Environmental Statement
2017 – 2020

Hamburg Airport

Contents

The systematic planting of extensive flowering meadows and flower strips by Hamburg Airport improves the living conditions for native insects. This is an important contribution to the maintenance of biodiversity.
The front cover shows a single cornflower from these meadows.

Dear Readers,

Every three years, Flughafen Hamburg GmbH publishes a comprehensive Environmental Statement. The publication contains a great deal of useful and interesting information on the development of the environmental impact of airport operations, on environmental protection measures taken, and on our environmental management.

Many construction projects have been carried out over the past three years. The new P1 multi-storey car park and the new cargo terminal, which entered operation in May 2016, are visible examples of the development of airport operations which also contribute to the improvement in the airport's energy balance. The latter shall also be true of current and future construction projects.

Michael Eggenschwiler (left), Chief Executive Officer, Alexander Laukenmann (right), Managing Director.

An important element in environmental management is the recording and reduction of our CO_2 emissions. This is ensured by the Airport Carbon Accreditation (ACA) certification system. Our CO_2 emissions are already at a very low level. Projects such as the conversion of our vehicle fleet to increase the usage of alternative drive systems and fuels make a crucial contribution to this.

Recent years have seen continual growth in the number of passengers using Hamburg Airport. Yet the environmental impact is barely changing. Environmental management is aimed at continuing to support this development in the future.

Happy reading!

Michael Eggenschwiler
Chief Executive Officer

Flughafen Hamburg GmbH

Alexander Laukenmann
Managing Director
Flughafen Hamburg GmbH

Activities and Organisation of the Hamburg Airport Group

With approx. 16.5 million passengers (2016), Hamburg Airport is the fifth-largest commercial airport in Germany. The airport operator is Flughafen Hamburg GmbH (FHG) together with its subsidiaries and holdings. They ensure smooth and safe flight operations and provide the operating areas, facilities, buildings, and services necessary for handling passengers, freight and aircraft. Numerous other companies are also active on the airport premises, including airlines, retailers, security service providers, etc. And directly adjacent to the airport premises is Lufthansa Technik AG. The airport is thus one of the most significant employment sites in the Hamburg Metropolitan Region, providing secure jobs for some 15,000 people.

Environmentally Relevant Processes

The many operational processes at the airport may have varying degrees of environmental impact. The purpose of Flughafen Hamburg GmbH's Environmental Management System is to avoid or minimise these various forms of environmental impact.

Take-off, Landing and Taxiing of Aircraft

Aircraft movements such as take-offs and landings in Hamburg are characterised by the runway system, consisting of two intersecting runways. This 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. Approach and departure routes are essentially determined by German Air Traffic Services (DFS, "Deutsche Flugsicherung").

Ground handling services represent an important field of activity for Hamburg Airport.

Taxiing refers to aircraft movements on the ground between the ground handling positions and the take-off and/or rollout 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. Taxiing times in Hamburg, including the waiting time at the end of the runway, average 6 minutes. Taxiing operations are carried out using the aircraft engines.

Aircraft Models and Time Distribution of Aircraft Movements

The most common aircraft encountered at the airport are regional jets and aircraft with the approximate size of the Airbus A320 and Boeing 737 ranges. In the ICAO classification system, these are Code C aircraft. Larger aircraft, falling into other classifications, are less common at Hamburg Airport.

Significant seasonal differences can be seen in aircraft movements. Up to 13,600 aircraft movements may occur in the peak holiday months. Peak days in this period are characterised by up to 500 take-offs and landings. These values are significantly higher than the annual averages. Differences in movement figures are also recognisable in the course of the day. In particular, the period after 6 a.m. and the period beginning in the late afternoon both experience higher traffic volumes.

Ground Handling Services

Ground handling locations include two aprons with appropriate parking positions for aircraft, although the majority of ground handling services take place on Apron 1. Pier positions with jetbridges to connect the aircraft directly with the terminals are located here, along with so-called Walk-In-Walk-Out gates and remote positions at a greater distance from the terminals.

The airport's presence and appearance in the community is largely characterised by take-offs and landings.

