircraft movements per day may occur in the peak months of the summer holiday period. But the differences during the course of the day are also very significant, with the period between 6 and 8 o'clock in the morning along with the late afternoon characterised by particularly high numbers of movements. There are no scheduled flight operations at night.

Approx. 138,000 commercial aircraft movements per year take place at Hamburg Airport (as of December 2010).

Handling of aircraft and passengers

The handling of both passenger and cargo aircraft is a core service offered by Flughafen Hamburg GmbH. Approximately 60 handling positions on three aprons are available for the purpose. The majority of aircraft are handled on Apron 1. This includes the following activities:

- boarding and disembarking of passengers including passenger transport to aircraft
- interior cleaning of cabins
- provision of fresh water and disposal of waste water from the aircraft toilets, transport of baggage and cargo between aircraft and handling facilities
- aircraft fuelling operations
- aircraft de-icing during cold weather
- shuttle trips to and from the more remote car parks

Special fuel tankers are used to refuel aircraft.

A wide range of options exist for getting to the airport.

FHG operates many other buildings apart from the terminals.

Passenger handling takes place in the terminals and the Passenger Pier. The essential prerequisites for these operations, in the form of check-in counters, security checkpoints and baggage transportation and sorting facilities, constitute a decisive factor in the design and size of the terminal buildings.

Traffic in the catchment area

Traffic to and from the airport: this issue encompasses passengers and employees who travel to and from the airport by private car, taxi or public transport (bus and metro rail network) as well as the delivery and collection of air cargo. The catchment area for passengers and personnel stretches from Flensburg in the north to Hanover in the south and from Rostock in the east to Bremen in the west. Recent years have also seen significant growth in the number of passengers from Denmark. The use of the various means of transport depends on the origin of the people concerned as well as whether they are employees, holiday/leisure passengers or business travellers. The usage of the different means of transport influences such measures as the provision of parking spaces, access roads and infrastructure for local and long-distance public transport. All of these measures are pursued by FHG as appropriate.

Operation and maintenance of buildings and facilities

Like any other airport, Hamburg Airport has a multitude of different buildings. The size and type of these buildings always depends on their purpose. The purpose also determines, to a degree, the impact of specific environmental aspects of operation such as energy requirements, waste production and drinking water consumption. In total, Hamburg Airport has approx. 100 buildings with a floor space of more than 260,000 m^2 (excluding car parks).

Rental and allocation of office and retail space

A large portion of the building space is used for offices, either for the airport's own personnel or rented to other companies active on the site. FHG also makes extensive space available for the operation of restaurants and retail businesses. These are located primarily in the terminals, the Airport Plaza and the

Passenger Pier. FHG has a total of 46,000 m² of office space. Around 13,000 m² is allocated to restaurants and retail premises, including the storage and behind-the-scenes areas needed

Workshops, hangars and facilities

The SAEMS and RMH subsidiaries operate several workshops:

- an automobile workshop for the repair, service and maintenance of all motor vehicles used at the site
- a fitter's workshop
- an electrical workshop, responsible amongst other things for the maintenance of the entire apron and runway lighting
- a carpenter's workshop

The central kerosene store is subject to strict security provisions.

The airport also has a civil engineering maintenance centre. This facility is responsible, amongst other things, for maintaining the airport greenery, for snow and ice clearance in winter and for the coordination and performance of all maintenance and repair work on roadways, aprons and sewerage canals.

Large garages and aircraft hangars – for example Hangar H, rented to Lufthansa, or the General Aviation Terminal's hangar – are another dominant feature of the airport. Their environmental relevance lies primarily in their size and the resultant energy requirements for heating them.

Hamburg Airport operates facilities which use water-hazardous substances in many areas of the site. All of these so-called "Water Hazardous Facilities" fulfill the highest safety standards, including the applicable legal requirements. These standards include double-walled tanks, corrosion prevention mechanisms, leak detection systems and regular inspections by external specialists.

Other facilities operated by the airport are relevant because of energy supply and/or their effect on local air quality. The central energy supply facility is the airport's block-type thermal power station (BHKW). This power station provides electricity and heat for the terminals. It also feeds the FHG heat distribution network. The simultaneous production of electricity and heat (cogeneration, combined heat and power) means that the plant has a very high efficiency factor, averaging 92–95%, making it very environmentally friendly. The plant is fuelled with natural gas, bringing further environmental benefits due to the lower level of air pollutants in comparison with other fuels.

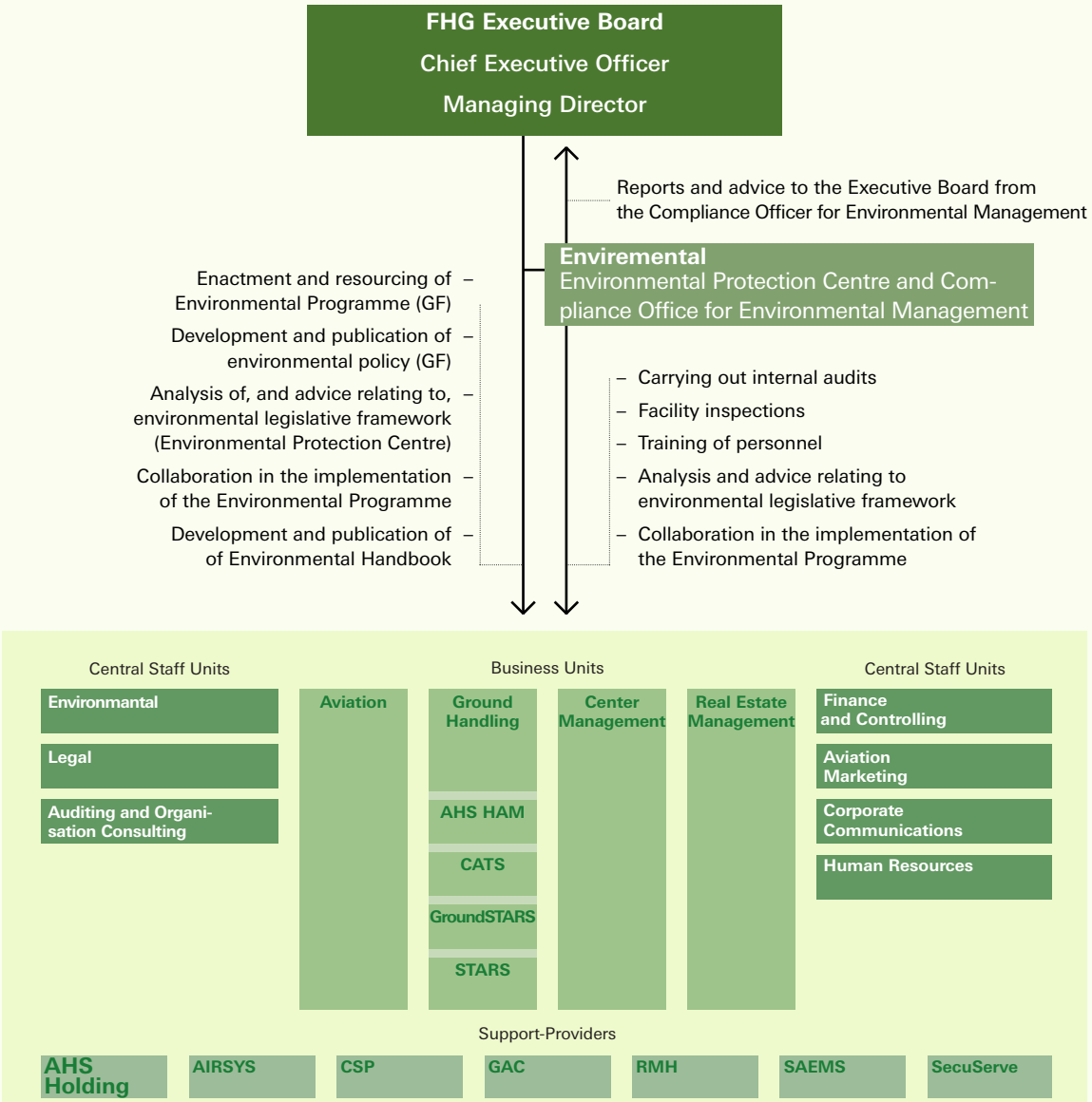
Operational Environmental Protection and Environmental Management

EMAS and ISO 14.001

The goal of the environmental management system, which is certified to fulfil the requirements of EMAS and ISO 14.001, is to systematically quantify the forms of environmental impact of airport operations, as detailed in the rest of this Environmental Statement, and to reduce their impact with environmental programmes. In order to ensure success in both aspects, the system consists of rules for the measurement and reduction of environmental impact as well as for the control of environmentally relevant activities, facilities, etc. It also defines and assigns responsibilities within environmental protection. The system implements the requirements of environmental law, involving all areas of operation of the airport and its subsidiaries in the process. The following diagram elucidates the structure of the system.

In considering environmental aspects, it is essential to differentiate between direct and indirect environmental impact. “Direct impact” refers to the environmental impact over which the airport can exercise direct influence. The table on page 11 shows all environmental impact which Hamburg Airport and its subsidiaries and holdings have to consider.

Structure of the Environmental Management System



All business units and central administrative units, along with support companies, which are integrated into the Environmental Management System:

- implement the Environmental Programme
- report environmental impact, etc., to the Compliance Office for Environmental Management
- make resources available for the Environmental Programme
- participate in shaping and developing the Environmental Handbook and Environmental Programme
- develop and adopt work processes which are as environmentally friendly as possible and which are compatible with the Environmental Handbook, the Environmental Programme and technical and legal standards

The Environmental Management System for Flughafen Hamburg GmbH and its most important subsidiaries (from an environmental perspective).

Environmental Guidelines

The Environmental Guidelines, published as early as 1998, represent FHG's binding environmental policy. The guidelines of Hamburg Airport's environmental policy clarify the airport's principles of operational environmental protection.

We see environmental protection as a process of continuous improvement.
We identify, document and evaluate those activities which have an impact on the environment in order to identify possibilities for improvement. We aim to make progress in operational environmental protection by providing thorough education and training to our employees. We set measurable targets for improvement in environmental protection.

Environmental protection is a component of our corporate strategy.
As far as possible, we avoid environmental pollution. We use energy and raw materials sensibly and as economically as possible. We seek to influence our customers and contractual partners in accordance with this goal.

We protect the environment beyond the level required by law.
We observe all legal requirements. As an innovative, environmentally conscious company, we desire to reduce environmental pollution associated with the operation of the airport in excess of legal requirements.

We are all responsible for the environment.
We promote consciousness of environmental responsibility on site at Hamburg Airport. We encourage every employee to make suggestions for the improvement of environmental protection, either within the framework of the company's employee suggestion system or by making direct contact with the relevant responsible persons.

We take into account the interests and needs of the surrounding area.
We engage in open and critical dialog with the general public. The general public receives information about our company's environmental impact, and we take its concerns, questions and criticisms seriously.

We are actively committed to environmental protection.
We reduce or compensate the CO_2 emissions generated by our activities. We regularly measure and analyse our greenhouse gas emissions. We conduct an active dialog with our business partners in order to plan and execute joint reduction measures. Our long-term goal is the CO_2-neutral operation of our airport.

Environmental impact

The most important direct and indirect forms of environmental impact occurring on site.

