Environmental Statement 2014–2017

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Hamburg Airport

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DEAR READERS,

This new "big" Environmental Statement informs you comprehensively about environmental protection matters at Hamburg Airport. You will find figures defining the scale of environmental impact and information on our projects and on measures to protect the environment and the neighbourhood. The Environmental Statement provides information on all Hamburg Airport Group changes that have consequences for the environment.

Michael Eggenschwiler, Chief Executive Officer (left),
Wolfgang Pollety, Managing Director (right)

The recently completed new P1 multi-storey car park clearly demonstrates that the airport is an active and busy construction site. In the coming years, various projects will be implemented to improve infrastructure. Worthy of mention in this context are the new facility for air cargo handling on the site of the former long-term holiday car park, the redesign of the Southern Passenger Pier, and a comprehensive redevelopment of Apron 1 with the associated taxi routes to the runways. These projects, however, will not have a detrimental impact on our Environmental Programme. This is ensured by, amongst other things, our Environmental Management System.

At the beginning of 2014, Hamburg Airport extended the Airport Carbon Accreditation certification which it has had for a number of years. Whilst the level of this globally recognised certification previously attained consisted of "Identification" and "Reduction" of CO_2 emissions, our efforts now also incorporate the local emission quantities of airlines and of passengers travelling to and from the airport. Our aim here, in particular, is to further improve the neighbourly relationship between the airport and local residents.

A further consequence of these efforts, as you will see in this Environmental Statement, is that environmental impact has declined in recent years. It is our intention to continue this development into the future.

Happy reading!

Michael Eggenschwiler
Chief Executive Officer,
Flughafen Hamburg GmbH

Wolfgang Pollety
Managing Director
Flughafen Hamburg GmbH

AT A GLANCE

ACTIVITIES AND ORGANISATION OF THE HAMBURG AIRPORT GROUP

- Environmentally Relevant Processes
- Take-offs and Landings of Aircraft
- Taxiing of Aircraft
- Aircraft Models and Time Distribution of Aircraft Movements
- Handling of Aircraft and Passengers
- Landside Traffic to the Airport
- Construction, Operation and Maintenance of Buildings and Facilities
- Rental and Allocation of Office and Retail Space
- Provision of Workshops, Hangars, and Facilities
- Environmentally Relevant Facilities

ACTIVITIES AND ORGANISATION OF THE HAMBURG AIRPORT GROUP

Hamburg Airport is Germany's fifth-largest commercial airport. In 2013, it served approx. 13.5 million passengers and handled approx. 66,000 tonnes of air cargo and airmail. The airport is operated by Flughafen Hamburg GmbH and its subsidiaries and holdings. As the airport operator, FHG is responsible for ensuring smooth and safe flight operations and for the provision of the operating areas, facilities, buildings, and services necessary for handling passengers, freight and aircraft. Beyond this, the airport is also an important location for numerous other companies. In the terminals, on the Passenger Pier, and in the Airport Plaza, for example, there are approximately 100 retail stores. Many airlines and security service companies are also active in the terminals. The Lufthansa Technik AG base, with more than 6,000 employees, is located directly adjacent to the airport premises and depends on FHG's traffic infrastructure. This concentration of jobs makes the airport one of the most significant employment sites in the Hamburg Metropolitan Region, providing secure jobs for some 15,000 people.

Environmentally Relevant Processes

The activities described below are essential for the operation of the airport. They can lead to a range of environmental impacts with varying degrees of severity. Reducing environmental impact is the essential goal of FHG's environmental management.

Take-offs and Landings of Aircraft

The most clearly perceptible environmental impact in the airport vicinity results from aircraft taking off and landing here. Aircraft movements in Hamburg are characterised by the runway system, consisting of two intersecting runways. The approach and departure routes are selected by German Air Traffic Services in agreement with the airport and the City of Hamburg. The runway system enables 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 particular situation means that there are four areas in the airport vicinity which are affected by aircraft noise.

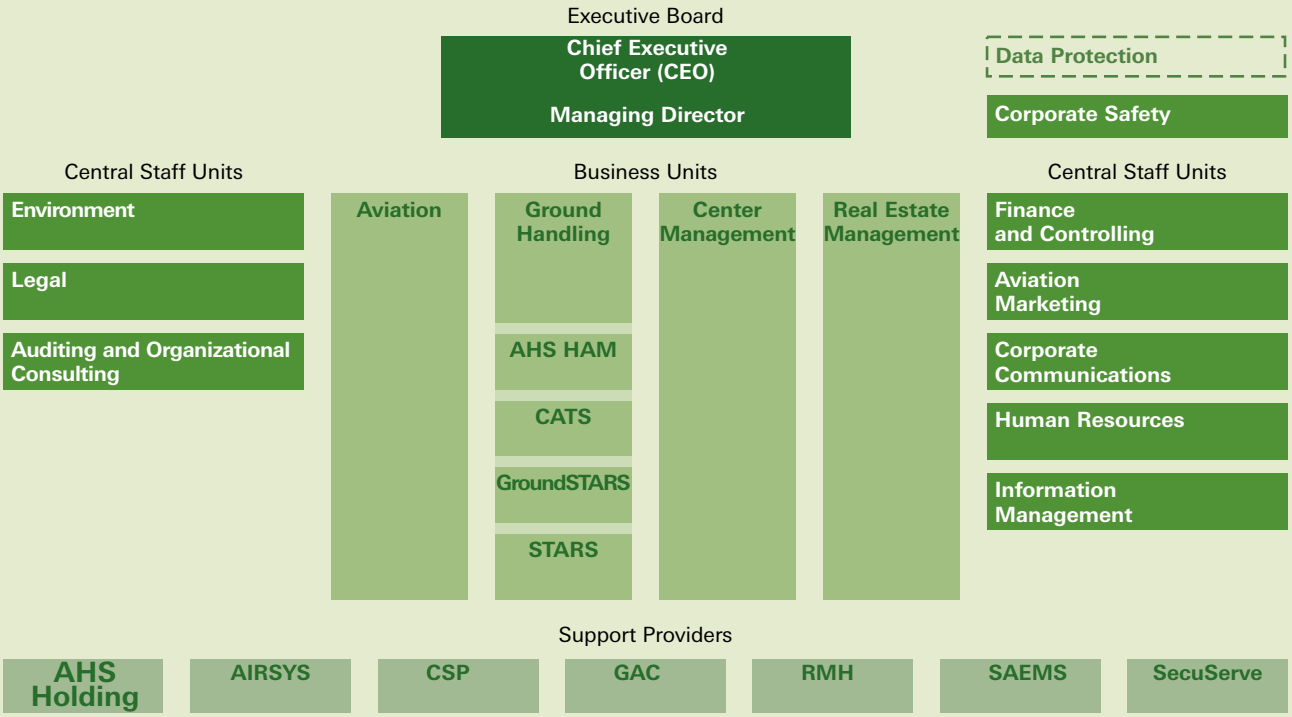
Taxiing of Aircraft

Aircraft taxiing takes place on the ground, in the airport's manoeuvring area. Taxiing operations take place between the ground handling positions and the take-off and roll-out points on the runways. 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 for some six minutes in Hamburg, including waiting times at the end of the runway in question. As taxiing manoeuvres require the operation of the aircraft engines, they must also be taken into account when considering environmental impact.

Aircraft Models and Time Distribution of Aircraft Movements

The aircraft most frequently seen at the airport are from the so-called ICAO Code C classification. This class of aircraft consists of regional jets and aircraft with the approximate size of the Airbus A320 and Boeing 737 ranges. Larger aircraft, falling into other classifications, are noticeably rarer at Hamburg Airport.

The distribution of aircraft movements throughout the day depends on several factors, including seasonal traffic volume and the varying needs for connections at



Organisational chart of Hamburg Airport Group. For EMAS scope, see diagram on page 13

different hours of the day. Up to 13,600 aircraft movements may occur in the peak months of the summer holiday period, for example. Peak days in this period are characterised by up to 500 take-offs and landings. These values are thus significantly higher than the respective annual averages. The differences during the course of the day are also very significant, In particular, the period after 6 a.m. and the period beginning in the late afternoon both experience higher traffic volumes. In contrast, there are no scheduled flight operations at night.

Handling of Aircraft and Passengers

One of Hamburg Airport's central services is the handling of passengers, freight, and aircraft. Appropriate handling positions for the provision of services for passenger and freight aircraft are available on two aprons; the majority of handling operations take place on Apron 1. Positions there include 17 pier positions with jetbridges, connecting the aircraft directly to the terminals. The remaining positions are remote positions. Aircraft handling means:

- Transporting passengers to the aircraft and/or the boarding and deboarding of passengers
- Disposal of waste water from aircraft toilets
- Supply of drinking water
- Cabin cleaning, including the disposal of resultant waste
- Baggage and air freight transport on the apron surfaces

Landside travel to the airport is organised with the goal of reducing environmental impact

- Landside shuttle transport between the airport and remote parking facilities
- Aircraft de-icing when made necessary by weather conditions
- Refuelling of aircraft
- Push-backs and aircraft towing operations

Passenger handling takes place in the terminals and on the Passenger Pier. Check-in counters, security checkpoint facilities, and baggage transportation and sorting systems are important prerequisites and significant determinant factors for the design and size of terminal facilities.

Furthermore, as part of passenger handling, appropriate buildings are reserved for the handling of air freight.

Landside Traffic to the Airport

Landside traffic to and from the airport, directly arising from the presence of the airport, can also be associated with environmental impact. This relates to passengers travelling by private car, taxi, or public transport (bus and rail) to and from the airport, to the incoming and outgoing transportation of air cargo, and to the daily travel to and from work of persons employed at the airport premises.

The airport's catchment area encompasses the whole of northern Germany. In recent years, there has also been significant growth in the number of persons from southern Denmark who fly from Hamburg Airport. The landside distances travelled are accordingly long. In this context, the extent of associated environmental impact is therefore largely dependent on the means of transport chosen.

The usage of the various means of transport depends to a significant extent on the place of residence of the individual persons and on the availability of economical, convenient and comfortable public transport alternatives to car-based travel (including taxis). Travel behaviour influences such traffic-related 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. At the same time, traffic-related measures, combined with targeted funding and support programmes, can have a guiding effect on the choice of means of transport.

Construction, Operation and Maintenance of Buildings and Facilities

Hamburg Airport is the owner and operator of a large number of different buildings. The size, design and nature of these buildings (including thee terminals) is always dependent on the usage of these buildings. Usage also determines, to a certain extent, specific building-related environmental aspects, including space requirements, energy consumption, waste production, and fresh water requirements.

In total, Flughafen Hamburg GmbH has almost 200 different buildings. They encompass usable space of approximately 595,000 m².

As well as the terminals, Hamburg Airport operates a large number of other buildings with various functions

Hamburg Airport provides the infrastructure and services necessary for handling aircraft and passengers

Rental and Allocation of Office and Retail Space
A large portion of the building space consists of offices, either for the airport's own personnel or rented to other companies active on the site. Hamburg Airport 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. In total, Hamburg Airport provides more than 33,000 m² of office space. Around 16,000 m² are allocated to restaurants and retail premises, including the storage and behind-the-scenes areas as needed.

Provision of Workshops, Hangars, and Facilities
Workshops of various sizes are operated in many areas, primarily by the companies SAEMS and RMH. The airport operates:

- an automobile workshop for the repair, service and maintenance of all motor vehicles used at the site
- a fitter's workshop for metalwork
- an electrical workshop for functions including the maintenance of the entire airport illumination and lighting facilities
- a joinery
- various smaller workshop facilities

The airport also has its own civil engineering department for the maintenance of sealed and unsealed surfaces. The responsibilities consist of, amongst other things, the maintenance of the airport's green spaces (grass cutting, etc.), snow and ice clearing in winter, and the coordination and performance of all repair work on roadways, aprons, sewerage drains, etc.

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

Environmentally Relevant Facilities
Hamburg Airport operates facilities which use water-hazardous substances in many areas of the site; these are the so-called VAUmwS facilities. The following table presents the most important of these facilities according to their size and the substances involved. The two storage facilities for de-icing agents have recently been completely renewed. All facilities listed fulfil the highest safety standards and conform to the applicable legal regulations. The requirements of these standards include double-walled tanks, corrosion prevention mechanisms, leak detection systems and regular inspections by external specialists.