Aircraft handling means:

- Transporting passengers to the aircraft and/or the boarding and deboarding of passengers

- Disposal of waste water from aircraft toilets
- Provision of drinking water for aircraft
- Cabin cleaning, including the disposal of resultant waste
- Baggage and air freight transport on the apron
- Aircraft de-icing when made necessary by weather conditions
- Refuelling of aircraft
- Aircraft pushback and towing operations

Passenger and cargo terminals also fulfil important functions in passenger and freight handling (check-in, security checks, baggage and cargo freight declarations, etc.). The building structure is to a large extent determined by these functions.

Landside Traffic to the Airport

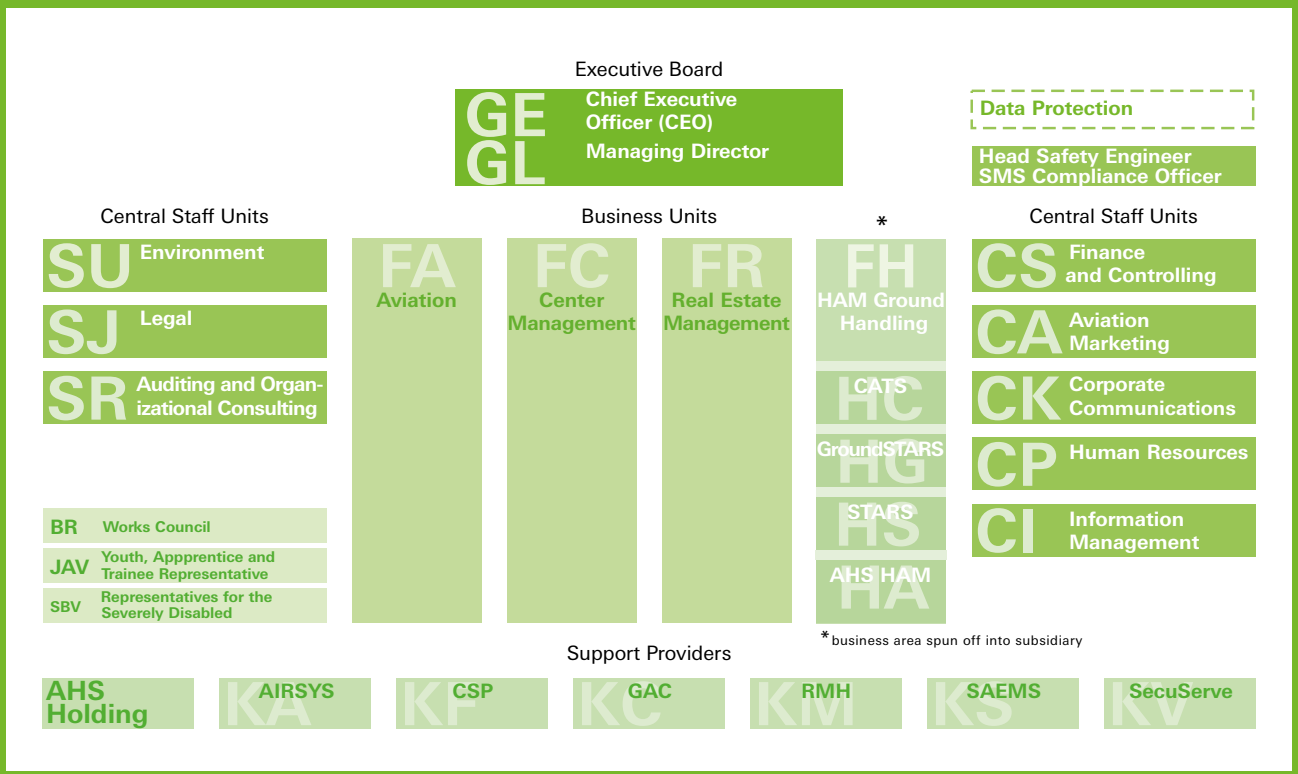
Airport operations lead to landside feeder traffic in terms of passengers travelling by private car, taxi, or public transport to and from the airport, the incoming and outgoing transportation of air cargo, and the daily travel to and from work of persons employed at the airport premises. The airport's catchment area encompasses the whole of northern Germany along with southern Denmark. The landside distances travelled are accordingly long. In this context, the scope 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 suitable public transport alternatives to individual car-based travel (including taxis). Other influencing factors include the availability of car parking and the accessibility of the airport in general.