Environmental impact	Nature of impact	Causes	Responsible business unit
Noise	indirect	aircraft taking off and landing aircraft taxiing ground handling of aircraft	FHG (airlines), GroundSTARS
Release of air pollutants	indirect, direct	aircraft, ground handling service vehicles, FHG vehicle fleet, internal energy and heat generation	FHG, GroundSTARS, CATS, STARS, RMH, AIRSYS
Resource consumption (fuels, drinking water))	direct	deployment of vehicles, water supply to aircraft, hygiene facilities, de-icing of surface areas a. aircraft, operation of power and central heating plants	FHG, RMH, CATS, GroundSTARS, STARS, SAEMS, AIRSYS
Energy consumption	direct	all consumers of electricity (e.g. lighting of apron, buildings, etc., air conditioning, heating)	all business areas, tenants of FHG
Generation of waste water	direct	surface water on aprons, hygiene facilities, workshops, de-icing	FHG, RMH, STARS, SAEMS
Generation of waste	direct	commercial waste in all areas, esp. in terminals (retail and restaurants), hazardous waste from workshops	all business areas, esp SAEMS, RMH, AIRSYS, FHG, tenants of FHG
Land usage, usage of and impact on green spaces	direct	buildings and facilities, air safety activities	FHG, RMH, tenants of FHG

Environmental Impact and Protective Measures

Aircraft Noise

Thematic Setting

The noise emissions from aircraft at the site represent the most readily perceived environmental impact in the vicinity of the airport. For that reason, measures to combat noise have long had an important place in the airport's environmental management. Noise created by aircraft can, depending on the process causing the noise, be limited in impact to immediate surrounding area of the airport, but it is also noticeable at a greater distance from the airport (e.g. within the flight corridor). This, along with the time spread of individual noise occurrences, essentially characterises the work involved in effective noise protection. The immediate proximity of the airport to residential areas in the Hamburg Metropolitan Region means that the issue of noise acquires additional significance in these locations.

Environmentally Relevant Processes

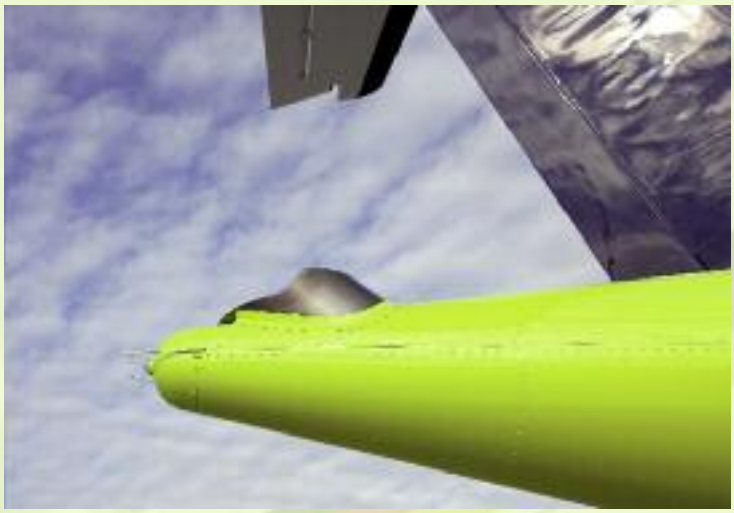
The extent of perceivable aircraft noise in the surrounding area depends on the various sources of noise identifiable at the airport. Firstly, there are the aircraft movements, consisting of aircraft taking off and / or landing. The extent and impact of aircraft noise produced by aircraft movements is characterised by various factors, in particular:

- choice of take-off or approach route, including the runway heading
- size and engine configuration of the aircraft in use
- frequency of aircraft movements
- weather conditions at any given time

Surface noise represents another significant source of noise pollution at the airport. It is produced by, amongst other things, the movement of aircraft on the aprons and taxiways. Auxiliary power units (APUs) can also be a

Flight paths and locations of noise measurement points at Hamburg Airport.

very significant source of surface noise, as almost every commercial aircraft has one as an autonomous supply of electrical energy and air conditioning. The noise produced by APUs can, because of its duration, be a source of disturbance, particularly for the community in the vicinity of Apron 1. For a long time, a third cause of surface noise was the engine tests conducted by Lufthansa Technik. These tests are necessary after every maintenance procedure or overhaul of an aircraft and were therefore conducted on the airport site with very high frequency, as there was insufficient noise protection for larger aircraft until the construction of the Noise Protection Hangar (see also next section). Essentially, two factors characterise the noise produced here: the duration of individual tests, causing a lengthy direct disturbance, and the requirements of Lufthansa Technik, necessitating tests at times which are sensitive from a noise protection point of view.



APUs provide aircraft with electricity and air conditioning during ground handling.

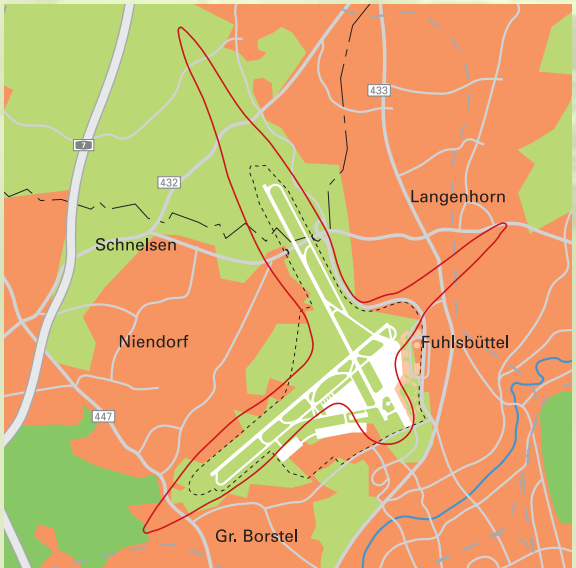
Environmental Protection Measures

At Hamburg Airport, noise protection has for a long time meant the pursuit of a strategy built, essentially, on two pilllars: the improvement of residential soundproofing (passive noise protection) and the reduction of aircraft noise (active noise protection).

Since the mid-1970s, Flughafen Hamburg GmbH has conducted primarily voluntary noise protection programmes to improve the passive noise protection in the surrounding area. These programmes have far exceeded the legally stipulated requirements and they continue to do so. The fundamental component in these programmes is the installation, funded by the airport, of soundproof windows in houses and apartments in the airport vicinity. Bedrooms are also fitted with soundproof ventilators, providing a high level of noise protection at the same time and allowing fresh air in at the same time. This aims to address the need for peace and quiet at the sensitive times of the beginning and end of the day. These programmes are based on various noise contours, always calculated on the basis of the latest legal requirements and medical findings. To date, FHG has made some 38 million euros available for noise protection in the surrounding community.

As well as protecting the community from noise, measures to reduce aircraft noise play a decisive role. In order to counteract the increase of aircraft noise, a so-called noise quota was agreed in 1998.

This is based on the level of noise pollution generated in 1997, calculated according to the air traffic at the time. This represents an upper noise limit for the airport which must not be exceeded in the future. The actual amount of noise generated each



Area covered by 6th voluntary noise protection programme.

Diesel generators (Ground Power Units) supply electricity to aircraft at remote positions.

year is calculated and sent to the authorities as proof that this regulation is being fulfilled.

Noticeable reductions in aircraft noise may be achieved by proactively encouraging the deployment of modern, and thus quieter, aircraft at the site. This has been implemented in Hamburg by making the landing charge dependent, among other things, on the noise generated by the individual aircraft model in use. Aircraft have been classified in seven noise classes, and the noise-related portion of the charge represents 30% of the total landing charge. The landing charge has been one contributing factor to the significant reduction in noise levels at Hamburg since the introduction of the noise quota.

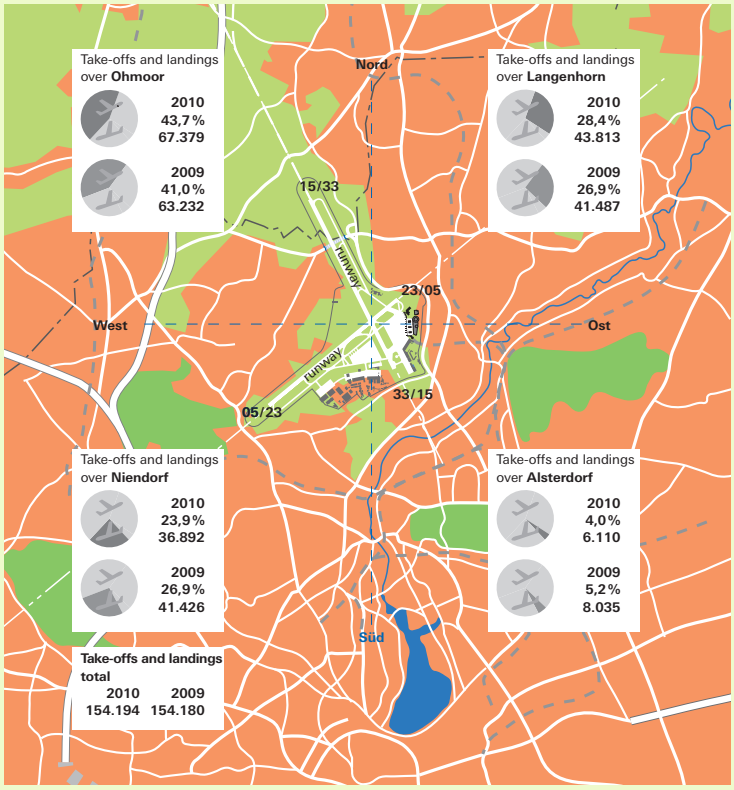
Prescribed noise quota from 1997 (area: 20.39 km2) and development of noise levels by 2010 (13.34 km2).

The schedule of charges is further coupled with the existing restrictions on night flights and also incorporates take-offs. The noise-related charge thus increases for landings and take-offs after 10:00 p.m. by 100 % and after 11:00 p.m. by 200 %. This measure also encourages compliance with the restrictions. The restrictions on night flights are intended to ensure that regular flight operations take place between 6:00 a.m. and 11:00 p.m., with exceptions for justifiably delayed flights up to midnight.

At Pier parking positions, the aircraft are supplied with electricity and air conditioning from the block-type thermal power plant.

The airport has effectively fought the generation of surface noise from the operation of auxiliary power units for several years now by providing the energy required directly, thus making APUs unnecessary. At Pier parking positions, there has long been a direct connection to FHG's block-type thermal power plant. This connection provides aircraft with electricity and conditioned air. Hamburg Airport was a pioneer amongst Germany's airports with the introduction of this technology. At remote parking positions, aircraft are supplied via mobile diesel generators and air conditioning equipment; sufficient equipment is on hand to guarantee supply to all aircraft handling positions. The Airport Usage Regulations include a requirement that APUs are switched off throughout handling. Compliance with this regulation is continually monitored. Ultimately, this strategy has resulted in APUs becoming a relatively insignificant source of surface noise.

Since the end of 2001, an enclosed noise protection hangar has been available for engine tests on all aircraft maintained by Lufthansa Technik in Hamburg. This facility, to this day the only one of its kind worldwide, was suggested, constructed and financed by FHG. The construction of this noise protection hangar has meant that Lufthansa Technik no longer has to conduct engine tests outside. The resultant improvement in the noise situation is considerable.



Average distribution of take-offs and landings over the four available operating directions.