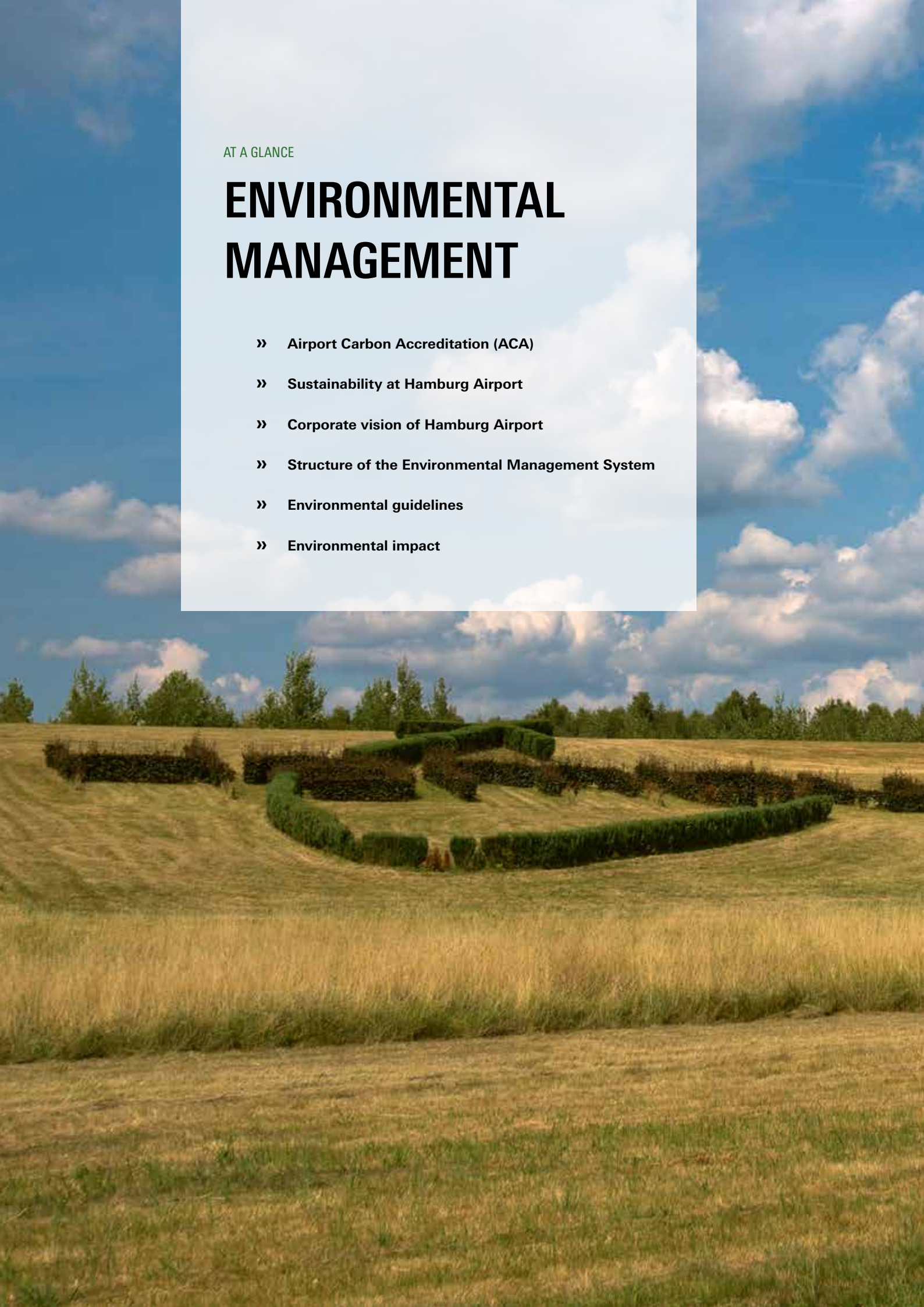
Facilities operated by the airport and relevant to immission-protection regulations are needed for the airport's energy supply. In this context, the primary facility is the Hamburg Airport block-type thermal power station (BHKW). This power station provides electricity and heat for the terminals. It also feeds heat to the airport's heat distribution network. This co-generation and power-heat coupling (simultaneous production of electricity and heat) is very environmentally friendly due to the very high efficiency level, averaging 92–95%, and the resultant lower requirement of fuel. The BHKW is fuelled with natural gas, which releases less air pollutants than other fuels when burned, providing a further environmental advantage. The second important facility is the boiler house, which supplements the BHKW's provision of heat for the airport. Hamburg Airport also operates a few decentralised low-capacity heat supply facilities.

The most important facilities in terms of immission protection are listed in the chapter "Local Air Quality and the Generation of Greenhouse Gases" on page 26.

VAUmwS facilities[1]

Identifier/ Site	Type of facility	Substances	Capacity
Central kerosene storage of fuel services	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 agents	10 x 30 m³ 1 x 20 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 and filling	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	Approx. 1 m³

[1] VAUmwS: Ordinance on Installations for the Handling of Substances Hazardous to Water. This ordinance defines the protective measures necessary for operation of facilities so that there is no danger to water (incl. groundwater)



AT A GLANCE

ENVIRONMENTAL MANAGEMENT

- Airport Carbon Accreditation (ACA)
- Sustainability at Hamburg Airport
- Corporate vision of Hamburg Airport
- Structure of the Environmental Management System
- Environmental guidelines
- Environmental impact

ENVIRONMENTAL MANAGEMENT

The central goal of the Environmental Management System (EMS), which has been certified for EMAS and ISO 14.001, is the systematic documentation and reduction of the environmental impact of airport operations. In order to achieve both of these things, the system consists on the one hand of regulations for the documentation of environmental impact, for the control of environmentally relevant activities and for the operation of environmentally relevant facilities, etc. Furthermore, it defines and assigns responsibilities in terms of environmental protection. The Environmental Programmes are particularly import here, because they are designed to achieve minimisation of environmental impact.

In addition to the System, certified for EMAS and ISO 14.001, Hamburg Airport also pursues other initiatives and goals. These are closely integrated with the EMS or have important links to environmental management.

Airport Carbon Accreditation (ACA)
This term refers to an international system for the documentation and, in higher certification levels, the reduction of CO_2 emissions generated at an airport. When an airport is aiming to reduce emissions, it is required to prepare a Carbon Management Plan which shows in detail what measures are to achieve the reduction and in what timeframe. An important component of ACA is the mandatory independent annual inspection. The first aspect of the inspection is verification of the accuracy of CO_2 emission level measurements. Where a Carbon Management Plan is in place, the inspections also require proof that the CO_2 emission levels are declining as planned. The inspections are carried out by an independent, authorised assessor; certification takes place at the London-based European head office. There are four Levels of certification available to airports, with increasingly stringent requirements (see following table). The strictest requirements are mandated by the final Level, which demands comprehensive reduction of all

Airport Carbon Accreditation
Levels und Scopes

Level 1 (Documentation)	Level 2 (Reduction)	Level 3 (Optimisation)	Level 3+ (Neutrality)
Caculation of all Scope-1- and Scope-2-CO_2-emissions	As for Level 1, plus the development of reduction targets with proof of fulfillment	As for Level 1 and 2 along with the calculation of important Scope 3 CO_2 emissions (aircraft at the site, transit to the airport, etc.)	Satisfaction of all requirements of Levels 1–3 plus: Compensation for all remaining Scope 1 and Scope 2 CO_2 emissions up to and including climate neutrality

Requirements of ACA for certification at various Levels. FHG was certified at Level 2 from the start of 2011, and has been certified at Level 3 since March 2014. The certification is a component within the Environmental Management System. The reduction measures required by the ACA Carbon Management Plan, for example, are a component within the Environmental Programme.

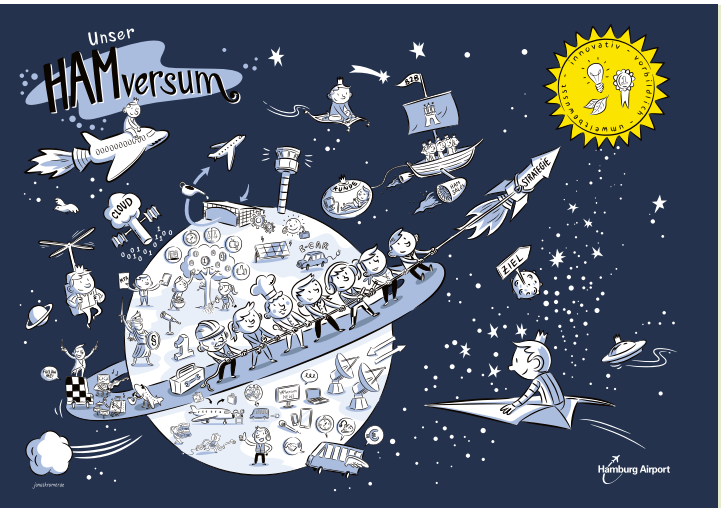
emissions arising from airport operations. Hamburg Airport has been certified at this Level since the beginning of 2014. This requires the documentation of all emissions produced by the airport's own activities, including proven reduction of these emissions, along with the accurate documentation of so-called Scope 3 emissions. These are CO_2 emissions which, whilst indirectly arising due to airport operations, are not within the scope of responsibility of the airport. For the most part, these are emissions from aircraft and from landside transit to the airport. Our Carbon Management Plan is an important element in our Environmental Programme.

Sustainability at Hamburg Airport

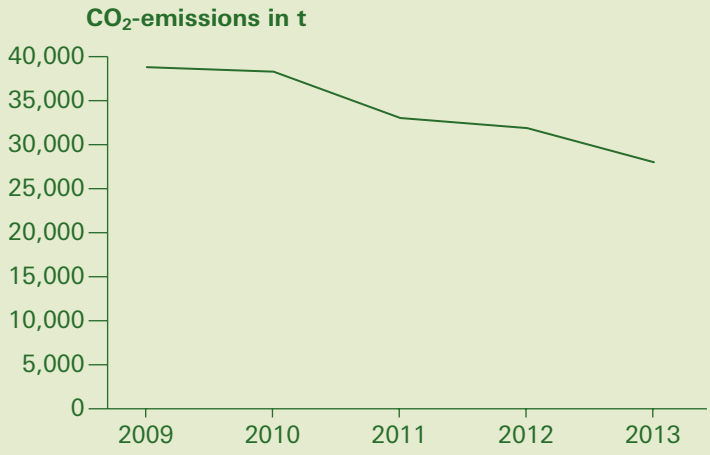
Hamburg Airport places great value on operating the airport in as sustainable a way as possible. Alongside effective environmental protection and continuing commercial stability, sustainability also means the systematic consideration of the interests of all interest groups: employees, customers, neighbours, and, for example, political organisations. The environmental management system represents a central element in the airport's sustainability concept, embodying both the ecological pillar and substantial aspects of the consideration of interest groups. To a large extent, the sustainability concept is thus based, both organisationally and in terms of content, on environmental management. Conversely, this strengthens the position of environmental management within the corporate management of Hamburg Airport and its subsidiaries and holdings.

Corporate vision of Hamburg Airport

A new conceptualisation of the corporate vision was jointly developed by all senior management personnel at the beginning of 2014. In conjunction with this vision, binding quantifiable targets were put in place for all divisions. These also incorporate environmentally relevant aspects such as energy consumption, CO_2 emissions, and waste recycling. The airport's new vision statement also expressly incorporates "environmental awareness". The voluntary commitment to environmental protection and to the reduction of environmental impact, long established in Hamburg Airport's Environmental Guidelines, has thus been further strengthened across the company at a high level. This means the further integration of goals associated with Environmental Management at the highest decision-making levels.