Construction, Operation and Maintenance of Buildings

Every airport operates a large number of various buildings (including terminals), whereby the size, design and nature of the building depends on the usage. In the case of FHG, there are approximately 200 buildings with a total floor space of 595,000 m². Specific building-related environmental aspects, including space re-

Organisational chart of Hamburg Airport Group (for scope of Environmental Management System, see page 11).



quirements, energy consumption, waste generation and drinking water requirements, are largely directly related to the particular nature of the individual buildings.

Provision of office and retail space.

A part of the available building space — approx. 33,000 m² — consists of offices for personnel and for companies operating at the airport. Hamburg Airport also makes space available for the operation of restaurants and retail businesses. Including storage and utility rooms, this space amounts to approximately 16,000 m².

Operation of Workshops, Hangars and Storage Areas

The airport has a range of workshops for the maintenance and servicing of the facilities, buildings and vehicles operated at the site:

- 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 airport illumination and lighting facilities
- a joinery
- various smaller workshop facilities

Facilities also maintained for the storage of vehicles and aircraft, e. g. hangar H and the GAT hangar for aircraft, and the underground garages for cars. Their environmental relevance lies primarily in their size and the resultant energy requirements for heating them.

Environmentally Relevant Facilities

The environmentally relevant facilities operated by the airport include facilities for dealing with water-hazardous substances: the so-called AwSV facilities These are listed in the table at the end of this Environmental Statement. All facilities listed fulfil the highest safety standards by virtue of, for example, double-walled tanks, anti-corrosion features and leak indicators as well as regular inspection by specialist companies.

Other facilities are operated to provide the airport with required energy. These are relevant to immission-protection regulations. The most important facility in this context is the block-type thermal power station (BHKW). This provides the terminals with electricity and heat as well as feeding the airport's heat distribution network. The simultaneous production of electricity and heat results in a high efficiency factor, ranging from 92 to 95 percent, and low fuel requirements. The BHKW is fuelled with natural gas, which releases less air pollutants than other fuels when burned, providing a further environmental advantage. FHG's boiler house is also powered with natural gas. This supplements the heating supply from the BHKW. A number of decentralised heating facilities with lower capacity are operated for individual buildings. All facilities relevant to immission-protection regulations are listed in the data section on page 51.

Subsidiaries & holdings of Flughafen Hamburg GmbH and their functions

Subsidiary/holding	Activity
AIRSYS	internal IT services
STARS	ground handling services (aircraft pushback, passenger bus transport)
CATS	ground handling services (aircraft cabin cleaning)
GroundSTARS	ground handling services (aircraft water supply, aircraft toilet waste disposal, baggage and freight transport on aprons, operation of jetbridges)
RMH	maintenance of aircraft facilities and buildings
SAEMS	maintenance and repair of vehicle fleet
SecuServe	car park management

The airport operates a number of buildings with various purposes and sizes.

The airport aims at compliance with the ambitious environmental protection goals in all operational processes — here, for example, solar-powered, self-propelled airstairs are in use.

Environmental Management

The central task of the Environmental Management System (EMS), which has been certified for EMAS and ISO 14.001, is the documentation and reduction of the environmental impact of airport operations. This encompasses the measurement and evaluation of key environmental data, the regulation of environmentally relevant activities and facilities, the allocation of responsibilities and the development of binding environmental targets and management measures. The EMS is complemented by other airport environmental protection initiatives.

Airport Carbon Accreditation (ACA)