Key Figures

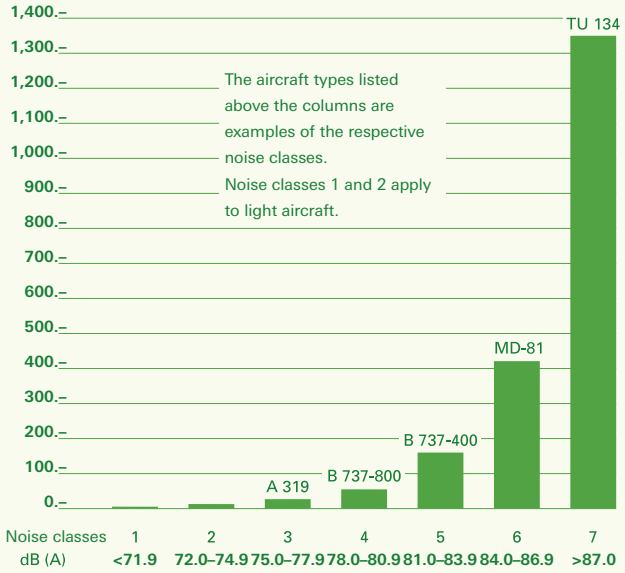
Annual noise levels (Leq3) at aircraft noise measurement points

	Measurement point	2008	2009	2010
1	Hasloh	55.3	54.7	54.9
2	Norderstedt	47.1	46.3	44.6
3	Quickborn Schule	53.9	53.8	53.3
4	Norderstedt	52.3	50.9	51.5
5	Langenhorn	59.8	59.6	59.7
7	Fuhlsbüttel	63.8	62.3	61.9
8	Empfängerstation	56.4	55.9	55.2
9	Quickborn Heide	48.1	46.5	46.5
10	Stellingen	60.5	59.8	59.9
11	Norderstedt	60.0	58.7	59.4
12	Groß Borstel	55.7	55.9	55.2
13	Poppenbüttel	55.3	53.8	54.2

Measurement point 6 is an industrial measurement point. measuring the noise of engine tests.

Landing Fees Noise Surcharge

Noise charge (in euros)



Noise protection programmes at Flughafen Hamburg GmbH as at September 2011

	Duration	Residential units*, applications processed only windows	only ventilators	ventilators installed
Legally required programme	1974 – 1982	800		0
1st voluntary programme	1978 – 1982	1,600		0
2st voluntary programme	1982 – 1987	5,500		0
3st voluntary programme	1989 – 1992	3,000		0
4st voluntary programme	1998 – 2001	383	300	1,001
5th mandatory programme	1999 – 2004	386	2,437	5,957
Total		**11,669**	**2,737**	**6,958**
6. Freiwilliges Programm	01.01.2003 – 31.12.2010	64		0
6+. Freiwilliges Programm	01.09.2007 – 31.12.2010	141		0
7. Freiwilliges Programm	30.06.2006 – 31.12.2010	889	180	292
7+. Freiwilliges Programm	01.09.2007 – 31.12.2010	1,661	322	470
8. Freiwilliges Programm	01.09.2007 – 31.12.2010	680	454	982
Total		**3,435**	**956**	**1,744**
All programmes		**15,104**	**3,693**	**8,702**

*Only those residences are listed for which noise protection applications have been made. The number of residential units entitled to protection within the geographical area covered is as a matter of course higher.

Local Air Quality and the Generation of Greenhouse Gases

Thematic Setting

The operation of aircraft and vehicles on the airport site and in the vicinity, along with the supply of energy for the lighting, heating, etc. of buildings and facilities, consume natural resources. This also applies to surface transportation to and from the airport, although this is, for the most part, outside of the airport's sphere of influence. Important associated environmental effects consist of the generation and emission of air pollutants and of gases with climatic effects. Considering current discussions on global climate change, this latter aspect, in particular, is significant. Effective energy management must therefore be integrated in all measures relating to the issues being addressed here.

Environmentally Relevant Processes

The most important pollutants generated at the site are, essentially:
- nitric oxide (NO_x)
- unburnt hydrocarbons (C_xH_y)
- particles (PM 10 and PM 2.5)
- carbon monoxide (CO) and carbon dioxide (CO_2)

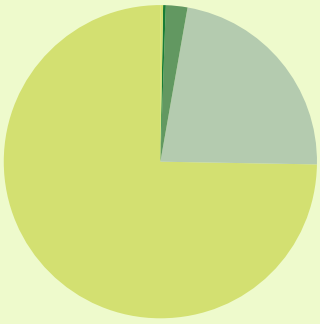
Aircraft at the site represent one source of emission for air pollutants via taxiing (incl. waiting periods), possible APU operation and take-offs and landings. Although these emissions are primarily the responsibility of the relevant airlines, the amounts are, to a limited extent, also dependent on the construction and characteristics of the airport. These emissions are thus thoroughly incorporated in FHG's environmental management.

Emissions within the airport's sphere of influence are generated by, amongst other things, the supply of energy to buildings and facilities; most of this is supplied directly by Flughafen Hamburg GmbH. The majority of this energy (some 80 %) is necessary to meet the heating and cooling requirements of the buildings. A further factor influencing the aircraft's energy requirements is illumination.

The deployment of vehicles airside, primarily for aircraft handling and for maintenance, also results in the generation of air pollutants and gases with climatic effects. In many cases, large and powerful vehicles are required, with subsequently high fuel consumption. In total, more than 400 vehicles of every possible size are in operation on the airport site. Vehicle operation contributes a maximum of 20 % to the total emissions within Flughafen Hamburg GmbH's direct sphere of influence.

The number of vehicles and journeys involved in surface travel to and from the airport, stimulated or induced by the airport, is much higher. This consists of private vehicles driven by passengers or those meeting / bringing them, taxis, buses, coaches, and vehicles delivering or collecting air cargo. In addition there are the journeys to and from work for the personnel of the airport and the companies based here. The extent of this traffic depends to a great deal on the airport's catchment area. In considering this environmental impact, however, it can be very difficult to draw clear boundaries.

Percentage distribution of CO_2-emissions *



- 74.99 aircraft in LTO cycle
- 22.31 energy requirements for buildings and facilities
- 2.25 vehicles
- 0.45 ground power units

* excluding landside traffic to / from airport

Environmental Protection Measures

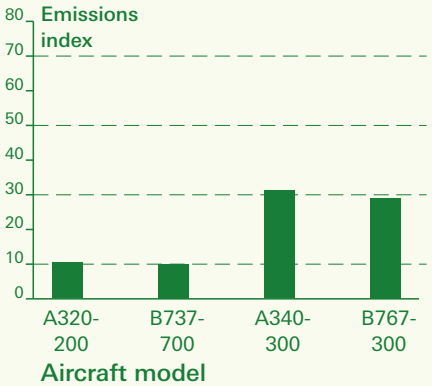
Overall, the air quality at Hamburg Airport is comparable with the air quality in other areas on the edge of the city. This is shown by the results of a measurement station on the airport site. The station is part of the Hamburg Air Measurement Network operated by the Hamburg Department of Civil Engineering and the Environment. Regardless of these results, one of the substantial aims of FHG's environmental management is the reduction of emissions of air pollutants. The reduction of greenhouse gas emissions is pursued with the same commitment.

Emission reduction measures begin at the source. FHG has only limited possibilities when it comes to aircraft emissions, as many decisions are taken by the airlines as owners of the aircraft. Nevertheless, the impulses given by Flughafen Hamburg GmbH to guide these decisions are proving very successful. The requirement that APUs are switched off on the aprons (see Noise) has resulted in a considerable reduction in air pollution. The emission of CO2, too, is being reduced, primarily because the energy provided by the airport is generated much more efficiently than an APU can operate. At the start of 2009, FHG introduced an additional emissions-based component to the landing charge. This gives airlines a financial incentive to use modern aircraft, which produce less pollution.

Aircraft are a significant source of air pollution.

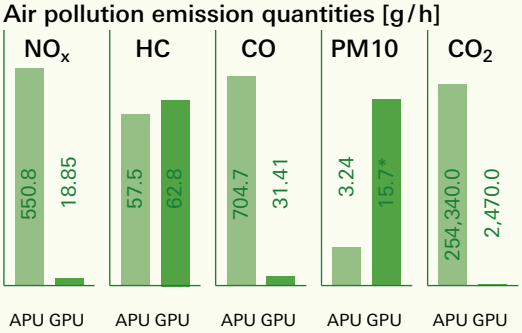
The strategy to reduce emissions from vehicles deployed for airside ground handling has two strands: reducing fuel consumption by optimising the necessary journeys, and increasing the number of vehicles using alternative, more environmentally friendly fuels. The latter, in particular, has shown itself to be an effective tool. The most important alternative fuel at present is natural gas. Natural gas produces less pollutants than gasoline or diesel fuel when burnt; on average, 25 % less CO_2 is produced per converted vehicle. Since 2010, biogas with natural gas quality from proven climate-neutral sources is being used instead of natural gas. This is reducing CO_2 emissions by 65 %. At present, all baggage tugs, eight passenger buses and a number

Average emissions indexes for selected aircraft models.



Emission indexes (a measurement of the pollutants generated by aircraft models) form the basis of the emission-based landing charge.

Emissions from auxiliary power units (APUs) in comparison to ground power units (GPUs)



of passenger vehicles operated by the company use biogas. This proportion shall continue to be increased. In the future, electric and hydrogen-powered vehicles will also be deployed, with both forms of fuel to come from renewable sources. This will result in a comprehensive reduction in air pollutants for the converted vehicles. As a first step in this direction, FHG currently operates three H2-powered vehicles. In addition, three electric cars have recently entered operation. These vehicles will provide practical experience in the deployment of this fundamentally environmentally friendly technology.

With reference to air quality and climate protection, the high energy requirements of the buildings, facilities and surface areas of the airport are of great importance. The efficient supply of energy to the buildings therefore has a decisive role in FHG's climate protection concept. This is achieved by:

- Energy management: The monitoring of energy flows, which is as complete as possible, provides detailed data on specific consumers and shows the effectiveness of energy savings measures taken. Energy management also controls the level of energy flow.
- Modern technology used for air conditioning in the buildings ensures that potential energy savings are taken advantage of to a high degree.
- Traditional lighting is being replaced with up-to-date technology wherever possible, e.g. LED lighting. This is reducing the electricity requirements for lighting.
- Since 2005, the air conditioning for Terminal 1 and the Plaza is fed by pre-conditioned air from a thermolabyrinth.
- A photovoltaic facility was installed on the roof of the main administration building in May 2011. The contribution of this facility to climate protection is small, but it is seen as a starting point to be followed by further photovoltaic installations in the future (e.g. on new construction projects).
- Some 10 % of electricity purchased from external providers currently comes from certified climate-neutral sources.

In order to compensate for the greenhouse gas emissions produced by work-related journeys undertaken by employees at the site, a new woodland area has been created in the Kaltenkirchen area. This "climate forest" has a surface area totalling 240,000 m^2 and may be enlarged in the future.

All measures are regularly evaluated and, where necessary, expanded in order to ensure the sustainable development of the airport.