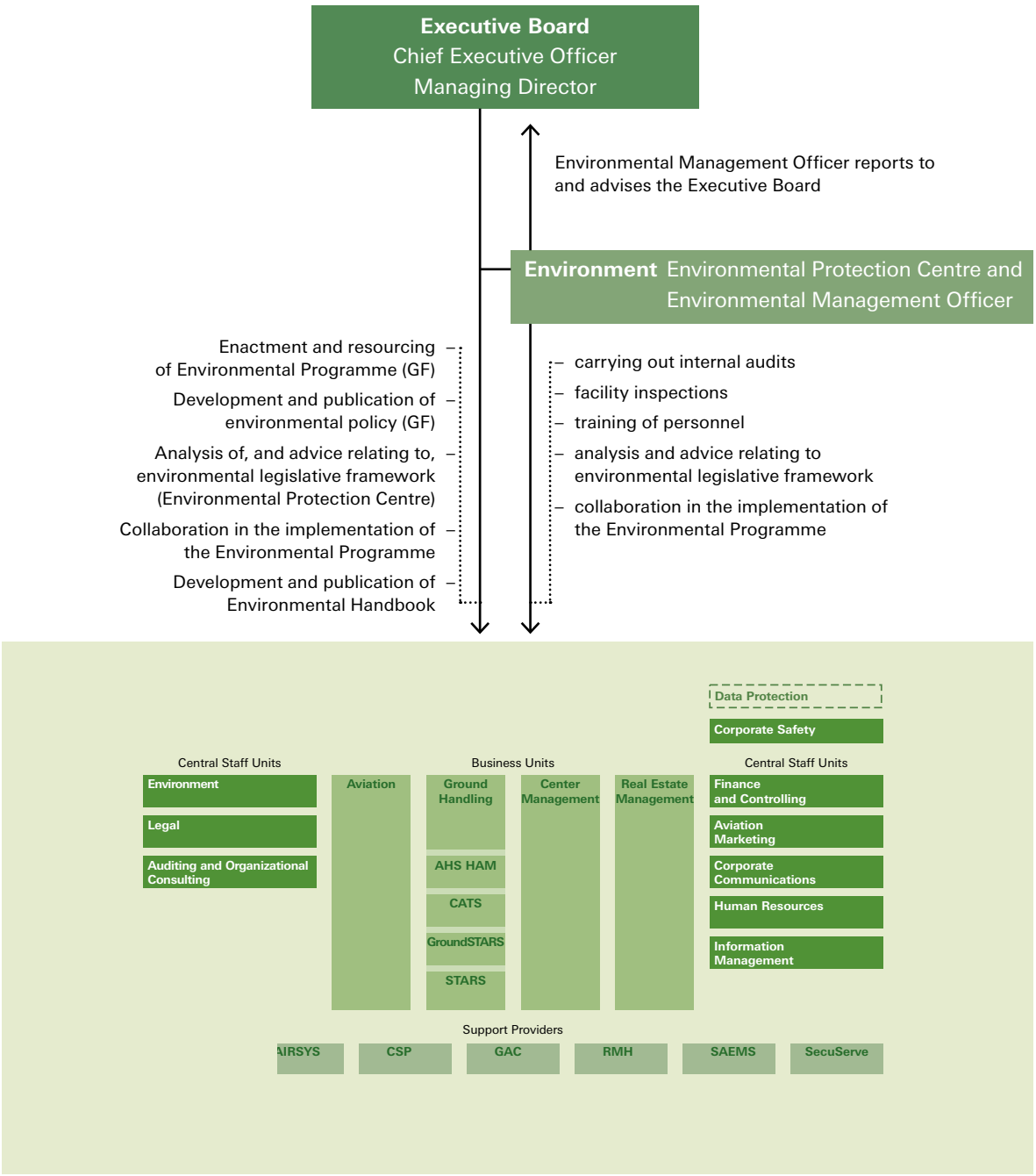


HAMversum, the newly formulated corporate vision of Flughafen Hamburg GmbH, incorporates sustainability and environmental protection within the primary corporate focus



Development of CO_2 emissions in the period 2009–2013, resulting from efforts related to Airport Carbon Accreditation (ACA)

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 Environmental Management Officer
- 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

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 influence our customers and contractual partners on the basis of these goals.

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 a sense of environmental responsibility 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 climate 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

In accordance with EMAS, environmental aspects are divided into two groups, direct and indirect aspects. Direct impacts are defined by EMAS as those over which the airport has direct influence and for the extent of which the airport thus has full responsibility. Indirect impacts arise within the scope of airport operations but cannot be directly influenced by the airport. The following table shows all environmental impacts which Hamburg Airport and its subsidiaries and holdings have to consider.

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

Environmental impact	Type of impact	Cause	Responsible business unit
Noise	indirect	Aircraft taking off and landing Taxiing and handling of aircraft	FHG (airlines), GroundSTARS
Release of air pollutants	indirect, direct	aircraft, ground handling vehicles, FHG surface vehicles, internal energy and heat generation	FHG, GroundSTARS, CATS, STARS, RMH, AIRSYS
resource consumption (fuels, drinking water)	direct	vehicle use, supplying water to aircraft, hygiene facilities, de-icing of surface areas and aircraft, operation of the BHKW and Central Heating Plant	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, FHG tenants
Generation of waste water	direct	surface water on the aprons, sanitary facilities, workshops, de-icing	FHG, RMH, STARS, SAEMS
Generation of waste	direct	commercial waste in all areas, esp. in retail and restaurants in the terminals, hazardous waste in workshops	all business areas, esp. SAEMS, RMH, AIRSYS, FHG, tenants of FHG
Land usage, usage of and impact on green spaces	direct	construction facilities, aviation safety regulations	FHG, RMH, tenants of FHG

AT A GLANCE

ENVIRONMENTAL IMPACT AND ENVIRONMENTAL PROTECTION

- Aircraft Noise
- Local Air Quality and the Generation of Greenhouse Gases
- Water Management and Water Protection
- Waste Recycling and Reuse
- Electromagnetic Radiation
- Care for Open Spaces, Flora and Fauna

Aircraft Noise

The consideration of noise emissions by aircraft operating at the airport has an important role in environmental management. These emissions constitute the most perceptible environmental impact in the airport area. The airport's location within the city of Hamburg plays a substantial role here. Various processes create noise, some of which only has an impact within the airport premises and some of which has an impact in the surrounding area, e.g. in the approach and departure paths. This results in various areas in the airport vicinity affected by aircraft noise. There are also differences in the distribution of noise pollution over time, dependent on traffic volume.

Environmentally Relevant Processes in Detail
Aircraft create noise in various ways, but essentially, the following sources can be identified: noise from aircraft taking off and landing, from aircraft operations on the apron, and from engine tests conducted by Lufthansa Technik AG. The extent and impact of aircraft noise produced by aircraft movements is primarily characterised by various factors, as follows:

- choice of take-off or approach route, including the runway heading
- size, type and engine configuration of the aircraft under consideration
- frequency of aircraft movements
- to a limited extent, the prevailing weather conditions

The spatial spread of flight noise is much greater than of surface noise, so that a larger area is affected.

The operation of auxiliary power units (APUs), present in almost all aircraft, can be a significant cause of surface noise. These serve to provide aircraft with electricity and air conditioning during ground handling. The noise impact area of the APUs is spatially limited, but their stationary operation results in lengthy concentration of impact, making them very disruptive.

Surface noise can also result from engine tests, primarily carried out at Hamburg Airport by Lufthansa Technik AG. The need to conduct such tests arises relatively frequently, as they must be carried out after every service and after every overhaul. Noise arising from engine tests varies according to the duration of the test, the engine power applied, and the time of day at which the tests take place.

Environmental protection measures
An important component in the protection against flight noise is constituted by so-called passive noise protection measures, including soundproofing in the strictest sense. Since the mid-1970s, Hamburg Airport has conducted regular, largely voluntary noise protection programmes to improve noise protection in the surrounding area. These programmes go well beyond what is required by law. Within the framework of its noise protection programmes, Hamburg Airport sponsors and organises such measures as the installation of soundproof windows. The 9th programme, in operation since 2012, also addresses the improvement of sound insulation of other parts of buildings. Bedrooms and children's rooms are fitted with soundproof ventilators, providing a high level of noise protection and allowing fresh air in at the same time. This addresses the fact that the start and end of the day, along with the night, are particularly sensitive in terms of noise pollution. All noise protection programmes are based on different noise contours. These are calculated in accordance with legislative requirements (incl. the Aircraft Noise Act and subsequent supplementary regulations). Beyond this, Hamburg Airport has defined its own criteria for noise protection programmes, going well beyond legal requirements. Hamburg Airport's investment in noise protection measures has thus reached a very high level. To date, FHG has made some 40 million euros available for noise protection in the surrounding community.

In contrast to passive noise protection, active noise protection measures seek to reduce noise at the source. Measures to promote the deployment of quieter aircraft, for example, result in a quantifiable reduction in aircraft noise. Some time ago, in order to achieve this, Hamburg developed a noise-related graduation of landing fees. 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 - measured on the basis of the Noise Quota - since the introduction of this upper level.

The schedule of charges is further coupled with the existing restrictions on night flights and also incorporates take-offs. 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. These delayed flights, however, are subject to special individual approval. Night flights, in a legal sense, are subject to a landing fee surcharge of 100 % for take-offs and landings after 10 p.m., and of 200 % after 11 p.m. There are no flight operations between midnight and 6 a.m.

An effective reduction in surface noise resulting from APU operation has been achieved by the airport making electricity and air conditioning available to aircraft during ground handing, making APU operation almost completely redundant. Two different approaches are used to supply the aircraft. At Pier parking positions, the aircraft are supplied with electricity and air conditioning from the block-type thermal power plant. At the remote parking positions, mobile diesel generators and air conditioning units supply the aircraft. 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.

As long ago as 2001, a new Noise Protection Hangar was commissioned to limit noise pollution arising from engine tests. This hangar was the first facility in the world to allow for engine tests at all power levels to be conducted in a fully enclosed environment. The reduction of noise pollution arising from the noise protection hangar has been so effective that the problem can now be said to have been fully resolved.

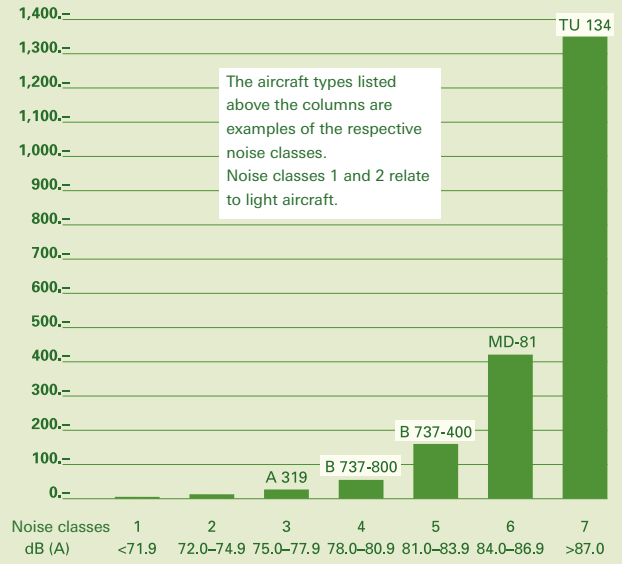
In order to avoid a renewed climb in aircraft noise, a so-called Noise Quota was put in place in 1998. This quota defines the permissible upper limits for aircraft noise. The upper limit is the noise level from the year 1997. Each year, in order to prove the fulfillment of the Noise Quota requirements, FHG determines the noise emissions levels of the previous year and reports them to the authorities.

Engine tests are conducted exclusively in the noise protection hangar

Mobile generators supply aircraft at remote parking positions with electricity, so that the APUs are not needed here, either

Landing Fees Noise Surcharge

Noise charge (in euros)



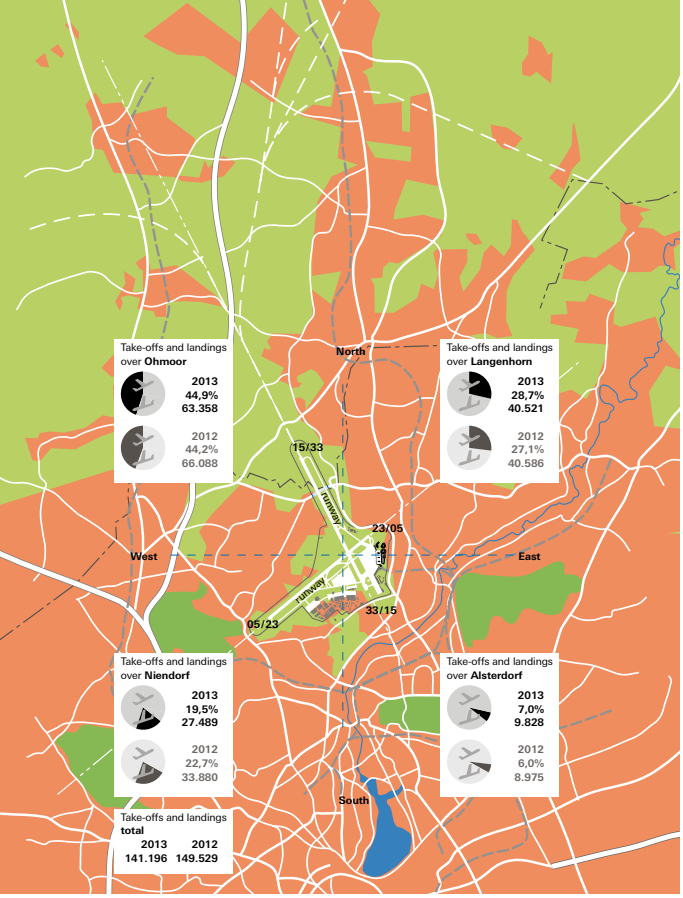
Night flying restrictions at Hamburg Airport

Operating hours and applicable charges

normale flight operations	delayed flights only	emergencies only
6 a.m.–11 p.m.	11 p.m.–midnight	midnight–6 a.m.
simple landing fee 6 a.m.–10 p.m.	triple landing fee	triple landing fee
double landing fee 10 p.m.–11 p.m.		