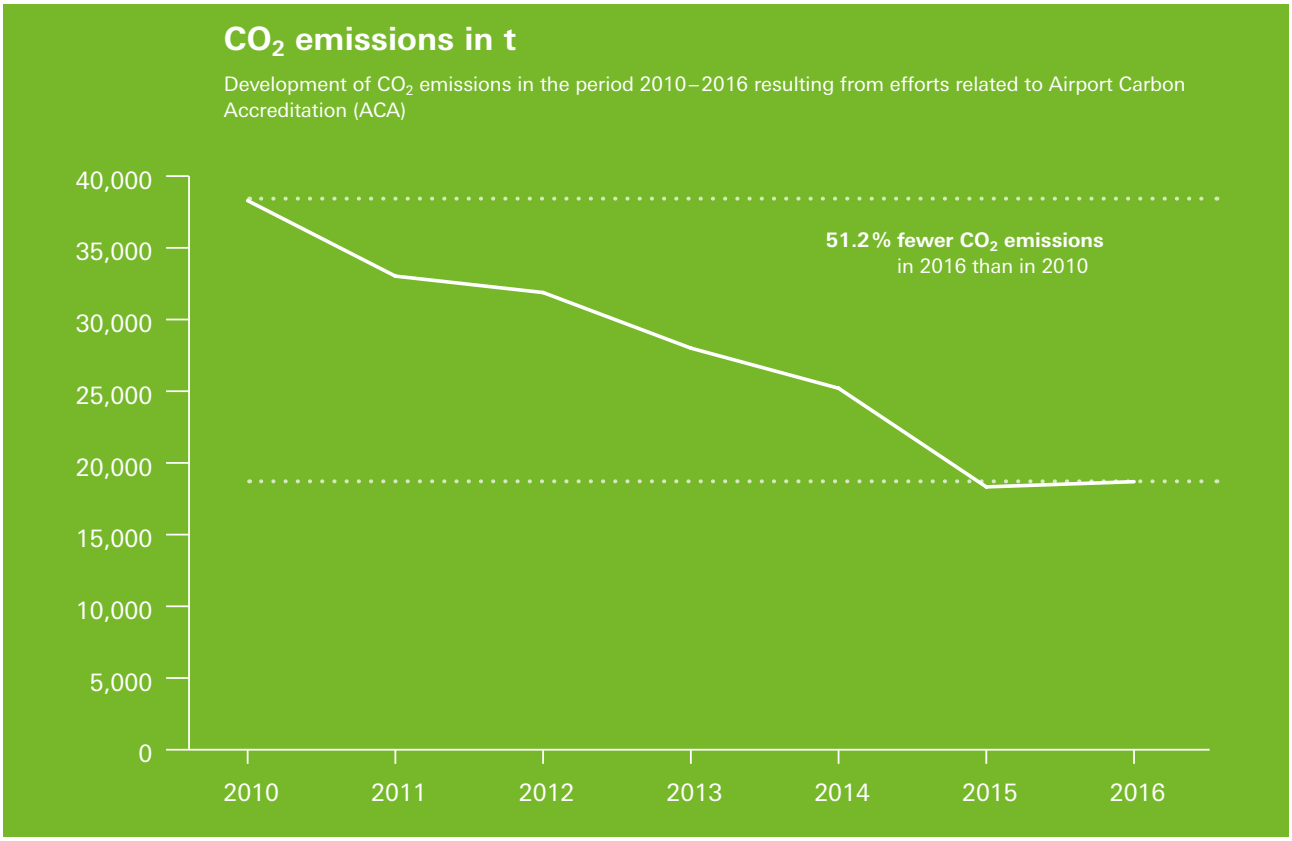
ACA is an internationally recognised system for measuring and reducing an airport's CO_2 emissions. Reduction targets must be defined in a binding Carbon Management Plan and annually verified. The inspection and verification is conducted by an authorised independent assessor. A central European office then certifies the level achieved. The Carbon Management Plan is a central element of the EMS. An airport can be certified at any of four different levels, each subject to specific requirements. The final level requires complete reduction of all emissions generated by airport operations. Hamburg Airport has been certified to the second-highest level since the start of 2014. This involves the recording of all emissions arising from the airport's own activities, a demonstrable reduction of these emissions and the recording of important so-called Scope 3 emissions. These are CO_2 emissions arising indirectly from airport operations which are nevertheless 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.

Level 1 (Documentation)	Level 2 (Reduction)	Level 3 (Optimisation)	Level 3+ (Neutrality)
Calculation of all Scope 1 and Scope 2 CO_2 emissions	As for Level 1, plus the proven reduction targets of achievement	As for Levels 1 and 2 plus calculation of important Scope 3 CO_2 emissions (aircraft at the site, transit to the airport, etc.)	Fulfilment of all requirements of Levels 1–3 plus compensation for all remaining Scope 1 and Scope 2 CO_2 emissions to the point of 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.