Facilities relevant to emissions protection

Identifier / site	Type of facility	Fuel in use	Size of facility
Block-type thermal power plant	electricity supply heat supply	natural gas	12.0 MW
Boiler house south	heat supply	natural gas	19.9 MW
Central heating GAT	heat supply	heating oil	682.0 KW
Central heating tower	heat supply	heating oil	457.0 KW
Central heating weather station	heat supply	heating oil	15.2 KW
Works sports centre	heat supply	natural gas	165.0 KW

Kennzahlen

Consumption of electrical energy in MWh

2008	2009	2010
34,214.68	39,614.71	37,948.42

CO_2 emissions from on-site generation and consumption of energy (in tonnes)

2008	2009	2010
33,014.64	34,590.27	35,804.82

Total energy consumption
pro traffic unit in kWh and per employee in MWh

	2008	2009	2010
per traffic unit	13.2	11.6	12.8
per employee	87.6	92.1	107.2

Emission of CO_2 per traffic unit in kg and per employee in t (including CO_2 from vehicles)

	2008	2009	2010
per traffic unit	2.72	3.01	2.96
per employee	22.9	24.4	25.0

Usage of natural gas as vehicular fuel in kg

business unit	2008	2009	2010
CATS	–	–	–
STARS	–	40,433	83,381
GroundSTARS	180,702	179,623	234,899
SAEMS	–	–	–
AIRSYS	–	–	–
RMH	1,131	1,870	2,552
FHG	6,337	6,619	8,110

Gasoline and diesel consumption of FHG and individual holdings in past years business unit

business unit	2008	2009	2010
CATS	21,455	22,255	24,023
STARS	511,516	522,332	525,658
GroundSTARS	416,113	452,141	644,991
SAEMS	2,433	2,471	3,130
AIRSYS	3,236	4,347	3,038
RMH	131,240	162,967	288,170
FHG	137,648	141,478	144,922

Emission of other greenhouse gases
(kg CO_2 equivalent, kg CO_2 equivalent/employee) and air pollutants according to EMAS III from energy generated on site

	2008		2009		2010	
	Gesamt-menge	pro MA	Gesamt-menge	pro MA	Gesamt-menge	pro MA
CH_4	17.6	10.9	18.3	11.6	19.8	12.2
N_2O	–	–	–	–	–	–
hydro-fluor-carbon	–	–	–	–	–	–
perfluor-carbon	–	–	–	–	–	–
SF_6	–	–	–	–	–	–
SO_2	176.25	109	183.18	115	198.23	122
NO_x	21,149.7	13.1	21,981.4	13.8	23,787.8	14.7
PM10	70.50	44	73.27	46	79.29	49

Generation of CO_2 by operation of vehicles (gasoline, diesel and natural gas) in t

business unit	2008	2009	2010
CATS	56	58	63
STARS	1,345	1,504	1,486
GroundSTARS	1,202	1,080	1,947
SAEMS	6	6	8
AIRSYS	8	10	7
RMH	349	435	744
FHG	346	382	380

The amended EU Eco Management and Audit Scheme (EMAS III) requires that water consumption, waste production, energy consumption and surface usage figures published in environmental reports are presented in relationship to the number of employees. This also applies to the emission of greenhouse gases and air pollutants, whereby EMAS prescribes the consideration of the greenhouse gases and air pollutants listed above.

Water Management and Water Protection

Thematic Setting

Work with water-hazardous substances demands effective protection and monitoring mechanisms to guarantee the safety of natural waterbodies in the surrounding area (including ground water). Sealed-surface operating areas and the surface water that occurs there must also be taken into account. Water management also addresses the airport's drinking water and service water requirements.

Environmentally Relevant Processes

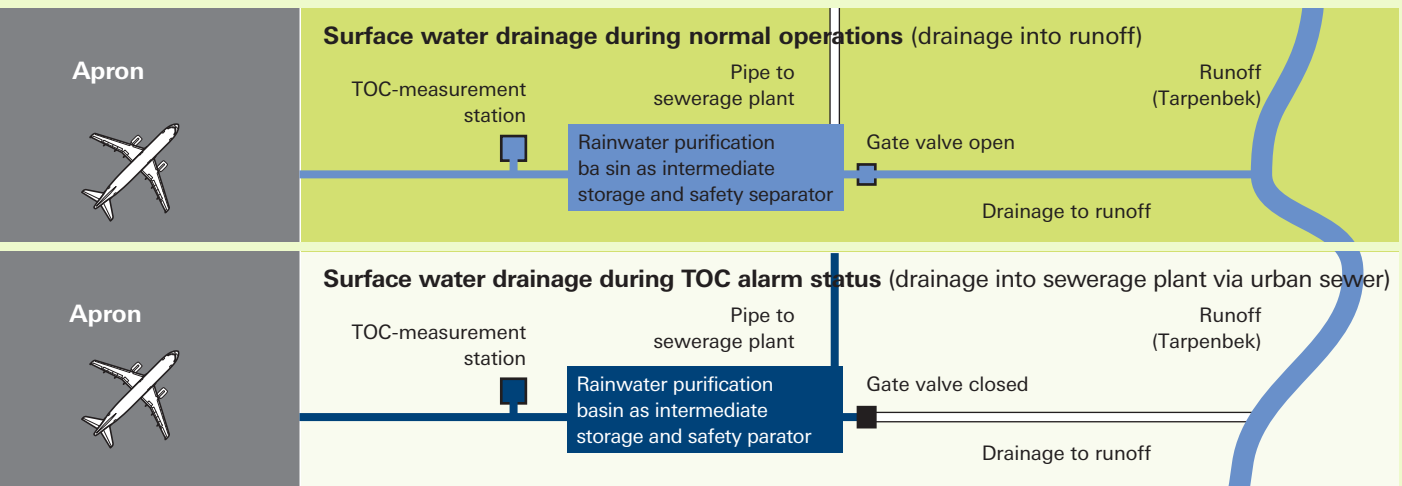
The drinking water requirement is influenced by various factors: the water supply to public restrooms, restaurants, etc.; supply of drinking water to the hotel on the airport site, opened in 2010; supply of water to aircraft by FHG's subsidiary, GroundSTARS. Corresponding quantities of (mostly domestic) waste water are directly associated with the drinking water supply. Activities such as, for example, workshop operations and aircraft de-icing also result in dirty water and waste water.

Environmental Protection Measures

Facilities and operational processes at the site can potentially contaminate surrounding waterbodies, groundwater and also wastewater. This potential risk is countered with appropriate protective measures. Water-hazardous substances such as kerosene, motor fuels and de-icing fluid, for example, may be released. Aircraft refuelling operations present a similar risk. The de-icing of aircraft in winter results in large quantities of surface water, contaminated with de-icing fluid.

Hot water is used for aircraft de-icing wherever possible so as to minimise the usage of de-icing fluid.

Drinking water requirements are reduced in several ways. Waterless urinals are installed in the public restrooms wherever hygiene considerations allow. Water-saving taps are used throughout the site. The rainwater utilisation system in Terminal 1 makes a much greater contribution to reducing the drinking water requirements. Thanks to this system, approx. 6,000 m³ of drinking water is provided from rainwater.



Water-hazardous materials are stored with great care. All larger storage installations are equipped with the latest technology in terms of double-walled tanks, leak indication equipment, corrosion protection facilities, etc. All other storage facilities are located underground with fluid-proof floors. All storage facilities are regularly inspected and maintained.

In winter, surface water from the aprons may be contaminated with de-icing fluids, particularly from aircraft de-icing. At this time of year, a TOC measuring point automatically monitors the concentration of de-icing fluid in drain water every 15 minutes. As long as the facility registers a concentration below 50 mg/l TOC, the water is fed into the Tarpenbek runoff. As soon as measurements show a concentration above this threshold value, the discharge to Tarpenbek is automatically closed and the contaminated surface water is diverted to a retaining basin and from there to the urban sewerage network. This makes it possible to protect Tarpenbek from contamination.

Furthermore, 20 oil separators and rainwater purification basins equipped as safety separators ensure that runoffs and urban sewerage are protected from contamination. Regular self-checking measurements monitor the functioning of these facilities. FHG operates a network of groundwater monitoring wells in order to obtain an overview of the quality and status of groundwater at the airport site. The wells are regularly sampled.

VAwS facilities

Identifier / site	Type of facility	Substances	Capacity
Central kerosene storage of fuel service	Storage and filling	Kerosene	4.150 m³ (2 tank complexes)
Fuel station for light aircraft	Storage and filling	Aviation gasoline	50 m³
FHG site fuel station	Storage and filling	Diesel / gasoline	230 m³ (5 individual tanks)
Car hire center fuel station	Storage and filling	Diesel / gasoline	100 m³ (3 individual tanks)
Central de-icing storage STARS	Storage and filling	Aircraft de-icing fluid	7 x 10 m³
Airport emergency power supply	Storage	Diesel	30 m³
Heat supply – General Aviation Terminal	Storage	Heating oil	50 m³
Heat supply – weather station	Storage	Heating oil	6 m³
Heat supply – tower	Storage	Heating oil	30 m³
De-icing storage RMH	Storage	Surface de-icing material, solid and liquid	30 m³
Waste oil tank SAEMS	Storage tank	Waste oil from vehicle repairs	5 m³
FHG main storage	Containerised storage	Various products	ca. 1 m³

VAwS: Ordinance on Installations for the Handling of Water-Hazardous Substances.

Key Figures

Drinking water consumption per traffic unit and per employee in m³

	2008	2009	2010
per traffic unit	10.02	10.87	14.93
per employee	85	91	120

The increase in drinking water consumption between 2009 and 2010 is attributable to the replacement of water metering equipment.

Waste Recycling and Reuse

Thematic Setting

A range of different types of waste are generated in various quantities on the airport site. This consists predominantly of commercial waste. Specific activities necessary to ensure smooth airport operation also generate a range of special types of waste. The proper disposal as well as minimisation of these forms of waste are the most important environmental management tasks in this area.

Environmentally Relevant Processes

Larger quantities of waste are generated in the terminals and the Airport Plaza. This is commercial waste, arising in the shops and restaurants as well as from passenger activity in the terminals. The composition of this waste is very similar to that of private household waste. More limited quantities of food waste are generated in the restaurants and take-away outlets in the terminals; this waste must be disposed of appropriately.

Waste is also created in the workshops operated to maintain the airport's facilities. In legal terms, this is "hazardous waste". This waste consists primarily of used oil, oil-soiled materials, sludge from oil separators and left-over marking paint. The volume depends on the amount of maintenance and service work needed at the airport.

Waste collection area

In individual cases, items and products are retained in the process of passenger security checks because these items or products are not permitted on an aircraft for security reasons. Except where passengers lodge claims for these items, they must be stored in a dedicated intermediate facility and disposed of as waste. To a very limited extent, hazardous waste is also present here.

Waste arising in the process of aircraft cabin cleaning is collected and stored in complete separation from all other waste. The largest portion of this waste is made up of used packing materials and newspapers. The separation of this waste results on the one hand from operational processes, and on the other hand from the need to dispose of different types of waste separately with controlled incineration for reasons of hygiene. Attention is paid to achieving a high recycling quota for newspapers and magazines.

Environmental Protection Measures

The focal areas for FHG's activities are:
- Development and implementation of strategies to avoid waste, including the promotion of environmental awareness.
- Clean separation of waste at the on-site intermediate storage.
- Selection of disposal service providers with reference to a high ration of reuse and recycling.
- Where possible, purchasing of products which represent non-hazardous, recyclable waste at the end of their useful life.

The goal of measures adopted is to maintain a low level of environmental impact even when quantities of waste increase. Clean separation on site is particularly important, as it makes a high level of recycling possible. The airport is thorough in selecting disposal service providers and regularly evaluates them.

Key Figures

Residual waste per passenger g and per employee in t

	2008	2009	2010
per passenger	219	187	181
per employee	1,75	1,44	1,44

In the, Hamburg Airport in Figures data section you will find information on the most important waste volumes generated at the airport.

Waste from aircraft cabin cleaning is carefully separated from other waste at the point of collection and in storage.