APUs supply aircraft with electricity and air conditioning during ground handling, but are a source of noise and air pollution

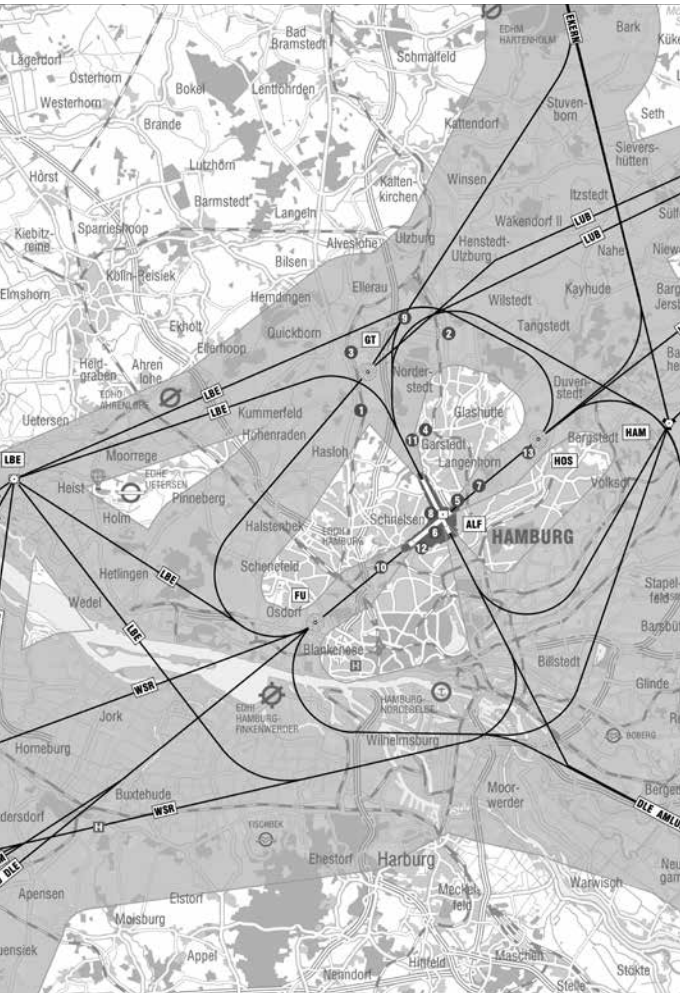
At Pier parking positions, the aircraft are supplied with electricity and air conditioning from the block-type thermal power plant and the APU remains switched off



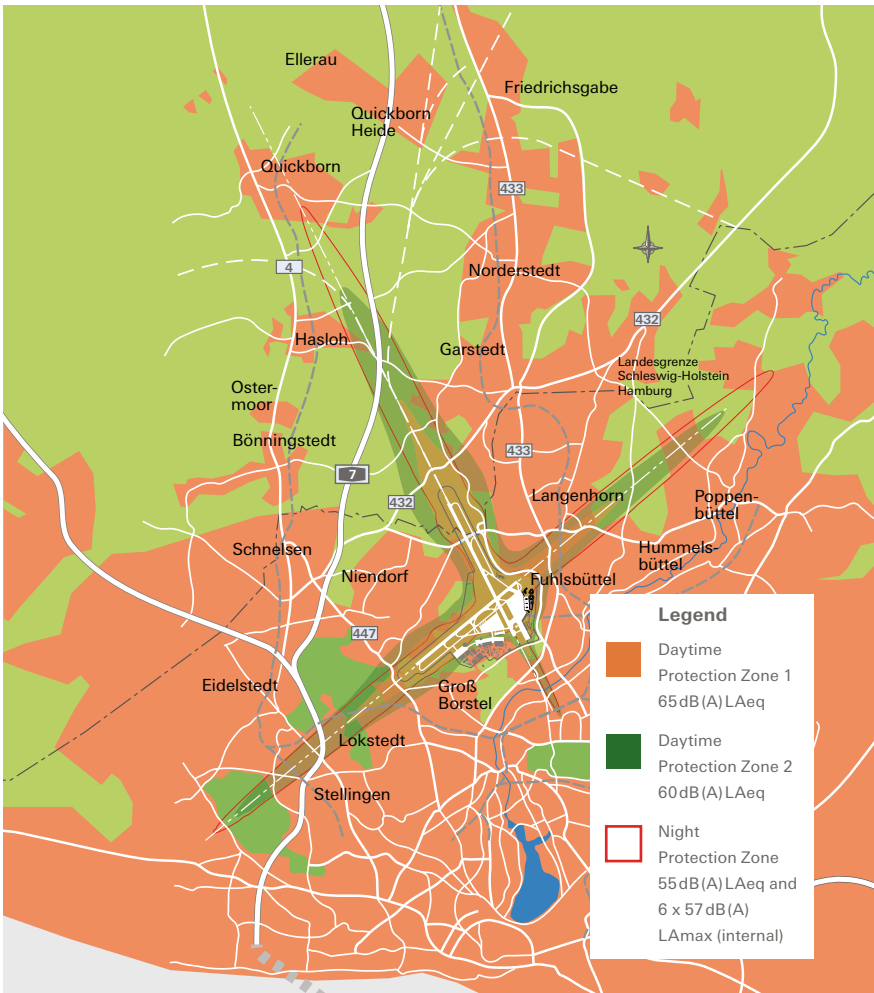
Average distribution of take-offs and landings over the four available operating directions

Prescribed Noise Quota based on noise emissions in 1997 (area 20.39 km²) and equivalent noise quota from 2013 (12.42 km²)

Flight paths and locations of noise measurement points at Hamburg Airport



Noise Protection Zone according to Aircraft Noise Act of 2007, also the area of applicability of the 9th Noise Protection Programme



Key Figures

Noise Protection Programme, Status in September 2014

	Duration	Residential units* applications processed windows	only ventilators	ventilators ventilators
Legally required programme	1974–1982	800		0
1st voluntary programme	1978–1982	1,600		0
2nd voluntary programme	1982–1987	5,500		0
3rd voluntary programme	1989–1992	3,000		0
4th voluntary programme	1998–2001	383	300	1,001
5th voluntary programme	1999–2004	386	2,437	5,957
Total		**11,669**	**2,737**	**6,958**
6th voluntary programme	01.01.2003–31.12.2010	64		0
6+th voluntary programme	01.09.2007–31.12.2010	141		0
7th voluntary programme	30.06.2006–31.12.2010	889	180	292
7+th voluntary programme	01.09.2007–31.12.2010	1,661	322	470
8th voluntary programme	01.09.2007–31.12.2010	680	454	982
9th voluntary programme	03.03.2012 ongoing	800		450
Total		**3,435**	**956**	**1,744**
All programmes		**15,904**	**3,693**	**9,152**

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

Annual noise levels (Leq_3) at aircraft noise measurement points

	Measurement point	2011	2012	2013*	
1	Hasloh	54.9	54.7	62.9	53.4
2	Norderstedt	44.4	44.0	52.5	40.3
3	Quickborn Schule	53.8	54.2	56.0	53.5
4	Norderstedt	51.4	51.5	56.9	48.9
5	Langenhorn	59.5	59.2	60.8	59.1
7	Fuhlsbüttel	63.0	62.4	63.5	61.5
8	Empfängerstation	54.8	55.0	57.6	51.0
9	Quickborn Heide	48.6	47.1	53.7	45.3
10	Stellingen	59.4	59.0	59.1	57.0
11	Norderstedt	58.9	59.0	59.5	58.3
12	Groß Borstel	55.6	55.1	56.1	53.4
13	Poppenbüttel	54.8	54.2	55.0	53.3

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

* Due to a change in DIN Norm 45643, applicable to the calculation of sustained noise levels, the column for 2013 contains both flight noise levels (left column 2013) and total noise levels (richt column 2013). The values for 2013 cannot be compared with values for previous years.

Local Air Quality and the Generation of Greenhouse Gases

The operation of an airport releases emissions into the air in the surrounding area. These emissions may consist of substances with greenhouse potential, various gaseous organic and inorganic compounds, particulate matter, and ultrafine particles. The category of ultrafine particles as a whole remains relatively unexplored. These emissions are created by various sources: the operation of aircraft on the airport premises and in the vicinity, the operation of the airport's energy-generating facilities, the deployment of vehicles on the airport premises, and landside traffic to and from the airport. The airport's environmental protection concept with regard to air quality is therefore concerned with the satisfaction of applicable legal requirements, the reduction of emission levels (including by means of effective energy management), the use of environmentally friendlier fuels, and (e.g. in the case of ultrafine particles) the carrying out of specific investigations and measurements.

Environmentally Relevant Processes in Detail

Overall, the air quality at Hamburg Airport is comparable with the air quality in other areas on the edge of the city. This is demonstrated by measurements over several years conducted by the Hamburg environment authority's air quality measurement station on the airport premises. The following substances and substance groups are relevant to emissions in this context:

- Nitric oxide (NO_x)
- unburnt hydrocarbons (CH)
- particulate matter (PM 10 and PM 2.5)
- ultrafine particles
- carbon monoxide
- carbon dioxide (as a measure for substances with climate-changing effect)

Factors in the relevance of these substances are the potential detrimental effect (in high concentrations) and the legal requirements to monitor them. Ultrafine particles represent a recently discovered phenomenon. Ultrafine particles are particles with a diameter less than 100 nm, so that they could also be defined as PM 0.1. At present, there are no legislative regulations covering ultrafine particles. Because of their size, ultrafine particles are measured not by weight units but by the number of particles. They are produced in all combustion processes. To date, little is known about the effect of ultrafine particles. Airports are amongst the first companies to be engaging intensively with the investigation of this phenomenon with the aim of finding a solution.

Aircraft as a source of emissions:
Aircraft operations generate large quantities of air pollutants and greenhouse gases. Specifically, the following processes generate the emission of these pollutants:

- taxiing on taxiways and taxilanes
- waiting at the end of the runways
- APU operation at aircraft parking positions
- take-off and landing and the associated approach and departure

Flight operations result in all the pollutants listed above, in various quantities. Because the issue of ultrafine particles is so new, the quantity and size of these particles in aircraft exhaust emissions and their significance is not yet known. Hamburg Airport is, however, involved in intensive investigation of this matter.

The aircraft in operation at the airport belong to the airlines. The airport's influence on the emissions they generate is therefore limited.

Energy-generating facilities as a source of emissions:
Hamburg Airport generates the majority of the energy it requires itself . The facilities operated for this purpose represent the largest source of air pollutants and greenhouse gases over which the airport has direct influence. Some 80% of greenhouse gases arise here. Electricity purchased by Hamburg Airport does not result in the emission of pollutants at the site, but it does result in emissions elsewhere (at the site of generation). The emission levels from this source depend directly on the energy consumption of the facilities, operating areas and buildings of the airport; the operation of the terminals and the Airport Plaza is responsible for the majority of energy consumption.

Surface vehicles as a source of emissions:
The remaining 20% of emissions over which the airport has direct influence arise from internal vehicle deployment, primarily for aircraft ground handling and maintenance operations. The vehicles considered here also include the mobile electricity generators used to supply electricity to aircraft (GPUs). A portion of the airport's fleet of more than 400 vehicles consists of very powerful vehicles which therefore have very high fuel consumption. Furthermore, many vehicular operations are characterised by short distances and lengthy waiting periods, both factors in high fuel consumption. It is currently assumed that the ground handling service vehicles constitute a relevant source of ultrafine particles on the airport premises.

Landside transit as a source of emissions:
The operation of the airport induces landside transit. The geographical spread depends on the airport's catchment area, although it is only landside transit in the immediate vicinity of the airport that actually has an effect on air quality at the site. It is primary the road-based traffic to and from the airport that is relevant to emissions – private cars, taxis, buses, heavy goods vehicles and smaller transport vehicles delivering and collecting air cargo and other goods. The airport has relatively limited influence on this traffic.
In the airport vicinity, too, landside transit is the major source of emissions for all pollutants under consideration.

Environmental Protection Measures
One of the essential goals of environmental management is the reduction of the emission levels for air pol-

lutants and greenhouse gases. All related measures and programmes begin at the source of origin.