Energy Management:

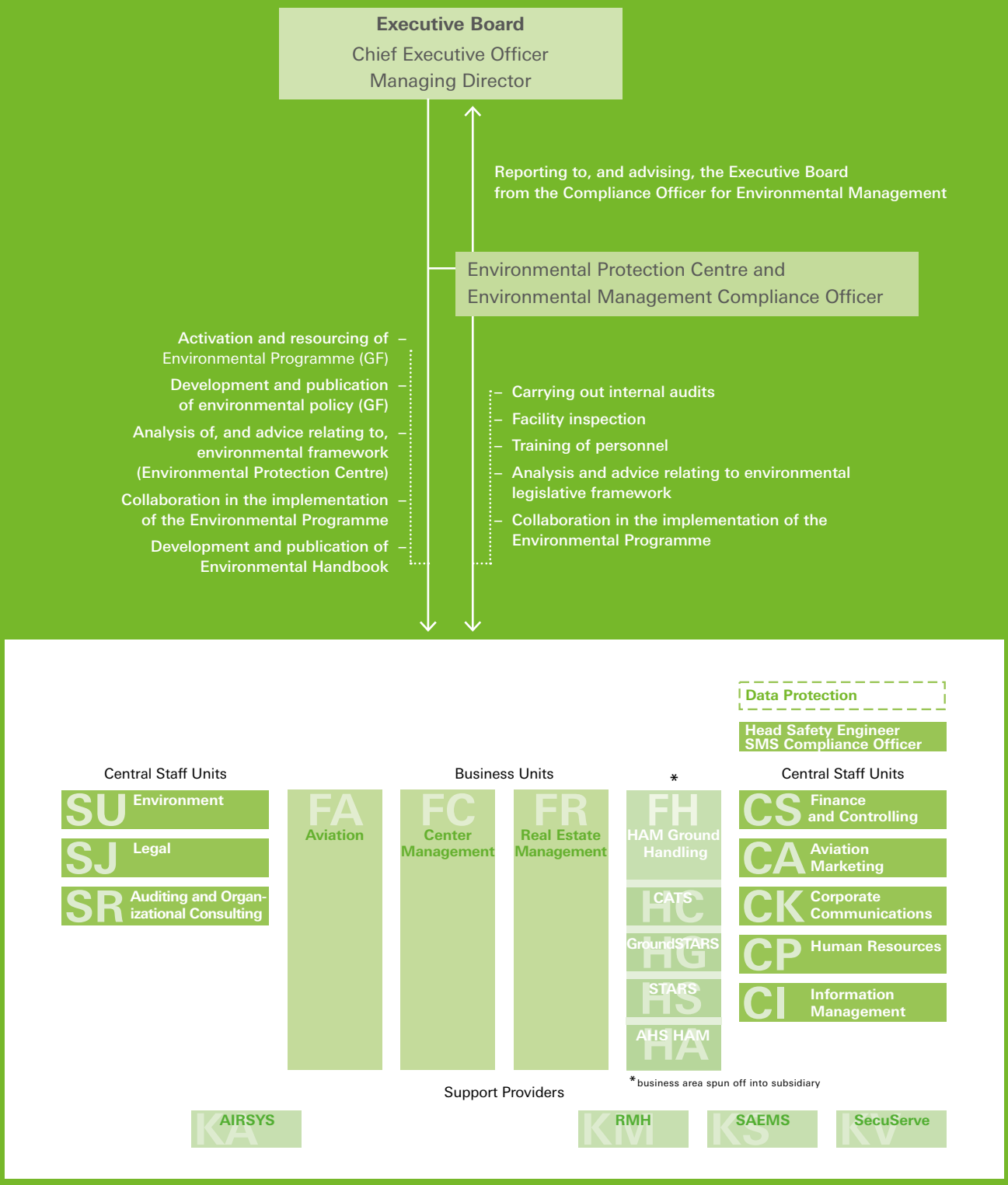
The goals of Flughafen Hamburg GmbH's energy management are an efficient and economical approach to energy and the usage of the most environmentally friendly energy sources possible. A further important element in energy management is the comprehensive determination of energy consumers according to consumption level, type of energy and location of energy consumption. The same applies to the operation of internal energy generation facilities. Energy management is closely linked to environmental management and the ACA certification.