Open Spaces, Flora and Fauna

Thematic Setting

Green spaces define the appearance of large areas of the airport site. The airside open spaces in particular have a largely natural character. Furthermore, all of the airport's construction projects, including those in the area of landside approach roads to the airport, incorporate the creation of green spaces and the planting of trees on a large scale. A visual perspective was decisive in this process. The care of all green spaces takes into account both nature and visual aspects. Considering air safety, a further aim in the management of these areas includes minimising the risk of birdstrike as far as possible.

Environmentally Relevant Processes

Large areas of the airport premises consist of open meadow and grassland. These are located immediately adjacent to the aircraft movement areas. For air safety reasons, these areas must be free of obstacles. Ecologically important habitats for rare animal and plant species have developed here, within the City of Hamburg. The areas have to be mowed regularly in order to maintain their character. The size of these contiguous green areas makes Hamburg Airport one of Hamburg's largest agricultural operations.

31.6 % of the entire airport site is paved (grey). Compensating areas are green, with compensating tree planting marked in dark green.

The necessity of keeping the airspace in the immediate vicinity of the airport free of obstacles means that trees which extend into this airspace have to be pruned on a regular basis. This requirement also affects trees in the approach sectors outside of the airport premises. As a matter of principle, tree-pruning is carried out in agreement with the responsible authorities and the owners of the relevant properties. Apart from this regular tree-pruning, the shrubs along the airport fence are also affected by cutting programmes. This is the result of requirements of air safety laws which state that ground immediately adjacent to the airport fence must be free of vegetation. It's large undisturbed natural areas make the airport site a popular habitat for many different bird species. This essentially positive development can be problematic from the point of view of air safety, where the aim is to prevent the occurrence of birdstrike. The ecological management methods applied to the airport site play an important role here. Minimal fertilisation of the areas results in a thinning of vegetation, which in turn reduces the amount of food for birds so that the spaces become less attractive as bird habitats. The airport meadowlands are also only mowed once or twice each year. This prevents the settling of birds that prefer open spaces. The following individual measures are also taken:

- Covering of smaller water areas (rainwater retention basins) with nets to prevent waterbirds from setting
- Shooting of blank munition to drive birds away

Landside green spaces fulfill, primarily, a design purpose. They consist for the most part of lawn areas and trees. They have limited ecological significance but characterise the landscaping in the airport terminal area.

The management of green spaces also incorporates concepts to prevent birdstrike.

Environmental Protection Measures

One of the aims of the management of the airport free spaces is to maintain their natural function and ecological value. The lean management of airside green spaces has a positive effect on the creation of rare and thus ecologically valuable habitats, rich in species variety. This results in rare insect species settling in these spaces.

Part of the ecologically vital area has been deliberately redeveloped from formerly sealed and/or insignificant areas into its present state. This is intended as compensation for natural spaces lost through construction projects. The creation of various lean grasslands has been and is being encouraged in these compensating areas. Regular inspections monitor their development. Supplementary investigations and surveys on the contamination of soil and groundwater provide further insights into the condition of the natural environment at the site as well as the development of these biotopes. FHG has also created new natural habitats as compensating areas at former intensive agricultural sites outside the airport premises. For every tree cut down at the site, a minimum of one new tree is planted.

Tree planting represents an important part of the compensation concept of FHG.

Key Figures

Paved area in ha and in ha per employee			
	2008	**2009**	**2010**
Area	164	164	164
per employee	0.102	0.103	0.101

Electromagnetic Radiation

Thematic Setting

In order to ensure safe flight operations, German Air Traffic Services (DFS) operate a radar system to monitor the airspace around Hamburg Airport. Furthermore, a surface radar system entered service at the site in 2010. This makes operations on the ground safer, in particular at times of poor visibility. Insofar as these systems generate electromagnetic waves they must fulfill applicable safety standards and immission protection standards.

Environmentally Relevant Processes

The DFS airspace monitoring facilities consist of a radar tower in the vicinity of Terminal 2. The DFS Control Tower is also equipped with radar. The tower is located on the airport site. The radar tower is approx. 35m. high. The transmission power of the radar equipment installed at the top of the tower (primary and secondary airspace monitoring radar) is 1.2 MW (primary radar) and 2 kW (secondary radar).

German Air Traffic Services (DFS) airspace monitoring control tower

The new radar system for monitoring surface movements consists of various components. The 25m-high radar tower is the most important of these components. The system has a transmitting power of 16 kW. It is complemented by a total of 23 smaller transmitters, operating at ground level, but directed inwards at the airport site. These transmitters have a substantially lower power of 100 W each.

The approval and notification for both systems is subject to the requirements of the 26th Ordinance on the Performance of the Federal Emission Protection Act. These regulations prescribe, amongst other things, upper limits for permissible electromagnetic radiation which may occur in the vicinity of high frequency facilities; the radar equipment falls into this classification. Electromagnetic tolerance is measured in terms of field strength.

Environmental Protection Measures

All radar systems are regularly maintained. This maintenance serves to maintain the operability of the equipment, but is also targeted at ensuring that the prescribed limits are at no time exceeded in the immediate vicinity of the facilities and in areas with continual human presence.

The respective protective distances for all transmitters mentioned, i.e. the areas directly adjacent to the transmitter where the limits specified in the 26th BImSchV may not be reached or exceeded, are located within the airport site, above the neighbouring buildings. As such, they do not contain any buildings or areas with continual human presence.
At the commissioning of the facilities, the electrical field strength arising from their operation was determined by calculation for the nearest positions with continual

human presence. Measurements were also carried out at the site. The primary purpose of these calculations and measurements is to show the extent to which airport personnel and employees of companies operating on the site are subject to electromagnetic fields. The measurements show that the field strength immissions at sites close to the facilities (but outside the protective areas) are only a very small percentage of the 61 V/m allowed by the 26th BImSchV.

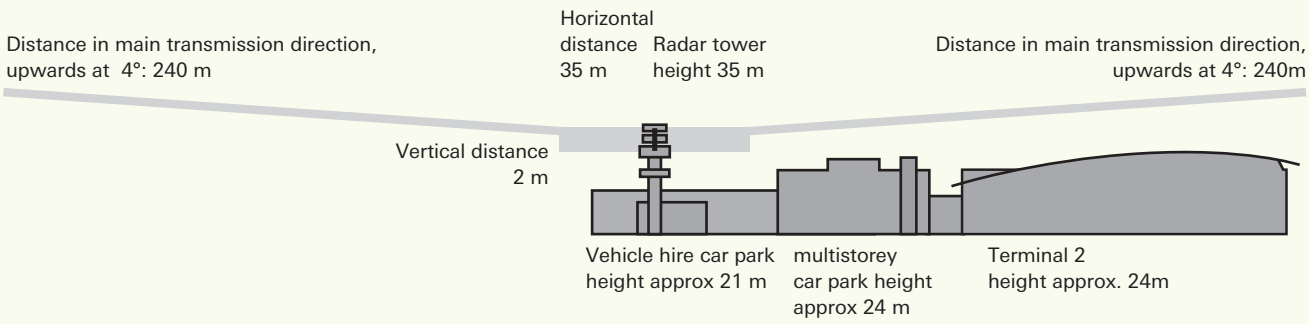
Surface radar

Key Figures

Protective distance from radar (in m.)

Type of radar	Primary transmission direction	Horizontal	Vertical (downwards)
Primary radar	240 (4° upwards from radar height)	35	2
Secundary radar tower	13 (8° upwards)	4	0
Surface radar tower	32	32	2,5
Surface radar sensors	1.4	32	0.61

Protective distances for primary airspace monitoring radar



Übersicht Flächen und Gebäude

regular pruning of trees 1
(to ensure absence of obstacles)

cleared area along permiter fence 2
(required by Aviation Security Act)

site sport facility 3
(decentralised heating system)

rainwater retention basin 4

DWD weather station 5
(decentralised heating system, heating oil storage)

radar tower (surface radar) 6

compensating area 7

compensating planting of trees 8

Tarpenbek as drainage catchment 9

fuel station for light aircraft 10

general aviation terminal 11
(decentralised heating system, heating oil storage)

tower building 12

TOC facility 13

14 **de-icing material storage** (surface de-icing)

15 **site fire brigade**

16 **site fuel station**

17 **thermolabyrinth in Terminal 1**

18 **rainwater utilisation system in Terminal 1**

19 **block-type thermal power station**

20 **radar tower** (airspace control)

21 **fuel station and car wash facility for car hire centre**

22 **southern central heating plant**

23 **caretaker's waste storage area**

24 **waste collection point – aircraft cleaning material**

25 **kerosene storage**

26 **natural gas and hydrogen fuel stations**

27 **de-icing material storage** (aircraft de-icing)

28 **noise protection hangar**

Werkstatt für Kommunikationsdesign
C. M. Semmler G_UE 06.10.2011

Research and Development

Active in Research and Development

Environmental protection always implies innovation, especially in terms of new technologies and processes. So as to be at the leading edge of technology and to play a role in defining this leading edge, Hamburg Airport participates in various research and development projects in environmentally relevant fields. The Hamburg Aviation Cluster is particularly worthy of mention, an alliance of important companies in the aviation industry with Hamburg's universities. The cluster drives research and development in aviation forwards, with environmental protection and ecological efficiency a focal point of individual projects. The cluster is financially supported by the federal government. It facilitates a thriving exchange of ideas and know-how between the airport and other project partners, for example participating universities. FHG is an important partner in the following projects.

Environmentally Friendly Services at the Airport

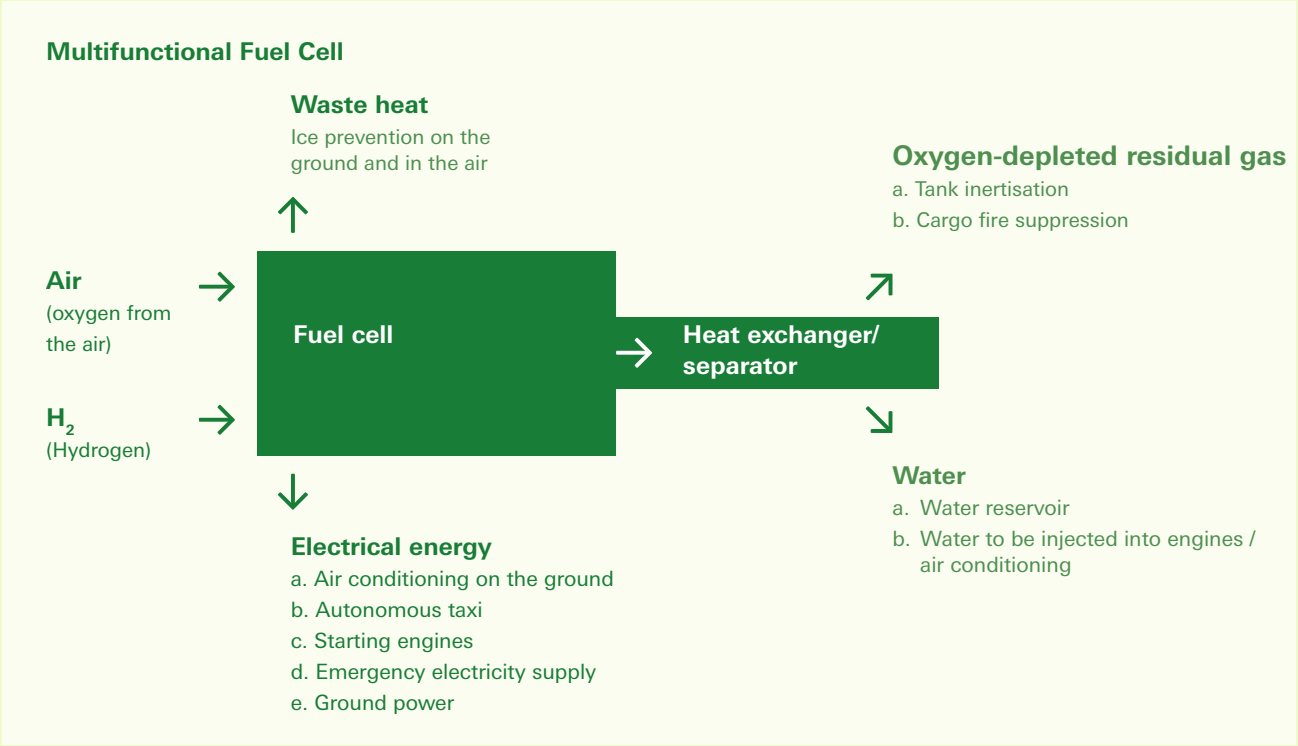
This development project, involving two Hamburg universities, consists of two subprojects.