In the case of emissions generated by aircraft operating at the airport, Hamburg Airport can only indirectly act to reduce emissions. Nevertheless, the actions taken here to steer the situation are demonstrating great success in the reduction of emissions. The regulations banning the use of APUs on the aprons (see section on noise), originally introduced as a noise protection measure, also result in an impressive reduction in the generation of air pollutants. CO_2 emissions are also reduced as a result. The reason for this effect is the higher efficiency level of the airport's energy generation facilities and mobile generators in comparison to the APUs. Since the beginning of 2010, landing charges are also graduated according to the emission of pollutants. This additional component is aimed at providing a financial stimulus for the deployment of aircraft that pollute less, similar to the approach to aircraft noise. Further reductions, in particular in greenhouse gas emissions, are anticipated for the future as a result of the use of biofuels in aviation. In order to promote this development, Hamburg Airport has taken an active part in several research projects where plant-based aircraft fuels are tested in real-world conditions. Furthermore, more efficient engines will result in greater fuel efficiency for aircraft in the future.

The fuel consumption of the airport's fleet of vehicles and the associated emissions are being countered in various ways, including the logistic optimisation of necessary journeys and an increase in the proportion of vehicles using alternative, more environmentally friendly and, wherever possible, renewable fuels. The latter is a major focus of measures implemented at the airport. As a commercially viable alternative fuel, the airport uses natural gas and/or biogas refined to natural gas quality. Natural gas produces substantially less pollutants than gasoline or diesel fuel when burnt; on average, 25 % less CO_2 is produced per converted vehicle. Biogas with natural gas quality from proven climate-neutral sources reduces CO_2 emissions by a total of 65 % per vehicle. At present, all baggage tugs, eight passenger buses and a number of passenger vehicles operated by the company are powered with natural gas. This proportion will be continually increased wherever it makes sense to do so. This is the case for vehicles which are primarily in permanent use and cover large distances. Electric vehicles are becoming increasingly important for vehicles that are primarily used on short and very short journeys with longer gaps between use. Such operating conditions are common at the airport. These vehicles reduce emissions because electric motors are more efficient than combustion engines under such operating conditions. Their environmental friendliness is further enhanced by the proportion of climate-neutral electricity generated by the airport. Hydrogen-powered vehicles may be an option in the future, when the technology has reached market readiness. Hamburg Airport is also involved in research and development projects aimed at achieving market readiness here in the medium term. The quantity of emissions arising from energy genera-

The power-heat coupling of the block-type thermal power station (BHKW) gives it a high level of efficiency

The central heating plant supplies heat to the southern area of the airport

tion facilities is determined largely by the technology of the facilities, by the fuel used, and by the energy levels required. Hamburg Airport's environmental protection measures address these three factors:

- Natural gas, the most environmentally friendly fossil fuel, is the primary fuel used.
- A portion of the electricity and heat is produced in the airport's block-type thermal power plant (BHKW). The power-heat coupling gives this power plant a high efficiency level and makes it more environmentally friendly than other power stations.
- Energy management: energy flows are thoroughly traced. This allows for weak points to be analysed and the efficiency of energy saving measures to be verified.
- The majority of heat and electricity is needed for the air conditioning in the terminals. The recently modernised technology for cooling and air conditioning therefore results in substantial reductions in energy consumption in the buildings.
- The thermolabyrinth in operation in the basement of Terminal 1 since 2005 further reduces energy requirements without generating any pollutants.
- Old lighting has to a large extent been replaced by more efficient lighting systems, including LEDs. This process is ongoing.
- The photovoltaic facility in operation on the roof of the main administration building since May 2011 provides climate-neutral electricity, albeit in limited quantities.
- Some 15% of externally sourced electricity comes from certified climate-neutral sources. The remainder of externally purchased electricity is in the standard German national mixture, which also incorporates an increasing amount of electricity from renewable sources.

Greenhouse gas emissions from personnel business travel are compensated by a so-called "Climate Forest". This is a property in the Kaltenkirchen area on which the airport has planted a 240,000 m² forest. This forest compensates for some 230 t of CO_2 per year, somewhat more than the amount of this greenhouse gas arising from personnel business travel.

All of these measures are subject to continual verification and, where necessary, are supplemented by further initiatives, in order to ensure the sustainable development of the airport in terms of energy supply, air quality, and climate protection.

Key Figures

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

	2011		2012		2013	
	total	per employee	total	per employee	total	per employee
CH_4	17.2	10.7	17.3	10.5	15.5	8.7
N_2O	–	–	–	–	–	–
Hhydrofluorocarbon	–	–	–	–	–	–
Perfluorocarbon	–	–	–	–	–	–
SF_6	–	–	–	–	–	–
SO_2	171.7	106.0	173.1	106.0	115.1	87.4
NO_x	20.597.4	12.8	20.765.4	12.5	18.607.8	10.5
PM10	68.7	43.0	69.2	42.0	62.0	35.0

Facilities relevant to immissions protection

Identifier/ site	Energy generated	Fuel	Size of facility
Block-type thermal power plant	electricity, heat	natural gas	12.0 MW
Boiler house south	heat	natural gas	19.9 MW
Central heating GFZ	heat	Heating oil	682.0 KW
Central heating tower	heat	Heating oil	457.0 KW
Central heating weather station	heat	Heating oil	15.2 KW
Central heating site sports facility	heat	natural gas	165.0 KW

Consumption of electrical energy in MWh

2011	2012	2013
38,073.64	38,545.78	39,801.20

Total energy consumption

per traffic unit in kWh and per employee in MWh

business unit	2011	2012	2013
per traffic unit	9.84	9.64	9.72
per employee	82.6	83.5	75.1

CO_2-emissions from energy produced and consumed on site (in t)

2011	2012	2013
29,067.14	27,992.29	24,468.23

Emission of CO_2 traffic unit in kg and per employee in t

(including CO_2 from vehicles)

Unternehmensbereich	2011	2012	2013
Pro VE	2.43	2.23	2.04
Pro Mitarbeiter	20.5	19.3	15.8

Usage of natural gas as vehicular fuel in kg

business unit	2011	2012	2013
CATS	–	–	–
STARS	16,918	110,843	108,351
GroundSTARS	253,036	241,589	439,545
SAEMS	–	–	–
AIRSYS	215	244	192
RMH	3,264	3,263	4,155
FHG	8,082	5,061	3,019

Gasoline and diesel consumption of FHG and individual holdings in past years in t

business unit	2011	2012	2013
CATS	20,945	23,867	23,155
STARS	402,200	375,887	195,642
GroundSTARS	627,737	592,280	645,902
SAEMS	1,899	1,954	1,732
AIRSYS	2,755	3,269	3,383
RMH	136,752	163,218	168,648
FHG	137,178	151,837	152,479

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

business unit	2011	2012	2013
CATS	56	64	62
STARS	1,188	1,112	627
GroundSTARS	1,922	1,817	1,935
SAEMS	5	5	5
AIRSYS	7	7	8
RMH	369	440	455
FHG	361	398	399

Water Management and Water Protection

Airport operations impact water in various ways. The airport operates a range of facilities which involve water-hazardous substances. This can have a certain risk for the protected resource, water, for example for groundwater or for local surface waterways.

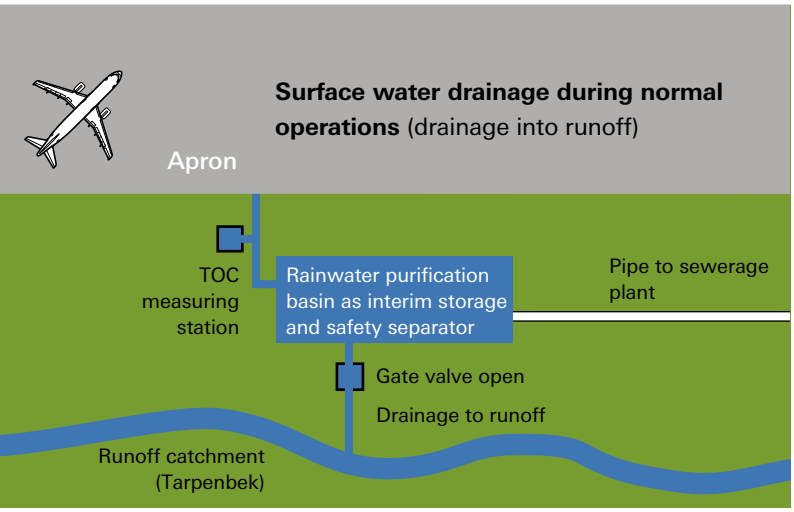
Other factors include the requirements for drinking water and industrial water at the airport as well as the waste water produced from used drinking water. Waste water can also be produced from surface water on sealed surfaces where this water is contaminated. The feeding of clean surface water into drainage catchments must take into account the relevant water usage.

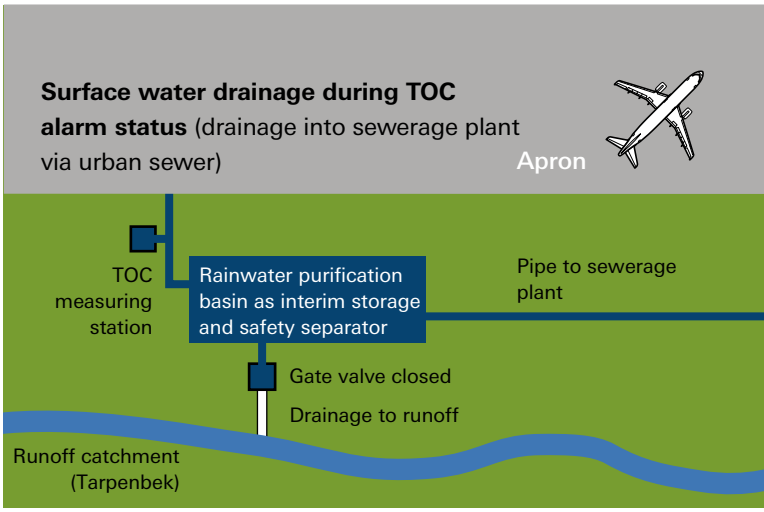
Environmental Impact in Detail

The airport operates a range of facilities which involve water-hazardous substances. These are primarily storage and/or filling facilities, including those for kerosene, de-icing agents, and heating oil. The risks for water here arise principally from (unprotected) release of these substances. Apart from these facilities, there are also operational processes with potential hazards for water, for example the refuelling of aircraft and de-icing during the winter months.

In the case of the latter, surface water which, under normal operating conditions, is not contaminated, becomes waste water. Uncontaminated surface water is fed into Tarpenbek, a local drainage catchment. The conditions and requirements of the relevant approval must be fulfilled.

The requirements for drinking and industrial water are closely connected with the number of persons making daily use of the airport. Both passengers and the em-





Functional principle of the TOC facility and the separator gate system it controls to protect Tarpenbek from de-icing agents

ployees of the airport and companies based there thus influence water requirements. In addition, the airport also provides drinking water to the SAS airport hotel which opened in mid-2010. There is also the need for industrial water, e.g. in restaurants. Industrial water is also used in other locations. The heating and cooling systems in the buildings require water. Water supply for aircraft also contributes to the demand for industrial water. The use of drinking water and industrial water in the buildings produces waste water. For the most part, the nature and extent of contamination of this waste water is equivalent to that of waste water in private households. The waste water coming from contaminated surface water is mostly contaminated with de-icing agents from aircraft de-icing processes.

Environmental Protection Measures

Significant effort is made to reduce the airport's drinking water requirements and to keep them at as low a level as possible on a permanent basis. Water-saving faucets are used throughout the airport premises. Wherever it is hygienically feasible, waterless urinals are installed. The rainwater utilisation facility in Terminal 1, commissioned in 2005, makes a significant contribution to reducing the requirement for drinking water. The facility replaces 6,000 m^3 of drinking water with rainwater.

Great caution is exercised when working with water-hazardous substances. All facilities which store water-hazardous substances are either of double-walled construction or equipped with sufficient retention devices to cope with any fluid leakages. The latest technology is deployed for corrosion protection, leakage detection, etc. All facilities dealing with water-hazardous substances are subject to continuous monitoring as part of normal operations. Furthermore, they are regularly maintained and inspected by external assessors.

Waste water arising from operational processes at the airport is treated on-site before being fed into Hamburg's municipal sewerage system. A total of 26 oil separator systems ensure that waste water from workshops and other facilities, along with surface water from refuelling areas, is free of oil and fuel residue. Fat separators are available for waste water from restaurant operations.

An important focus of water protection is the quality of the surface water which occurs on sealed surfaces during precipitation. In normal operating conditions, this water is not contaminated, and the majority of it is fed into the Tarpenbek drainage catchment. A total of eight rainwater purification basins, equipped to serve as safety separators, ensure that the catchment drainage is protected from contamination.