Sustainability at Hamburg Airport

Sustainably structured airport operations are a declared goal of Hamburg Airport. The Environmental Management System is a central element in the pursuit of this goal, building on the twin foundations of ecology and the consideration of interest groups (employees, customers, neighbours, etc.). To a large extent, the sustainability concept is thus based, both organisationally and in terms of content, on environmental management. By the same token, the position of environmental management within the corporate leadership of the Hamburg Airport Group is further strengthened by this approach.

Structure of the Environmental Management System



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

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

Environmental Guidelines

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

We see environmental protection as a process of continuous improvement.

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

Environmental protection is a component of our corporate strategy.

As far as possible, we avoid environmental pollution. We use energy and raw materials sensibly and as economically as possible. We seek to influence our customers and contractual partners in accordance with this goal.

We protect the environment beyond the level required by law.

We observe all legal requirements. As an innovative, environmentally conscious company, we desire to reduce environmental pollution associated with the operation of the airport in excess of legal requirements.
We are all responsible for the environment.

We promote consciousness of environmental responsibility on site at Hamburg Airport.

We encourage every employee to make suggestions for the improvement of environmental protection, either within the framework of the company's employee suggestion system or by making direct contact with the relevant responsible persons.

We take into account the interests and needs of the surrounding area.

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

We are actively committed to environmental protection.

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

Environmental Impact

Some of the sources of environmental impact of airport operations, as shown in the following table, may be influenced by the airport, as they are directly associated with the airport. These are identified as direct environmental impact. Indirect environmental impact encompasses factors which are associated with airport operation but cannot be directly attributed to the company.

Overview of 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 service vehicles, FHG vehicle fleet, internal energy and heat generation	FHG, GroundSTARS, CATS, STARS, RMH, AIRSYS
Resource consumption (fuels, drinking water)	direct	deployment of vehicles, water supply to aircraft, hygiene facilities, de-icing of surface areas and aircraft, operation of BHKW and central heating plant	FHG, RMH, CATS, GroundSTARS, STARS, SAEMS, AIRSYS
Energy consumption	direct	all electricity consumers (e.g. apron and building lighting, air conditioning & heating of buildings)	all business areas, tenants of FHG
Generation of waste water	direct	surface water on aprons, hygiene facilities, workshops, de-icing	FHG, RMH, STARS, SAEMS
Generation of waste	direct	commercial waste in all areas, esp. in terminals (retail and restaurants), hazardous waste from workshops	all business areas, esp. SAEMS, RMH, AIRSYS, FHG, tenants of FHG
Land usage, usage of and impact on green spaces	direct	buildings and facilities, air safety measures, flight operations areas	FHG, RMH, tenants of FHG

One of Flughafen Hamburg GmbH's mobile noise measurement stations

Aircraft Noise

Aircraft noise results from various processes at and around the airport. Principal sources of noise are aircraft flyovers in the airport vicinity, take-offs and landings, surface noise from processes on the apron, and engine tests conducted by Lufthansa Technik AG.
The actual extent of noise emissions depends on the following factors:

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

The operation of auxiliary power units (APUs), fitted to almost every aircraft, can also result in surface noise. APUs provide aircraft with electricity and air conditioning during ground handling. APU noise emissions have a limited geographical scope, but may take place over lengthy periods. Surface noise can also result from engine tests, primarily carried out by Lufthansa Technik AG. These tests, varying in length, must be conducted after every maintenance or overhaul operation on an aircraft.