The first subproject looks at improvements in energy efficiency in aircraft hangars, which, due to structural and usage factors, have high energy requirements for heating and lighting. The second subproject is concerned with investigating the possibilities for using alternatively powered vehicles on the airport site.

The first results of this project show how the energy requirements of aircraft hangars can be significantly lower in the future by means of changes to heating and ventilation systems as well as by modifying the lighting control systems. A further result of this project indicates which of the seminal alternative vehicle power sources (natural gas, hydrogen, electricity) are best suited for deployment in which functions at the airport. Future vehicle acquisitions will be guided by these results. This project is aimed at improving two typical aspects of airport operations in terms of energy efficiency.

Multifunctional Fuel Cell

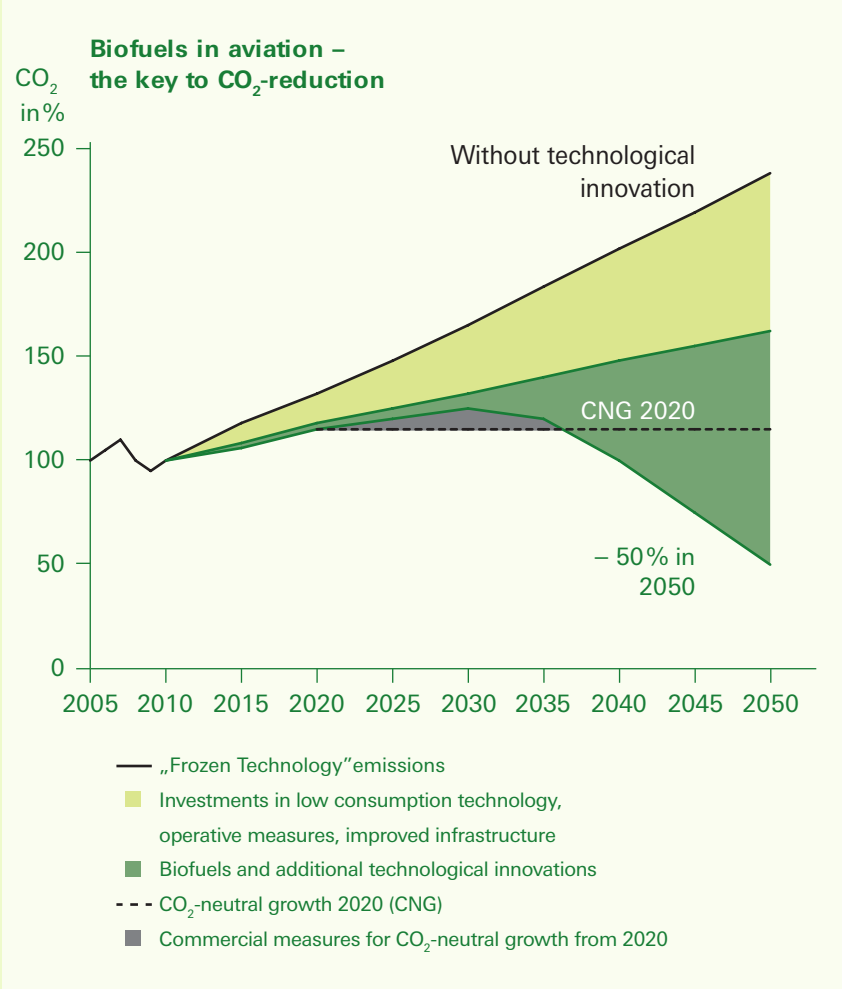
The kerosene consumption and noise emissions of the conventional auxiliary power units (APUs) used in aircraft are comparatively high. In the context of their primary use, the provision of electrical energy, the APU can largely be replaced y a system which provides energy via a hydrogen-powered fuel cell. Such a fuel cell is being developed to the point of market readiness in this research project; EADS, a major aviation corporation, is also participating in the project. Multifunctional fuel cells will allow the emission of greenhouse gases to be noticeably reduced in the future by eliminating the burning of kerosene for APU operations. FHG's role in this project is to define and develop the infrastructural requirements for storage and internal logistics for hydrogen. This also includes identifying technical safety requirements. From FHG's viewpoint, working with hydrogen will play a significant role in future airport operations. This project may therefore also be perceived as a complement to existing initiatives involving the use of hydrogen. FHG has already been deploying hydrogen-powered vehicles for several years.



Alternative Aircraft Fuels in "Future Aircraft Research" (burnFAIR) Project

The finite nature of fossil fuels and the many demands for global climate protection represent challenges that aviation companies are facing proactively. The use of aircraft fuels from renewable and climate-neutral sources may contribute to the alleviation of this problem. In this context, the burnFAIR project addresses the investigation of alternative fuels in terms of their suitability in aviation. burnFAIR is a subproject of the FAIR (Future Aircraft Research) project being led by the Airbus parent company. This research project, which consists of three subprojects, is aimed at minimising the influence of aviation on climate change.

Lufthansa is also involved in the burnFAIR project, focused most importantly on the use of biofuel to power an aircraft. An Airbus A321 from Lufthansa regularly flies the Hamburg-Frankfurt route with 50 % of the fuel supplied to one of the air-



Emission reduction scenarios for aviation to 2050

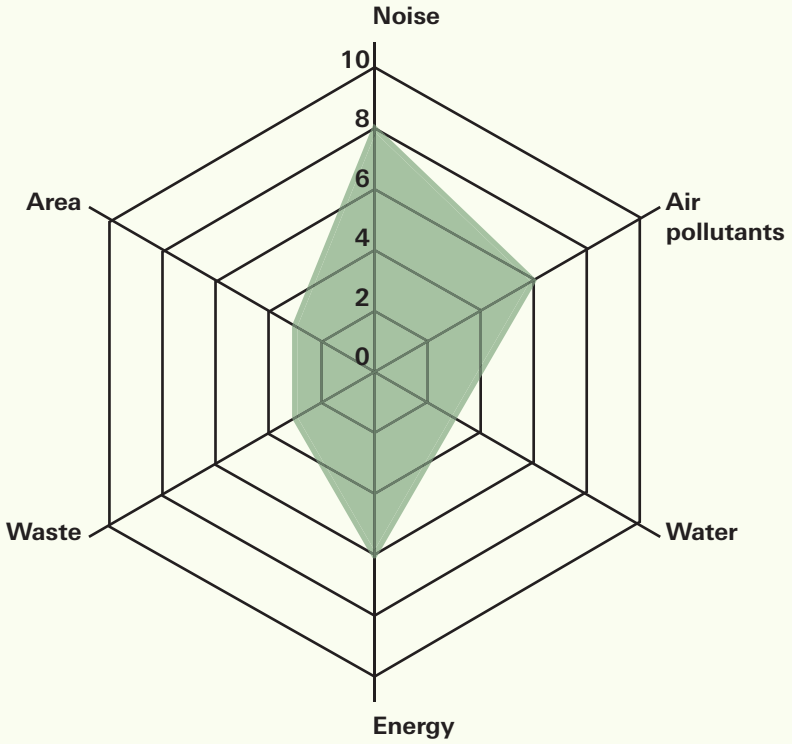
craft's engines being made up of biofuel. Hamburg Airport took on the leadership and coordination of this project. The airport is also responsible for making storage and refuelling facilities for biofuel at the site, and for giving this "bio-aircraft" priority handling. The aircraft will be deployed using the chosen biofuel for six months from August 2011. Lufthansa and the airport are joined in this project by the Institute for Environmental Technology and Energy Economics at Hamburg University of Technology. This teaching department is primarily responsible with the production of the selected fuel.

burnFAIR is an important element in the overall FAIR project. This project, which also looks at aircraft technology, is intended to fulfill the ICAO target of reducing CO_2 emissions by 2050 to 50 % of the 2005 level. The target also requires fuel consumption of engines to be reduced by 1.5 percent per year.

Green Airport 2030

This is the newest of the leading-edge cluster projects in which FHG is involved. Green Airport 2030, a cooperative project between Siemens, the German Aerospace Center (DLR) and Hamburg Airport, aims at optimising all processes and activities from an environmental protection perspective. The project is based on the principle that every airport must operate exclusively within a fixed environmental capacity. The project partners define "environmental capacity" as a fixed upper limit for all significant environmental impacts, such as noise, air pollutants, greenhouse gases, water quality, space utilitisation, etc. The project's scope consists of energy supply to buildings and facilities, deployment of vehicles, and aircraft taxiing movements on the apron. The project is tasked with developing sensible environmental indicators and environment-related threshold values for existing technical assistance systems used in airport process management. Where there is no system in place, concepts for new assistance systems, including the indicators defined above, are to be produced. The goal of "Green Airport 2030" is to automate environmental aspects, thereby integrating them effectively in day-to-day airport operations. Furthermore, any side-effects and interactions between individual environmental issues are to be taken more into consideration. Ultimately, all environmental indicators that are developed should have defined upper limits which are incorporated as alarm values in process management. The project commenced in June 2011 and should be completed in three years.

Interaction between environmentally relevant factors
(Example)



Legend:
Environmental impact
1 Very limited 10 Very high ■ Evaluation

Environmental Programme 2008 – 2011

Reduction of energy consumption levels / climate protection

The reduction of energy consumption once again constituted an important aspect of the environmental programme. The programme as a whole was intended to contribute to resource conservation as well as supporting climate protection measures. Measures to reduce energy requirements were therefore accompanied by initiatives that led to increased usage of climate neutral energy and / or energy from environmentally friendly sources. It was planned to reduce the energy requirements in the coming years by a total of 10 % in comparison to the reference year, 2007, by means of the following measures:

- A portion of externally purchased electricity was already certified as coming from climate-neutral generation. This represented approximately the amount of electricity used by FHG's multi-storey car parks. This proportion was increased from 2009.

- A concept was to be developed which would facilitate the usage of surplus energy generated, under certain operating conditions, at the block-type thermal power station, e.g. to produce hydrogen. This would increase the efficiency of the block-type thermal power station. The concept, however, showed that these operating conditions occurred too rarely to effectively supply energy for this purpose.

- Existing lightbulbs were replaced with more energy-efficient models. The conventional lamps previously used were replaced with new eco-lightbulbs. The new eco-lamps use 15 % less energy than normal lamps. These lights also have a much longer life, which means that their usage can contribute to reduction in waste.