Regular self-checking measurements monitor the functioning of these basins. In winter, surface water occurring on the aprons may be contaminated with de-icing fluids, particularly from aircraft de-icing. A TOC measurement station, operating all year round, automatically

The de-icing agent storage was recently completely overhauled

In winter, aircraft de-icing operations, made necessary by weather conditions, can lead to pollution of surface water

determines the concentration of de-icing agents in drain water every 30 minutes. Provided the TOC concentration detected by the system is less than 50 µg/ml, the water is fed into the Tarbenbek catchment. 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 municipal sewerage network.

This system, which is subject to regular functional inspections, has enabled Tarbenbek to be kept free of contamination for a long time now.
The Environmental Protection Centre operates a tightly-knit 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. In this way, Hamburg Airport obtains reliable information on any contamination of the groundwater (or the soil).

Key Figures

Usage of de-icing agents for aircraft (in litres)

	2011	2012	2013
Type I	453,602	967,889	234,278
Type II	336,103	673,532	177,621

The annual figures for de-icing agents relate to the winter season under consideration. The number 2011 thus refers to the winter season 2011/2012.

Drinking water consumption per traffic unit in l and per employee in m³

	2011	2012	2013
per traffic unit	13.91	15.07	19.05
per employee	123	131	122

Central location for placing waste to be disposed of

Waste Recycling and Reuse

Operational processes at the airport produce large quantities of various types of waste. Large quantities of commercial waste occur in the terminals, on the Pier and in the Airport Plaza.

Waste produced in the workshops and maintenance facilities of the airport is considered separately, as it is legally classified as hazardous waste. In the case of this waste, the focus is not on the quantity but on the strict legal requirement to store and dispose of different types of waste separately. Major construction and renovation work can result in individual cases of construction site waste. This is, however, relatively irregular.

Environmental Impact in Detail

The commercial waste arising in the terminals and the Airport Plaza is produced in the shops and restaurants and also in general by the use of the terminals by passengers. 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. The disposal of this waste necessitates comprehensive logistic planning with regard to the location and collection of waste containers. Furthermore, the processes are influenced by concepts for reducing quantities of waste and for increasing the separation of waste in order to promote recycling.

As well as commercial waste, there is also so-called hazardous waste generated, particularly in the workshops in the maintenance area. Such waste consists for the most part of used oil, oil-contaminated supplies, slurry from oil separators, and residue from marking paints. Small quantities of other hazardous wastes are also produced. The quantity of hazardous waste to be disposed of depends above all on

the necessary maintenance operations carried out at the airport.

At the passenger security checkpoints, objects are frequently retained which are not permitted on board an aircraft. Where no further claim is made on these objects, they have to be disposed of as waste. Often, this waste consists of fluids or weapon-like objects; hazardous waste also occurs at times. The disposal of these smaller quantities of waste is at the discretion of the airport.

Environmental Protection Measures

In view of the variation in source and composition of the individual types of waste, Hamburg Airport pursues various waste management goals: clean and distinct separation of waste when stored on site allows for better identification of the quantities caused by individual producers; increasing the recycling ratio of individual types of waste; disposal and documentation, particularly of hazardous waste, in line with legal requirements; purchasing of products (wherever possible) which ultimately produce non-hazardous and recyclable waste and/or smaller quantities of waste.

The goal of these measures is to keep the impact on the environment at a low level even where quantities of waste rise (where the airport has no influence on waste quantities). This can only be achieved when waste is clearly and cleanly separated on-site. This also facilitates thorough recycling. To this end, Hamburg Airport chooses specialist disposal partners who guarantee recycling. This is verified by Hamburg Airport on the basis of regular visits to these partner firms. Furthermore, personnel and tenants are regularly informed on possibilities for avoiding the production of waste.

Key Figures

Development of waste quantity per passenger in g and per employee in t

	2011	2012	2013
per traffic unit	176	225	206
per employee	1.48	1.95	1.56

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

A large portion of waste produced at the airport comes from the cleaning of airport cabins

Hazardous waste arises primarily from the operation of workshops

Electromagnetic Radiation

Radar-supported systems are indispensable for the monitoring of airspace and of the approach and departure sectors. German Air Traffic Services (DFS) therefore also operates such systems at Hamburg Airport. FHG itself has also operated a surface radar system since 2010. This system serves to better identify all moving objects on the airport premises, even when visibility is poor. This results in an enormous improvement to operational security and safety. The environmental impact of both radar systems consists of their generation of electromagnetic non-ionising radiation and radio waves.

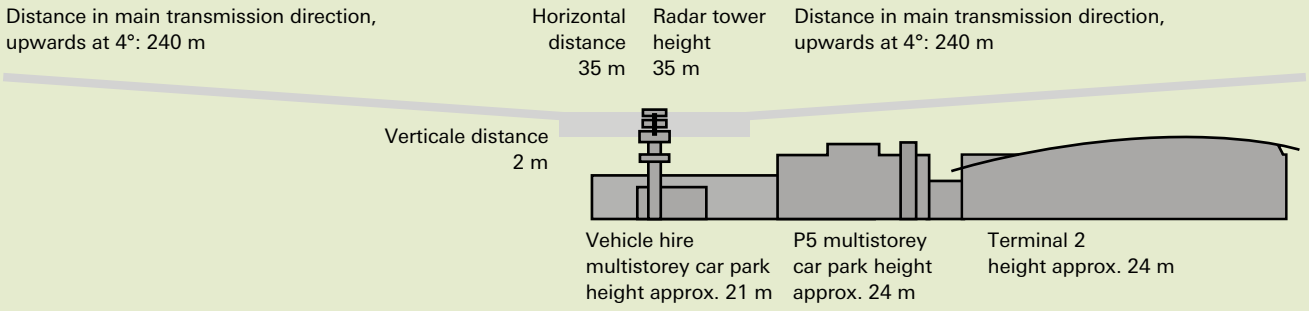
Environmental Impact in Detail

For airspace monitoring, DFS relies primarily on a large radar system installed on a tower some 35 m above sea level, immediately adjacent to Terminal 2. 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). The DFS control tower is also equipped with radar; this facility, however, has a substantially lower transmission power. The tower is located on the airport site.

The surface radar system consists of a number of different elements. The most important component is the radar tower, approximately 25 m high, located on the western side of the airport site. The radar system has a transmitting power of 16 kW. A total of 23 smaller transmitters with transmission power of 100 W each are distributed throughout the airport site at approximately ground level.

The approval and notification for the three systems described is subject to the requirements of the 26th Ordinance on the Performance of the Federal Emission Protection Ordinance (BImSchV). Included in the provisions of this ordinance are upper limits for the amount of electromagnetic radiation that is permitted in the vicinity of radar and other high-frequency facilities. The associ-

Protective zones for primary airspace monitoring radar



Radarturm des Bodenradarsystems

ated EMT (electromagnetic tolerance) is stated alongside the electrical field strength. The ordinance also prescribes the definition of so-called protective zones. These are areas directly adjacent to the transmitting facilities in which the limits imposed in the 26th BImSchV are reached or exceeded. No persons are allowed to be present for any length of time within these protective zones.

Measures Adopted

The chosen location and height of the airport's transmission facilities mean that the protective zones are located above surrounding buildings and on the airport site. As such, they do not contain any buildings or areas with ongoing human presence. The facilities thus have no negative impact. When servicing and repairs are performed on the facilities, checks are carried out to ensure that the specified limits are observed and that the protective zones have not changed.

At the commissioning of the facilities, the electrical field strength arising from their operation was determined by calculation for the nearest positions with ongoing 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 radiation. The measurements showed that the field strength immissions at sites close to the facilities (but outside the protective zones) are only a very small percentage of the 61 V/m allowed by the 26th BImSchV.

Key Figures

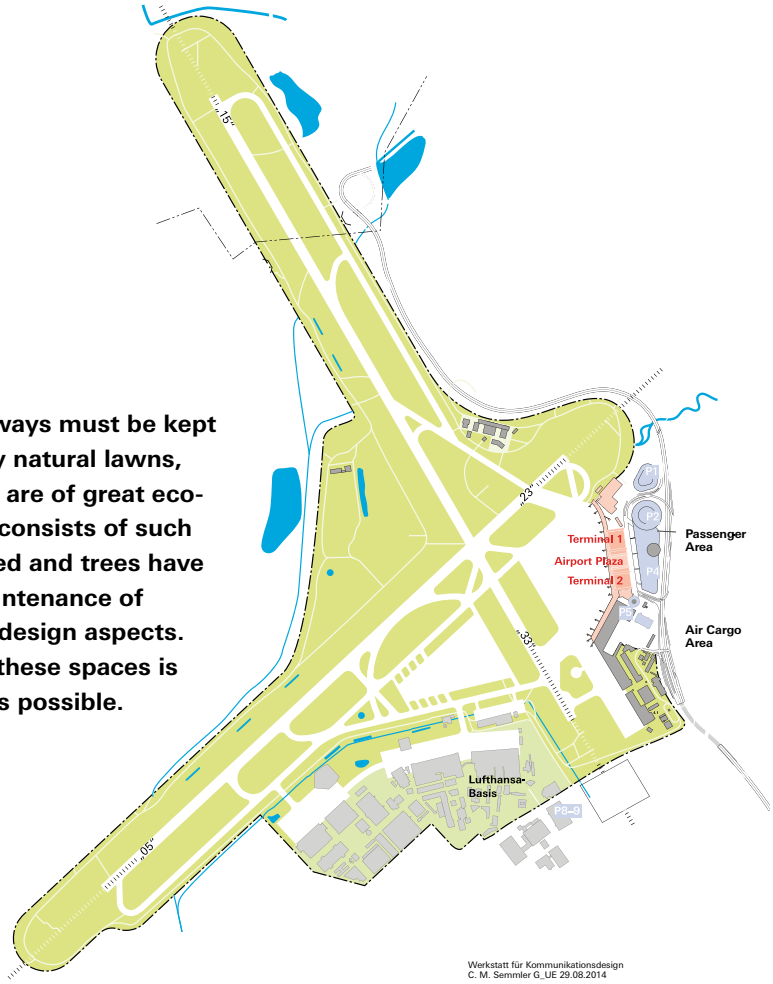
Protective distance from radar (in m.)

Radar type	Primary radiation	Horizontal	Vertikal (downwards
Primary radar	240 [1]	35	2
Secondary radar	13 [2]	4	0
Surface radar tower	32	32	3
Surface radar sensors n	1	32	1

[1] 4° upwards from radar height
[2] 8° upwards

Care for Open Spaces, Flora and Fauna

Airside areas adjacent to the runways and taxiways must be kept free of obstacles. These areas consist of largely natural lawns, meadows, and grasslands. In many cases, they are of great ecological value. More than half of the airport site consists of such areas. Landside, green spaces have been created and trees have been planted. The concept for the care and maintenance of these spaces incorporates both ecological and design aspects. With respect to air safety, the management of these spaces is aimed at keeping the risk of birdstrike as low as possible.



Environmental Impact in Detail

The open meadows and grasslands of the airport site consist mostly of ecologically relatively valuable vegetation suited to low-nutrient and poor quality soils. As these areas are largely undisturbed, they present important natural habitats for Hamburg's flora and fauna. The care of these spaces is aimed at maintaining their natural and undisturbed character into the future. The equipment necessary for this work (mowing equipment, hay collecting vehicles, etc.) makes Hamburg Airport one of the largest agricultural operations in Hamburg.

The large natural and undisturbed open landscapes airside provide the ideal conditions for various bird species. This aspect, in itself and in principle positive, can be problematic in terms of air safety, as the airport is obliged to keep the risk of birdstrike – collisions between birds and aircraft – at the lowest level possible. The ecological management methods deployed at the airport play an important role in this.

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. This also promotes the ecologically valuable lean character of the areas. To further discourage the settlement of bird species which prefer land that can be clearly seen from the ground, the areas are only mowed once or twice a year. The following other measures are also implemented to reduce the risk of birdstrike:

- Prevention of settlement of waterfowl on smaller water surfaces (rainwater retention basis) by covering them with nets
- Removal of crow nests and placement of crow dummies in trees around the airport during the nesting season
- Regular bird counts
- Driving through areas for inspection regularly, especially when visibility is poor
- Use of warning ammunition to deter birds

The necessity of keeping the airspace in the immediate vicinity of the airport free of obstacles as specified in the Aviation Act means that trees which extend into this airspace have to be pruned on a regular basis. This affects all trees in the defined obstacle-free areas in the approach sectors, regardless of whether the trees are inside or outside the airport premises. All trees are therefore pruned every few years on a sector-by-sector basis so as to ensure freedom from obstacles. 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 more comprehensive 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.

The green spaces along the landside approaches to the airport are primarily aesthetic in function. They consist for the most part of smaller lawn areas and a large number of planted trees. Although they only have limited ecological significance due to their size, they nevertheless characterise the landscape in the airport terminal area.

Measures Adopted

Alongside operational management goals, two approaches that have been adopted with reference to the green spaces are also relevant for environmental protection: the maintenance of the natural function of these spaces and the maintenance and promotion of their ecological value.

Operational requirements and ecological necessity agree that the thinning of these spaces in order to reduce bird population promotes the development of valuable green space vegetation which has great ecological value due to the rarity and the combination of species and plants. These spaces thus provide important habitats for rare animal species, in particular insects. In order to maintain and further develop these spaces, other measures are implemented where necessary, in addition to the thinning and long-grass management. The spread of neophytes, for example, is curbed. Success is monitored by means of regular charting of the areas in terms of vegetation and fauna.

The green spaces include areas that have developed from areas that were formerly sealed or used for operational purposes. These compensatory spaces benefit from special legal protection. They have been created to compensate for the sealing of green spaces elsewhere on the airport site (for construction purposes). The care and maintenance of these spaces, where necessary, is agreed with the authorities.

The creation of various lean grasslands and heathlands has been and is being encouraged in these compensating areas. The development of these plant colonies is monitored by regular inspections. 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.

In addition to these compensating areas, FHG has also created new natural habitats at former intensive agricultural sites outside the airport premises. New trees are planted to replace those felled on the site. All of these measures are aimed at maintaining the green character of the airport aesthetic.

Key Figures

Sealed area in ha and area per employee in ha

	2011	2012	2013
Area	165	165	165
per employee	0.102	0.100	0.093

CONSTRUCTION WORK ON THE AIRPORT SITE

CONSTRUCTION WORK ON THE AIRPORT SITE

Hamburg Airport plans a series of building projects for the near future in order to improve ground handling services and facilities. In part, these projects will also modernise older airport facilities. Overall, however, they will not result in an increase in environmental impact in the future, nor do they prevent or hinder the achievement of the targets of the airport's environmental policy.

Southern Passenger Pier
The rear of the Southern Passenger Pier, facing the current air cargo terminal, is to be equipped with six parking positions in the future. This will make the handling of aircraft more effective and increase passenger comfort. The rear of the Pier will be widened in order to create attractive waiting areas for passengers.

The most significant environmental impact associated with this project will be the presence of surface noise and pollutant emissions in an area that has not been subject to either of these to date. Although the level of new noise pollution will be very low, a new 12-metre high soundproof barrier will be erected next to these new positions to protect the most immediate neighbours from possible noise pollution. Aircraft handled at these positions will be supplied with electricity and air conditioning from the airport's BHKW. This eliminates the noise and air pollution arising from the use of APUs as far as possible. In total, the situation at the airport will not change, as this project merely relocates the environmental impact but does not create any new impact.

Construction of new cargo handling facilities
A further project is the modernisation of the facilities needed for the handling of air cargo and airmail, replacing the existing facilities which are in part very old. A new cargo terminal with a surface area of approximately 22,000 m^2 is to be constructed on the site of the old remote P8 car park. The new building will fulfil much stricter energy standards than the old buildings, which will be demolished after the new facility enters operation. The energy requirements for the operation of air cargo facilities will thus sink significantly. As the new terminal is being constructed on space that was already in use, only a minimal amount of new space will be sealed.

In order to ensure that the drainage of surface water on the new building is environmentally suitable, a new rainwater sluice was already constructed on the airport site in 2013. This sluice was designed to partially supplement and partially replace the existing rainwater sluice. In addition, the installation of storage sewers in the rainwater sluice creates additional rainwater retention volume, providing further protection against flooding for the Tarpenbek catchment runoff.

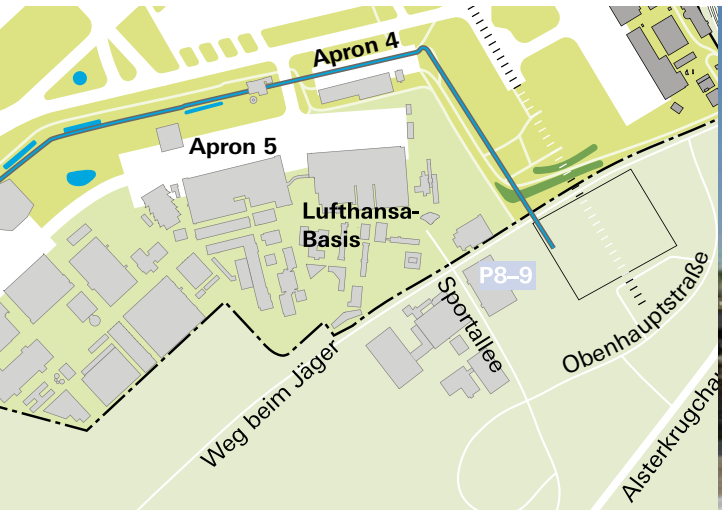
Renewal of Apron 1
This is an extensive project, because not only the apron itself is to be fully renewed, but also the taxiways that connect directly to the apron. The latter serves to implement current European air safety regulations. The renewal will not result in an expansion of the apron itself, but when the work is complete, the handling positions

The new cargo terminal is taking shape on the site of the former remote P8 car park

will be grouped together differently. The commissioning of these new areas will not produce any additional environmental impact. During the individual construction phases, however, various temporary environmental impacts may arise, e.g. a different noise pollution structure due to a deviation from the typical average runway usage pattern during a particular building phase. The rerouting of some taxiways will result in a – limited – increase to the green space of the airport site. This will have a positive influence on FHG's green space balance sheet.

P1 Car Park

Associated with this building project is also the newly constructed P1 multistorey car park, which already opened in July 2014 and provides significantly more



In association with the construction of the new cargo terminal, along with other projects, part of the rainwater drainage was renewed

Initial work in the apron 1 south area

Visualisation of the future Air Cargo Center

capacity than the old P1. The construction of this new multistorey car park made it possible to demolish the P8 remote car park, so that the space there became available for the new cargo terminal. The new car park construction does not result in any additional environmental impact, as this car park is on the same site as the old car park. The removal of an older tree population, necessary for the new construction, was compensated by the planting of an appropriate number of trees directly next to the car park.

The new P1 multistorey car park entered operation in summer 2014

OVERVIEW OF AREAS AND BUILDINGS

Regular Pruning of Trees 1
(to ensure absence of obstacles)

Cleared Area Along Perimeter Fence 2
(required by Aviation Security Act)

Site Sports Facility 3
(decentralised central heating)

Rainwater Retention Basin 4

DWD Weather Station 5
(decentralised heating system, heating oil storage)

Radar Tower (surface radar) 6

Compensatory Areas 7

Compensatory 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 12

TOC Facility 13

14 **De-icing Agent Storage**
(surface de-icing)

15 **Airport Fire Brigade**

16 **Site Fuel Station**

17 **Thermolabyrinth in Terminal 1**

18 **Rainwater Utilisation System in Terminal 1**

19 **Block-type Thermal Power Plant**

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 Agent Storage**
(aircraft de-icing)

28 **Noise Protection Hangar**

Werkstatt für Kommunikationsdesign
C. M. Semmler G_UE 29.08.2014

ENVIRONMENTAL PROGRAMME 2011 – 2014

The 2011 – 2014 Environmental Programme

The environmental programme put in place in 2011 was largely implemented over the past three years. Those measures not yet fully implemented are either long-term projects (e. g. the current noise protection programme) or projects that have not yet been implemented due to delayed demand.

Climate Protection

One focal area of the environmental programme was the reduction of the airport's greenhouse gas emissions. This was also associated with the measures contained in the carbon management plan produced by Hamburg Airport as part of Airport Carbon Accreditation. In total, these measures achieved a reduction of some 20 % of CO_2 emissions. The following measures were carried out in order to achieve this reduction, affecting the supply of energy to buildings and the deployment of vehicles:

Acquiring Electricity from Climate-Neutral Sources

As anticipated in the Environmental Programme, the proportion of externally purchased electricity from climate-neutral production was raised to 15 %.

● ● ●

Optimisation of Air Conditioning for Terminals and Plaza

The construction of connecting pipes in the coolant supply network between the terminals allowed for a reconnection. This meant that older air conditioning equipment could be decommissioned, and cooling needs are satisfied by newer equipment with significantly higher efficiency levels. This resulted in a substantial improvement in the total efficiency level of the airport's energy supply system.

● ● ●

Increase of the Proportion of Natural Gas in Vehicle Fuels

This target was not pursued due to the significant additional financial burden it would have imposed.

○ ○ ○

Acquisition of Natural Gas-Powered Passenger Buses

There was no demand for new passenger transport buses during the reporting period; consequently, no additional natural gas-powered buses were acquired. On the other hand, several cars used for apron services were replaced with new electrically powered vehicles.

○ ○ ○

Investigating Possibilities for Using a Car Pool
A comprehensive survey of all personnel in 2014 assessed the demand for a car pool and the benefits for the environment that would arise from such a project. Benefits would only come into play when a car pool supplemented local public transport.
● ● ●

Acquisition of Mobile Heating Devices for Aircraft at Remote Parking Positions
Over the past three years there was no demand for additional external equipment to heat aircraft cabins. The acquisition of such equipment therefore did not take place, but it will be a feature of the new environmental programme.
○ ○ ○

Noise Protection

Noise Protection Programme for the Neighbourhood
An extensive noise protection programme was developed and, for the most part, implemented over the last three years. As part of this programme, approx. 800 residences were evaluated by assessors and, where necessary, fitted with structural soundproofing in the period to July 2014. The programme shall continue as applications are received.
● ● ○

Implementation of a Roof Securing Programme for Buildings in the Airport Vicinity
The securing of roofs has been integrated in the current noise protection programme. As a consequence, the completion of the noise protection programme will also represent the completion of this project.
● ● ○

Waste Management

Creation of a Waste Management Concept
In the course of 2012, a new concept was produced for the disposal of airport waste. In connection with this concept, internal waste collection processes were simplified and better identification of waste generating sources and their respective waste types was made possible. This made it possible to implement further waste management measures. Comprehensive training has been provided to the personnel of the cleaning service provider, and all divisions of the airport have received detailed information on the new requirements.
● ● ●

Paper Separation in Offices
Paper (incl. cardboard) is an important resource and a not insignificant component of the waste produced at the airport. Wherever possible, paper waste should therefore be collected separately from other waste and then recycled. In order to achieve this, appropriate collection systems have been installed throughout the site and all personnel have been informed of the goal. The proportion of paper waste separately collected and the development of these ratios for the individual waste production sites are subject to continual monitoring. Although there is great variation in the results, the recycling ratio for paper has risen, demonstrating early success.
● ● ○

Separate Collection of CD-ROMs.
Since 2012, used CD-ROMs have been collected separately from other waste and recycled. Waste volume has declined accordingly.
● ● ●

Legend

● ● ● Target achieved
● ● ○ Ongoing process
● ○ ○ Target largely achieved
○ ○ ○ Target not achieved and/or cancelled

ENVIRONMENTAL PROGRAMME 2014 – 2017

Hamburg Airport sees the new Environmental Programme as the systematic continuation and extension of previous programmes. The targets and measures presented here are thus directly associated with the targets of the previous programme

Climate Protection / Energy Efficiency

Climate protection and the reduction of greenhouse gas emissions by the airport are essential areas to be addressed by environmental activities. Both have also been an important element in the environmental programmes undertaken by the airport as well as in the measures adopted as part of ACA. The current Environmental Programme aims to reduce energy consumption in buildings, fuel consumption for vehicles, and thus the associated CO_2 emissions, by 6 % compared to the values from 2013. This is to be achieved as follows:

Renewal of the block-type thermal power station

In the coming years, the block-type thermal power plant is to be fully renewed. The new power station will have approximately the same capacity as the current facility. The use of newer technology will give the new BHKW a higher energy efficiency level. This increase in energy efficiency will lead to a reduction in primary energy consumption of approx. 6 %.

Renewal of the ground services building

Consideration is being given to the demolition of the building used by ground services, replacing it with a new building that fulfils the highest energy and sustainability standards. This will reduce the energy required by this building by 5 – 10 %.

Deployment of vehicles with alternative power sources

By 2020, all of the airport's normal cars are to be replaced by vehicles with alternative power sources, using natural gas, biogas, electricity or hydrogen as fuels. Similarly, by that date, half of the fleet of special airport-specific vehicles are to be replaced by alternative power vehicles. Within the period of this environmental programme, some 30 % of the fleet will be replaced. This measure should reduce vehicle-based CO_2 emissions to half the level of 2013.

Installation of charging stations for electrically-powered company vehicles

Additional charging stations for electric vehicles are to be installed where needed on the airport site, so as to make these vehicles more usable. The number and location of charging stations will be determined on the basis of operational requirements.