- The subsidiary company, SAEMS, modernised the illumination of its workshops. This achieved the planned energy consumption levels in this area.

- FHG also investigated the possibilities for using organic waste produced on site to generate energy. The intention was that this would increase the amount of environmentally friendly and climate-neutral energy as a proportion of the total energy used by FHG. The investigation showed, however, that the amount of usable waste is too small.

- The subsidiary company STARS acquired additional natural gas-powered passenger buses. A total of 8 such buses are now in operation.

Noise Protection

The reduction of aircraft noise has long been an important element in Flughafen Hamburg GmbH's environmental management. In addition to FHG's existing long-term activities in this area, the following additional measures were implemented:

- To improve noise protection for the time after midnight, FHG and the airlines have ensured that more flights arriving in the evenings land between 10p.m. and 11p.m.

- FHG and GroundSTARS planned the acquisition of additional heating equipment for climate control during aircraft ground handling at outer apron positions. As there has not been any demand for this additional equipment to date, it has not yet been acquired.

- The current, voluntary noise protection programme continues.

Implementation of a programme to protect roofs in the airport neighbourhood

In the years ahead, FHG will introduce a programme to better prevent damage to buildings and vehicles arising from wake turbulence. This programme, which will include, amongst other things, the protection of roof tiles, will also include measures for thermal insulation of the affected buildings.

Environmental management / promotion of environmental awareness

The environmental effects of terminal operations, such as energy consumption or the creation of waste, are also caused by the shops and restaurants located in the terminals. FHG therefore only has indirect influence on these effects. Against this background, FHG intended to exercise its influence on the operators of businesses in the terminals and the Airport Plaza to encourage them to operate their businesses in as environmentally friendly a way as possible. To achieve this, FHG produced an environmental brochure containing suggestions and guidelines for energy conservation, waste reduction and other environmentally friendly measures. This guide has been made available free of charge to tenants.

Continuation of measures from previous environmental programmes:

- The construction of a solar power (photovoltaic) facility was implemented in 2011. It is intended that the smooth operation of this facility will serve as an example for other business units to construct similar facilities where they are economically viable.

- Preparation for the separate collection of waste CD-ROMs has reached the stage that this can be implemented from August 2012.

- The inspection of the state of the environment in the airport neighbourhood has been partially completed. Specifically, the inspections consist of
  - Measurements of the condition of green spaces.
  - Regular observations of birdlife by FHG's Environmental Protection Centre.
  - Recurring biomonitoring campaigns, using bees as monitoring organisms. These inspections have shown that there is no trace of pollutants present in honey, bees or plants (pollen).

Environmental Programme 2011–2014

Climate Protection / Reduction of Energy and Fuel Consumption

FHG's own contribution to climate protection is a central component in Hamburg Airport's Environmental Programme. This commitment is also expressed in FHG's certification in the Airport Carbon Accreditation (ACA) programme. FHG's commitment here includes a 15% reduction in CO_2 emissions arising from building operations by the end of 2020.. Airport Carbon Accreditation is a component in our environmental management; an important focus of the Environmental Programme thus relates to climate protection measures. The emission of greenhouse gases from building and vehicle operations is to be reduced in the coming years by some 5% from the 2010 figures.

Use of Environmentally Friendly Electricity

Since 2010, 10% of purchased electricity has come from certified environmentally friendly sources. From 2013, this proportion is to be increased from the current 10% to a total of 15%. The remainder represents the national German mix of electricity, meaning it also contains a certain percentage of electricity from renewable sources. This means that the proportion of "green" electricity is, mathematically speaking, even higher.

Optimisation of Air Conditioning for Terminals and Plaza

In some areas of the terminals and the Passenger Pier, comparatively old adsorption chillers with a relatively low efficiency factor are used. In these areas, compression refrigeration systems, some of which are already in place, are to be deployed, as they have a significantly higher efficiency factor. The air conditioning network will be adapted to this end. This measure is targeted at reducing greenhouse gas emissions by 500 t per year.

Increased Use of Biogas as Vehicle Fuel

The airport has its own fuel station on the apron to supply fuel to natural gas-powered vehicles. The methane gas made available here includes up to 4 MWh per year of biogas from climate-neutral sources. This proportion is, however, not sufficient to supply the increasing number of natural gas-powered buses with environmentally friendly fuel. This proportion will therefore be increased to 7 MWh, which also takes into account future natural gas-powered vehicles.

Acquisition of Natural Gas-Powered Passenger Buses

In addition to the natural gas-powered passenger buses already deployed, further buses using the fuel are to be ordered. These buses will then replace diesel-powered vehicles, which will be decommissioned. In the coming years, up to four new buses will be acquired, and the equivalent number of diesel-powered buses will be taken out of service.

Investigating Possibilities for Using a Car Pool

A significant portion of greenhouse gases arising at the site are generated by landside traffic to the airport. Usage of the S-Bahn (metro rail network), which has been serving the airport since 2009, in combination with the wide-scale introduction of subsidised ticket products, has already brought about measurable changes in the usage of private vehicles, both by passengers and by persons working at the site. FHG will conduct a survey of personnel and their travel behaviour by 2014. The results of this survey will form the basis for developing additional future concepts for alternatives to the use of private vehicles, e.g. car pool or car sharing concepts.

Noise Protection / Development of Noise Protection Programmes

The noise protection programmes from earlier initiatives are currently being finalised. A new noise protection programme is currently being drafted, with reference, among other things, to the amendments to aircraft noise regulations. The resources needed to implement this programme have already been put in place. The programme will commence as soon as the new noise protection zones are legally binding. The aim of this programme is to further improve noise protection for persons living close to the airport.

Waste Management / Creation of a New Disposal Concept

The internal disposal of waste generated at the airport will be adjusted. In order to make this a reality, a new disposal concept will be produced. This concept is targeted at the following environmental goals:

- Increase in the proportion of waste that can be recycled
- Reduction in the number of journeys needed to collect waste at the site
- Improvement of the separated collection of waste
- Reduction in the quantity of waste by measures including advising tenants and employees

The concept is to be implemented on-site starting in 2012.

Paper Separation in Offices

Investigations of the composition and quantities of waste arising in FHG's offices have shown that a large proportion of the residual waste occurring there often contains paper. The installation of new collecting systems for paper in offices is thus aimed at achieving as high a ratio of paper recycling as possible.

Continuation of Measures from Previous Environmental Programmes

Recycling of Used CD-ROMs

A suitable company has been found to separately collect and then recycle CD-ROMs. It is intended, that these collections will commence on site in the course of 2011.

Acquisition of new heating equipment for aircraft parked at remote positions

As the ban on the usage of auxiliary power units during ground handling is currently observed at all aircraft parking positions, these heating units will be acquired and deployed as soon as existing capacity is not sufficient.

Implementation of a programme to protect roofs in the airport neighbourhood

Initial agreement on the commencement of this programme had already been achieved through the previous Environmental Programme. The framework for the project was also put in place as a concept. The implementation of the programme (providing information to entitled households, processing applications received, etc.) will commence in the course of the current Environmental Programme.

Hamburg Airport in Figures

Year	2008	2009	2010
Turnover in € million	**230.7**	**224.1**	**248.6**
Employees *	**1,612**	**1,589**	**1,619**
* Annual mean value excluding trainees/apprentices and Executive Board			
Passengers			
Total	**12,838,199**	**12,229,339**	**12,962,917**
of which:			
Transit	32,773	23,355	44,157
Domestic	5,576,449	5,366,350	5,627,238
International	7,228,977	6,839,634	7,291,522
Passengers per aircraft movement			
Average	**85.7**	**89.1**	**94.2**
of which:			
Scheduled flights	78.3	81.8	86.7
Charter flights	159.4	159.8	159.9
Air Freight			
Total in t	**78,017.7**	**64,411.2**	**71,702.1**
of which:			
Aircraft freight	34,704.8	31,356.6	27,202.6
HGV freight	42,435.9	33,043.3	44,380.0
Transit	876.9	11.3	119.5
Airmail in t	**1,681.3**	**9.8**	**14.1**
Aircraft (landings) by type			
Total	**86,102**	**78,874**	**78,656**
of which:			
Propellor/helicopter	14,073	12,922	11,399
Chapter 3 Bonus	71,632	65,695	67,094
Chapter 3	397	224	163
Chapter 2	0	0	0
Uncertified	0	33	0

Year	2008	2009	2010
Aircraft movements			
Total	**172,221**	**157,764**	**157,314**
of which:			
Non-commercial	21,957	20,314	19,254
Commercial traffic	150,264	137,450	138,060
of which:			
Scheduled flights	135,454	123,387	122,425
Tourism	14,136	13,451	14,921
Package tours	–	–	–
other traffic	674	612	714
of which over Alsterdorf			
Take-offs (15)	866	2,900	1,090
Landings (33)	2,305	5,135	5,020
of which over Langenhorn			
Take-offs (05)	5,506	8,015	8,717
Landings (23)	42,734	33,472	35,096
of which over Niendorf			
Take-offs (23)	24,397	25,058	19,104
Landings (05)	19,735	16,368	17,788
of which over Ohmoor			
Take-offs (33)	53,675	41,125	48,187
Landings (15)	19,650	22,107	19,192
Night-time aircraft movements			
Total	**6,799**	**5,731**	**6,331**
of which:			
10p.m – 11p.m.	5,568	4,970	5,080
11p.m. – 12a.m.	998	609	941
12a.m. – 6a.m.	233	152	310

Shareholders

51 % Freie und Hansestadt Hamburg
49 % HAP Hamburg Airport Partners GmbH & Co KG
(Hochtief Airport GmbH und Dublin Airport Authority Plc.)

Year	2008	2009	2010
Engine tests:			
Total	**387** [1]	**448** [2]	**423**
of which:			
daytime	214	278	258
night	173	170	165
of which:			
Take-off power	16	20	24
Part power	93	157	183
Idle	278	262	216
of which:			
In the noise protection hangar	384	424	414
Outside the noise protection hangar	0	10	6
Remote positions	3	14	3

[1] plus 158 engine tests for third-party customers, all in the noise protection hangar.

[2] plus 97 engine tests for third-party customers and LH City Line, all in the noise protection hangar. Maintenance work in the noise protection hangar led to a comparatively high number of engine tests outside the hangar.

Noise complaints	**3,013**	**2,600**	**1,629**
Energy			
Natural gas usage			
in MWh	122,928	126,824	135,613
of which:			
in BHKW	106,839	108,395	110,975
in the central heating plant	16,088	18,429	24,638
Energy production			
in MWh	103,600	106,659	103,945
of which:			
in BHKW	91,292	92,561	94,733
in the central heating plant	12,308	14,098	18,848
Water ***			
Consumption in m³	136,410	145,061	193,586

Year	2008	2009	2010
Waste			
Total in tonnes	**3,946**	**3,322**	**3,535**
of which:			
Sheeting, DSD	20	12	26
Newspapers	–	–	–
Mixed paper	623	453	488
Waste wood	103	46	79
Unsorted recyclables	373	520	598
Non-recycling waste	2,816	2,290	2344
Hazardous waste (selection of most important materials)			
Waste oil (in l)	23,820	33,410	20,748
Oil filters (in l)	1,440	2,870	*
Oil-contaminated materials (m³)	16.2	16.72	17.33
Fluorescent tubes (pcs.)	4,950	6,200	7,150
Paint shop waste (kg)	2,585	4,340	1,850
Fat separator contents (m³)	499	595	566
Dry batteries (t) **			
Immissions (long-term mean)			
Location (east of FHG premises)			
Airborne particles in µg/m³	18	19	21
Sulphur dioxide in µg/m³	3	3	3
Nitrogen dioxide in µg/m³	21	22	22
Nitrogen monoxide in µg/m³	8	9	8

* The quantity of oil filters disposed of in 2010 is included in the quantity of oil-contaminated materials.