Water Protection

With regard to the protected resource, water, the environmental programme aims to further improve the protection of local waterways against contamination. Furthermore, the programme aims to reduce the consumption of drinking water.

Installation of a Rainwater Utilisation Facility

Rainwater utilisation facilities are to be installed for the new ground services building and for the new building sections of the Southern Passenger Pier. This should result in savings of some 6,000 m^3 of drinking water per year.

Installation of a Gravel Bed Filter for Surface Water

In order to deal with any contamination of surface water that may occur on the aprons, a gravel bed filter will be installed. Considering the fact that the existing protection against contamination is already very high, this facility will provide additional security against contamination.

Waste Management, Use of Waste Lock Systems

The aim of waste management is the reduction of waste quantities on the airport site and the increased separation of different types of waste. Major improvements have already been achieved in the past. Further waste management measures will complement these improvements in a sensible way. In order to improve the separation of individual types of waste and to make it easier to identify internal waste producers, Hamburg Airport shall acquire waste lock systems, which are more effective than other systems at ensuring waste separation. The waste separation and recycling ratio shall thus exceed the level seen in 2013.

Noise Protection

In view of the centrality of noise protection measures and of the efforts pursued for a long time already, the environmental programme pursues the goal of reducing the noise impact of individual noise occurrences further below the average levels seen in past years. The following measures are planned:

Acquisition of additional mobile heating equipment for remote parking positions

This equipment is to be acquired as required by demand. The devices heat the aircraft cabins, eliminating the need to operate the APU during ground handling. As such, this equipment is part of the project to reduce APU-related noise. The acquisition of equipment to match demand will mean that the duration of essential APU operation is kept low, even at times with high ground handling volumes.

Reduction of delays for evening and night landings

Aircraft movements between 11 p.m. and midnight are to be avoided by adjusting schedules to preclude delays from entering into this curfew period. Airlines are to be required to improve the punctuality of approaches in this time frame. This will further improve noise protection in the evenings and at night.

Encouraging the deployment of newer, quieter aircraft

Hamburg Airport is working together with the airlines on ways to achieve the deployment of modern and thus quieter aircraft for flights to and from Hamburg. The aim is to ensure that new developments in aircraft manufacturing, in particular the low-noise A320neo range of aircraft, available from 2015, are increasingly deployed in Hamburg. This will reduce aircraft noise for individual aircraft movements.

General Environmental Management

Inspection of the quality of surface water occurring on the site

A comprehensive series of measurements will assess the quality of surface water on the airport site. These tests are to be carried out over a lengthy period so as to take into account, as far as possible, all meteorological conditions and operational processes as they influence water quality. This will provide documentary evidence for the already low levels of contamination of surface water with organic substances and sediments.

Measuring the Concentration of Ultrafine Particles

In view of the initial findings from recent years, Hamburg Airport is continuing its programme to measure the concentration of ultrafine particles in the air on the airport site. The aim of these measurements is to learn more about these substances, which remain relatively unexplored to date.

HAMBURG AIRPORT IN FIGURES

Year	2011	2012	2013
Turnover in € million	**253.3**	**251.5**	**254.5**
Employees [1]	**1,615**	**1,656**	**1,774**
1Annual mean value excluding trainees/apprentices and Executive Board			
Total passengers	**13,559,370**	**13,698,247**	**13,502,937**
of which:			
Transit	23,260	20,270	18,077
Domestic	5,703,551	5,342,156	5,123,046
International	7,832,559	8,335,821	8,361,814
Passengers per aircraft movement			
Averaget	**96.6**	**100.4**	**104.9**
of which:			
Scheduled flights	91.1	94.9	99.8
Charter flights	166.0	168.6	167.7
Air cargo in t			
Total	**67,874.80**	**64,641.20**	**65,820**
of which:			
Flown air cargo	27,328.40	28,171.10	28,275
HGV cargo	40,390.40	36,468.30	37,532
Transit	156.1	1.8	13
Airmail in t	**10**	**93**	**13**
Aircraft (landings) by type			
Total	**79,150**	**76,529**	**71,990**
of which:			
Prop. /Helicopter	11,452	11,664	10,433
Chapter 3 Bonus	67,547	64,720	n, a,
Chapter 3	150	145	n, a,
Chapter 2	0	0	n, a,
Uncertified	1	0	n, a,

Year	2011	2012	2013
Aircraft movements			
Total	**158,295**	**153,066**	**143,802**
of which:			
Non-commercial	16,977	15,873	14,300
Commercial traffic	141,318	137,193	129,502
of which:			
Scheduled flights	123,159	118,542	111,766
Tourist flights	14,143	14,290	14,000
Package tours	4,016	4,361	3,736
Other flights			
of which over Alsterdorf			
Take-offs (15)	1,556	3,309	2,621
Landings (33)	2,767	5,666	7,207
of which over Langenhorn			
Take-offs (05)	5,069	5,147	7,991
Landings (23)	41,670	35,439	32,530
of which over Niendorf			
Take-offs (23)	26,486	23,064	17,214
Landings (05)	10,689	10,814	10,275
of which over Ohmoor			
Take-offs (33)	44,234	43,248	42,768
Landings (15)	22,224	22,837	20,590
Night-time aircraft movements			
Total			
of which:	5,155	5,369	5,385
10p.m – 11p.m.	4,440	4,614	4,795
11p.m. – 12a.m.	548	551	451
12a.m. – 6a.m.	167	204	139

Shareholder

51% Free and Hanseatic City of Hamburg
49% AviAlliance GmbH, Essen

Year	2011	2012	2013
Engine tests:			
Total	**451**[2]	**329**	**278**
of which:			
daytime	231	179	135
night	220	150	143
of which:			
Take-off power	31	17	16
Part power	145	102	56
Idle	275	210	206
of which:			
In the noise protection hangar	435	297	260
Outside the noise protection hangar	11 5	21 11	13 5
Remote positions			

[2] plus 61 engine tests in 2011 for third-party customers and LH City Line, all in the noise protection hangar.

Noise complaints	**1,308**	**1,822**[3]	**2,858**[3]

[3] plus 1,171 signatures in 2012 and 1,706 signatures in 2013 from petition.

Energy			
Natural gas usage			
in MWh	**95,359**	**96,137**	**86,148**
of which:			
in BHKW	80,812	78,767	71,053
in the central heating plant	14,547	17,370	15,095
Energieerzeugung			
in MWh	**100,640**	**100,738**	**89,891**
of which:			
in BHKW	89,512	87,450	78,344
in the central heating plant	11,128	13,288	11,547

Water consumption			
in m³	**198,174**	**216,129**	**214,539**

Year	2011	2012	2013
Waste			
Total in t	**3,637**	**3,743**	**3,265**
of which:			
Sheeting, DSD	9	15	24
Newspapers[4]	–	–	–
Mixed paper	478	449	408
Waste wood	74	28	58
Unsorted recyclables	686	19	–[5]
Non-recycling waste	2,389	3,233	2,775

[4] included in mixed paper since 31.10.2007.

[5] included in non-recycling waste.

Hazardous waste (selection of most important materials)			
Waste oil (in l)	20,748	18,900	24,991
Oil filters/oil-contaminated materials (m³)	18,47	9,83	8,23
Fluorescent tubes (pcs.)	14,515	8,850	4,835
Paint shop waste (kg)	1,349	1,658	3,607
Fat separator contents (m³)	562	577	523

Immissions (long-term mean)			
Eastern airport premises			
Particulate dust µg/m³	23	19	21
Sulfur dioxide in µg/m³	–[6]	–[6]	–[6]
Stickstoffdioxid in µg/m³	23	23	22
Nitrogen dioxide in µg/m³	9	9	8

[6] Measurements by authority suspended (concentrations too low) ,

GLOSSARY

ACA (Airport Carbon Accreditation)
Certified system for documenting and reducing airport emissions of greenhouse gases.

Acetates
Water-soluble salts of acetic acid, e.g. potassium acetate, sodium acetate. Acetates serve as environmentally friendly de-icing agents.

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

Benzene
Hydrocarbon compound with an aromatic ring system. Benzene (C_6H_6) iis highly inflammable, toxic and classified as a carcinogen. It is used as a fuel additive and is found in motor vehicle exhaust gases.

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
Non-hazardous commercial waste are similar in nature and consistency to waste generated in private households.

Continuous noise level
(equivalent continuous noise level, Leq_3)
Average level of noise pollution measured (calculated) over a defined period of time. In general, the energy-equivalent continuous noise level (Leq_3) is used today, as an increase in this noise level of 3 db(A) is equivalent to doubling the noise energy.

dB(A) (Decibel)
Acoustic logarithmic unit of measurement showing the peak of an acoustic event. As the human sensitivity to high and low tones varies, these tones are evaluated differently in measurements and calculations from mid-range tones. This A-evaluation is identified by the unit 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.

Effectiveness level
See Energy efficiency level

Electrical field strength
Measurement of the effect that an electrical field can have 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 level
The ratio of transformed and usable energy to the total energy contained within the energy source used, also known as "effectiveness level".

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 operational environmental protection, geared towards concrete local environmental impact. The core aspects of an environmental management system are a companys environmental policy and environmental programme.

Environmental policy
Component of an environmental management system, establishing 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 European Union has enacted a second set of regulations for voluntary participation in the Eco-Audit (EU 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.

Formates
Salts of formic acids. Increasingly preferred over acetates for use as surface de-icing agents due to their lower TOC content.

Glycols
Water-soluble liquids, similar to alcohol, 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". This is the common terminology used throughout the EU for identifying such 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, finalised in 2006, currently contains the strictest noise limits for licensing aircraft types.

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.

Leq_3
See Continuous noise level.

Nitric oxide (NO_x)
Oxygen compound of nitrogen. 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. Nitric oxide can function as a greenhouse gas.

Oil separator
Equipment for separating 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.

PAH (Polycyclic aromatic hydrocarbons)
Polycyclic aromatic hydrocarbons (PAHs) are compounds with several benzene rings, produced as a result of combustion processes. Some PAHs are classified as carcinogenic and/or may cause genetic defects.

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.

Primary energy source
Natural energy source immediately after extraction or mining, e.g. crude oil, coal, gas.

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. They must therefore be pushed back from their parking position by an aircraft tug if they are parked directly at a terminal position with a jetbridge. This procedure is known as push-back.

Red list endangered species
Lists of animal and plant species in varying degrees of danger of extinction, compiled by an international commission.

Renaturalisation
The restoration of a biotope or ecosystem to (a state as close as possible 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.

Soot
Fine graphite particles resulting from the incomplete burning of hydrocarbon compounds.

Sulphur dioxide (SO_2)
Colourless, foul-smelling, cough-inducing gas. Reacts with water to form an acid which can, amongst other things, be harmful to plants and buildings.

Surface noise
Noise emanating from aircraft when they are on the ground, arising from engine tests, taxiing, and/or 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 on the ground.

Take-off power
Engine power of at least 90%, as required at take-off.

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.

TOC (Total Organic Carbon)
Total quantity of organically bonded carbon. A unit of measure for quantities of dissolved organic substances.

Toluene (also known as methylbenzene)
Chemically very similar to benzene, but less toxic. It is used as a fuel additive and is found in exhaust gases.

Ultrafine particle, Nanoparticle
Particulate dust with a particle size of less than 100 nm (0.1 µm). The effect of these substances remains essentially unexplored.

Unburnt hydrocarbons (C_xH_y)
Organic compounds in exhaust gases as the product of incomplete combustion processes. When exposed to high temperatures and intense sunlight, unburnt hydrocarbons contribute to smog with increased concentration levels of ozone.

Traffic unit (TU)
One TU is the equivalent of either a passenger with 30 kg of baggage or 100 kg of air cargo or airmail.

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.

Xylene
Used as a solvent, a typical component of vehicle exhaust fumes. It is less toxic than benzene.

VALIDATION

The undersigned Bernd Eisfeld, EMAS environmental auditor with the registration number DE-V-0100, licensed for areas 51.1, 51.21, 52.21 (NACE code), confirms that he has audited the site and/or the entire organisation, as specified in the updated Environmental Statement of Flughafen Hamburg GmbH with the registration number D-131-00019, to determine whether all requirements of the regulation (EC) No. 1221/2009 of the European Parliament and Council from 25 November, 2009, relating to the voluntary participation of organisations in a community system for environmental management and auditing (EMAS) are met.

The signature on this declaration confirms the following:

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

Hamburg, 17 October, 2014

B. Eisfeld

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Abendrothsweg 69, 20251 Hamburg

STAY IN TOUCH ...

In addition to brochures and flyers, the Environmental Protection Centre can provide DVDs on the subjects of the environment in general, airport ecology, noise protection hangars, and aviation in general.

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