** The disposal of dry batteries is provided for by a manufacturer return system established some years ago.

*** The increase in water consumption between 2009 and 2010 is attributable to the replacement of metering equipment.

Glossary

Acetates
Water-soluble salts of acetic acid, e.g. potassium acetate, sodium acetate.

APU (Auxiliary Power Unit)
Used to provide the aircraft with electricity and air conditioning during ground handling, and to start the main engines immediately before take-off.

Biotope
A biotope is a habitat for specific plant and animal species, characterised by its abiotic factors.

Block-type thermal power station (BHKW)
Small, normally natural gas-fired power station for generating heat and electricity. Functions according to the principle of power-heat coupling, whereby waste heat from electricity generation is used for heating and cooling.

Carbon dioxide (CO_2)
Colourless gas, produced in various ways including as a result of burning fossil fuels. CO_2 released in large quantities as a result of human activities is one of the main causes of the global greenhouse effect.

Commercial waste
Commercial waste, classified as non-hazardous, is similar in structure and composition to private household waste.

Continuous noise level (equivalent continuous noise level, (Leq3)
Average level of noise pollution measured over a defined period of time. In general, the energy-equivalent continuous noise level (Leq3) is used today, as an increase in the noise level of 3 db(A) is equivalent to doubling the noise energy.

Cooling beams, cooling plates Roof
segments surrounded by circulating air. They are linked by pipes or channels filled with cold water.

dB(A) (decibel)
Unit of measure for acoustic signals, oriented towards human hearing. Because there is a difference in the way humans perceive high and low frequencies, measuring instruments have built-in compensating filters. The filtered unit of measure is indicated as db(A).

DIN EN ISO 14000 ff.
The ISO 14000 ff. series of standards developed by the International Organization for Standardization refers to the organisation of operational environmental management. The most important of these standards is ISO 14001: this standard forms the basis for a certifiable environmental management system.

Electrical field strength
Measurement of the effect of an electrical field on a charge located within the field.

Emission
Output or emission into the environment of irritating or harmful substances (gas, liquid or solid), noises, vibrations or radiation.

Energy efficiency ratio
The ratio of transformed and usable energy to the total energy contained within the energy source used.

Environmental impact
Negative (or positive) effect on the environment, resulting from the various environmentally relevant activities carried out by a company. EMAS III differentiates between direct and indirect environmental impact. According to this classification, direct environmental impact consists of those effects on the environment over which the company has direct influence. If the company only has indirect influence over an effect, this is considered to be indirect environmental impact.

Environmental management system (EMS)
System for the coordinated processing of the operational environmental system, geared towards concrete local environmental impact. The core aspects of an environmental management system are a company's environmental policy and environmental programme.

Environmental policy
Component of an environmental management system, establish guidelines for environmental protection at the highest level within a company.

Environmental programme
Within the framework of an environmental management system, a plan of measures to be applied for a specified period of time in order to minimise environmental impact.

EU Eco-Management and Audit Scheme (EMAS III)
The EU has passed a third set of regulations for voluntary participation in the Eco-Audit (EG No. 1221/2009), which applies to all EU member states. It entails setting up an environmental management system in conformity with the 2004 edition of ISO 14001. Further elements include the publication of environmental statements for public release and an environmental review.

Glycols
Water-soluble liquids which are used as antifreeze. Diethylene glycol and propylene glycol are the main agents used for de-icing aircraft.

Hazardous waste
The legally correct term, since 2006, for waste matter previously classified as "requiring monitoring" or "requiring special monitoring". The new term was adopted so as to correspond more closely with the terms used across the EU for this type of waste.

ICAO (International Civil Aviation Organisation)
Committee of the UN, responsible amongst other things for creating standards for civil aviation. Aircraft licensing is subject to various chapters of Appendix 16 of the ICAO guidelines on noise emissions and air pollution.
Chapter 4 currently contains the strictest noise limits for licensing aircraft types. It was ratified by ICAO in 2006.

Immission
Harmful or undesired emissions, such as noise, vibrations, hazardous materials or radiation at a specific location.

Kerosene
Fuel for aircraft engines, chemically and physically similar to diesel fuel.

Leq3
See Continuous noise level.

LTO cycle
Cycle defined by ICAO to describe aircraft movements within an airport's area of influence. The LTO cycle includes approaches (from altitude of 914m) with landings, taxiing and APU operation along with take-offs and departures up to an altitude of 914m.

Nitric oxide (NO_x)
Nitrogen monoxide (NO) is a colourless, non-water-soluble gas, which is converted to nitrogen dioxide (NO_2) upon contact with air. NO_2 reacts with water to form nitric acid which can damage both the natural environment and buildings. When exposed to high temperatures and intense sunlight, NO_2 is a trigger for so-called "summer smog" with increased concentration levels of ozone.

Oil separator	Collection equipment for separating petrol or other mineral oil hydrocarbons from waste water. Separators take advantage of the fact that these substances are lighter than water and therefore collect on the surface of the water.
PCA systems (Pre-conditioned air systems)	Equipment to provide external air conditioning for aircraft. PCA systems are employed to make the operation of aircraft auxiliary power units unnecessary.
PM10	Specialist term for airborne particles 10 µm or less in size.
Push-back	As aircraft can only move by means of engine propulsion, even on the surface, they cannot move in reverse under their own power. It is, however, necessary for aircraft to reverse to leave parking positions on jetbridges. They are pushed bakkwards from these parking positions with special vehicles. This procedure is known as push-back.
Renaturalisation	The restoration of a biotope or ecosystem to its natural state.
RiStWag	German guidelines for construction measures in water catchment areas. Amongst issues covered by these guidelines are the criteria for designing separator systems.
Red list endangered species	Lists of animal and plant species in danger of extinction, compiled by an international commission.
Soot	Fine graphite particles resulting from the incomplete burning of hydrocarbon compounds. They are carcinogenic.
Sulphur dioxide (SO_2)	Colourless, foul-smelling, cough-inducing gas. Reacts with water to form an acid which can be harmful, for example to plants and buildings.
Sulphur hexafluoride (SF_6)	Non-toxic gas with high greenhouse gas potential. Its characteristics lead to its deployment in high-voltage switches and other settings.
Surface noise	Noise generated by aircraft whilst on the ground. Classical surface noise is generated by engine test runs, aircraft taxiing operations and APU operation. Noise generated by take-off and landing is not considered to be surface noise, not even for the phases when the aircraft is located on the ground.
Thermal output capacity	The maximal thermal output of a combustion facility based on the specific calorific value of the fuel in use. The calculation is based on the maximal quantity of fuel burnt within a specific timeframe.
Take-off power	Engine power of at least 90 %, as required at take-off.
TOC (Total Organic Carbon)	Organically bonded total carbon. A unit of measure for quantities of dissolved organic substances.

Unburnt hydrocarbons (CxHy)	When exposed to high temperatures and intense sunlight, unburnt hydrocarbons contribute to smog with increased concentration levels of ozone.
Water hazardousness classification (WGK)	Measurement and classification of the hazardousness of a substance for water, according to legally prescribed criteria. The WGK has to be individually measured for every material.
VAwS	Ordinance on Installations for the Handling of Substances Hazardous to Water. This regulation defines mandatory protection measures in order to minimise the potential hazard for water (including groundwater) arising from such facilities.
26th BImSchV	26 th Ordinance on the Performance of the Federal Emission Protection Act. This regulation specifies limits for the emission of electromagnetic radiation.

Validation

The signatory, Bernd Eisfeld, EMAS Environmental Assessor (registration number: DE-V-0100), accredited or authorised for area 51.1, 51.21, 52.23 (NACE codes), confirms that he has assessed the site and/or the entire organisation, as detailed in the updated Environmental Statement of Flughafen Hamburg GmbH, including the subsidiary companies STARS GmbH & Co. KG, Groundstars GmbH & Co. KG, SAEMS Gmbh& Co. KG, CATS GmbH & Co. KG, RMH GmbH, Airsys GmbH, registration number D-131-00019, in terms of the fulfillment of all requirements of Regulation (EC) No. 1221/2009 of the European Parliament and Council, issued on 25 November 2009, relating to the voluntary participation of organisations in a community system for environmental management and environmental auditing (EMAS).

The signature on this declaration confirms that:

- the assessment and validation have been carried out in full compliance with the requirements of Regulation (EC) No. 1221/2009,
- the result of the assessment and validation confirms that there is no evidence for non-compliance with the applicable environmental regulations,
- the data and claims contained in the organisation's updated environmental statement provide a reliable, credible and faithful representation of all of the organisation's activities within the area delineated in the environmental statement.

This declaration is the equivalent of an EMAS registration. EMAS registration may only be carried out by a competent authority as defined in Regulation (EC) No. 1221/2009. This declaration must not form the sole basis of communications with the general public.

Hamburg, 19 September, 2011

Signature

Hamburg Airport at a glance

Stay in touch …

The Flughafen Hamburg GmbH Environmental Protection Centre will be pleased to assist you with any questions you may have relating to environmental protection

Responsibility	Contact person / Email	Telephone
Centre Manager, Compliance Officer for Water Protection, Hunting and Birdstrike	**Axel Schmidt** aschmidt@ham.airport.de	(040) 50 75 - 15 97
Compliance Officer for Waste Management and Water Protection, Deputy Centre Manager	**Volker Budde-Steinacker** vbudde@ham.airport.de	(040) 50 75 - 28 69
Environmental Cost Calculation	**Knut Battenfeld** kbattenfeld@ham.airport.de	(040) 50 75 - 20 18
Compliance Officer for Environmental Management, Energy, Air Quality	**Udo Bradersen-Brenner** ubradersen@ham.airport.de	(040) 50 75 - 16 62
Noise Protection Programme	**Demet Çekel** dcekel@ham.airport.de	(040) 50 75 - 14 65
Processing of Applications, Waste Disposal	**Isabel Eggert** ieggert@ham.airport.de	(040) 50 75 - 18 22
Water Protection, Research Projects	**Jan-Eike Hardegen** jhardegen@ham.airport.de	(040) 50 75 - 23 02
Aircraft Noise Technology	**Peter Kleemann** pkleemann@ham.airport.de	(040) 50 75 - 22 72
Hunting, Birdstrike	**Markus Musser** mmusser@ham.airport.de	(040) 50 75 - 35 42
Processing of Applications, Waste Disposal	**Regina Nacke-Nagel** rnacke-nagel@ham.airport.de	(040) 50 75 - 18 22
Aircraft Noise Calculation, Waterway Protection, Compliance Officer for Hazardous Goods and Radiation Proetction	**Carsten Neumeier** cneumeier@ham.airport.de	(040) 50 75 - 14 20
Aircraft Noise Technology	**Wolfgang Schümann** wschuemann@ham.airport.de	(040) 50 75 - 30 00
Ecology, Birdstrike, Compensatory Measures	**Marina Stern** mstern@ham.airport.de	(040) 50 75 - 16 81
Energy, Air Quality	**Christin Ulbrich** culbrich@ham.airport.de	(040) 50 75 - 16 51
Centre Fax		(040) 50 75 - 18 78

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