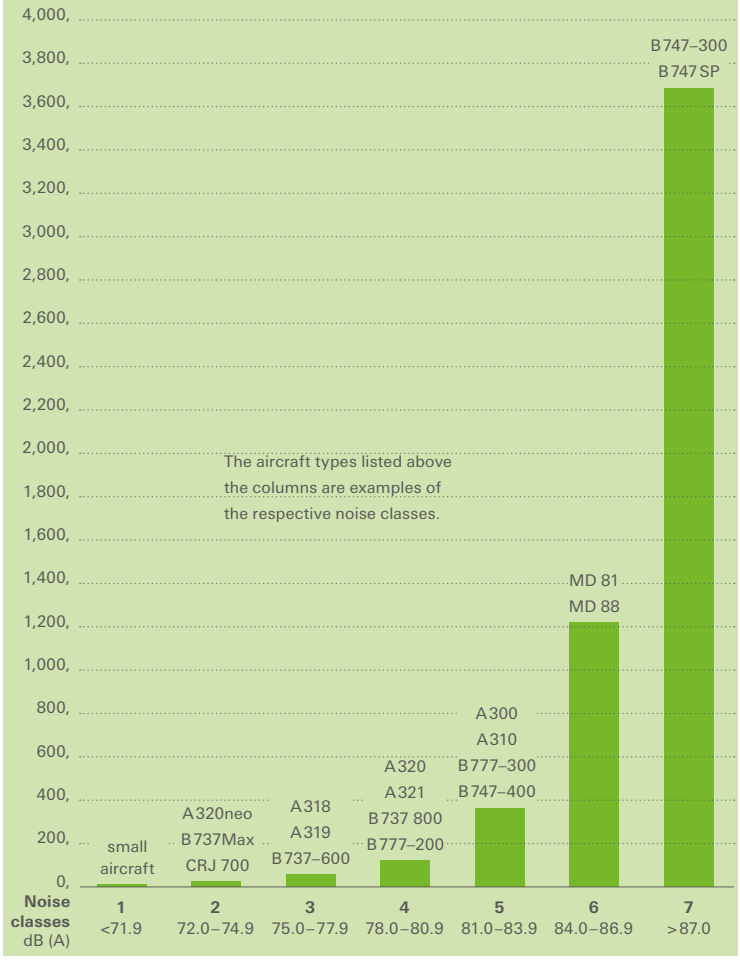
Noise Protection Measures

Passive noise protection in the surrounding area — an important element of Hamburg Airport's noise protection measures — has been carried out regularly and for the most part voluntarily by the airport since the mid 1970s. Within the framework of its noise protection programmes, Hamburg Airport sponsors and organises such measures as the installation of soundproof windows along with the installation of soundproof ventilators in bedrooms. Since 2012, noise protection has encompassed the improvement of noise insulation of other building elements. The noise contours which underlie the noise protection programmes are based either on legal requirements (incl. the Aircraft Noise Act and subsequent supplementary regulations) or on Hamburg Airport's own criteria, which go well beyond legal targets.

Active noise protection measures serve to reduce noise pollution at the source. Some time ago, for example, Hamburg developed a noise-related graduation of landing fees. Aircraft are categorised into seven noise classes; higher fees are paid for louder aircraft than for quieter ones. This encouragement to deploy quieter aircraft achieves a quantifiable reduction in aircraft noise. The fees have played a role in ensuring that less

Noise surcharge on landing fees

Noise charge (in euros)



Noise Protection Programmes

Programme	Period	Residential units,* applications processed		Installed ventilators
		Windows	Only ventilators	
Mandatory 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 mandatory programme	1999–2004	386	2,437	5,957
Total		**11,669**	**2,737**	**6,958**
6th voluntary programme	01 Jan. 2003–31 Dec. 2010	64		0
6th+ voluntary programme	01 Sept. 2007–31 Dec. 2010	141		0
7th voluntary programme	30 Jun. 2006–31 Dec. 2010	889	180	292
7th+ voluntary programme	01 Sept. 2007–31 Dec. 2010	1,661	322	470
8th voluntary programme	01 Sept. 2007–31 Dec. 2010	680	454	982
9th programme	03 Mar. 2012 ongoing	1,350		950
8th+ voluntary programme	01 Dec. 2017–31 Dec. 2017	130		85
Total		**3,435**	**956**	**1,744**
All programmes		**16,584**	**3,693**	**9,737**

* 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.

aircraft noise is generated in Hamburg, measured according to the noise quota, than when the fees were introduced.

Landing fees also consider take-offs and are linked to the night flying restrictions. These 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. The fees are higher for night flights, as shown in the adjacent table, in order to protect neighbours from aircraft noise at night.

The airport provides aircraft with electrical energy and air conditioning during ground handling, eliminating the need to use APUs and thus reducing surface noise. APU operation has become almost completely superfluous. The BHKW supplies aircraft being handled at pier positions. Mobile diesel generators and air conditioning units are deployed at remote positions and at the Walk-In-Walk-Out gates. 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 made APUs an insignificant source of surface noise.

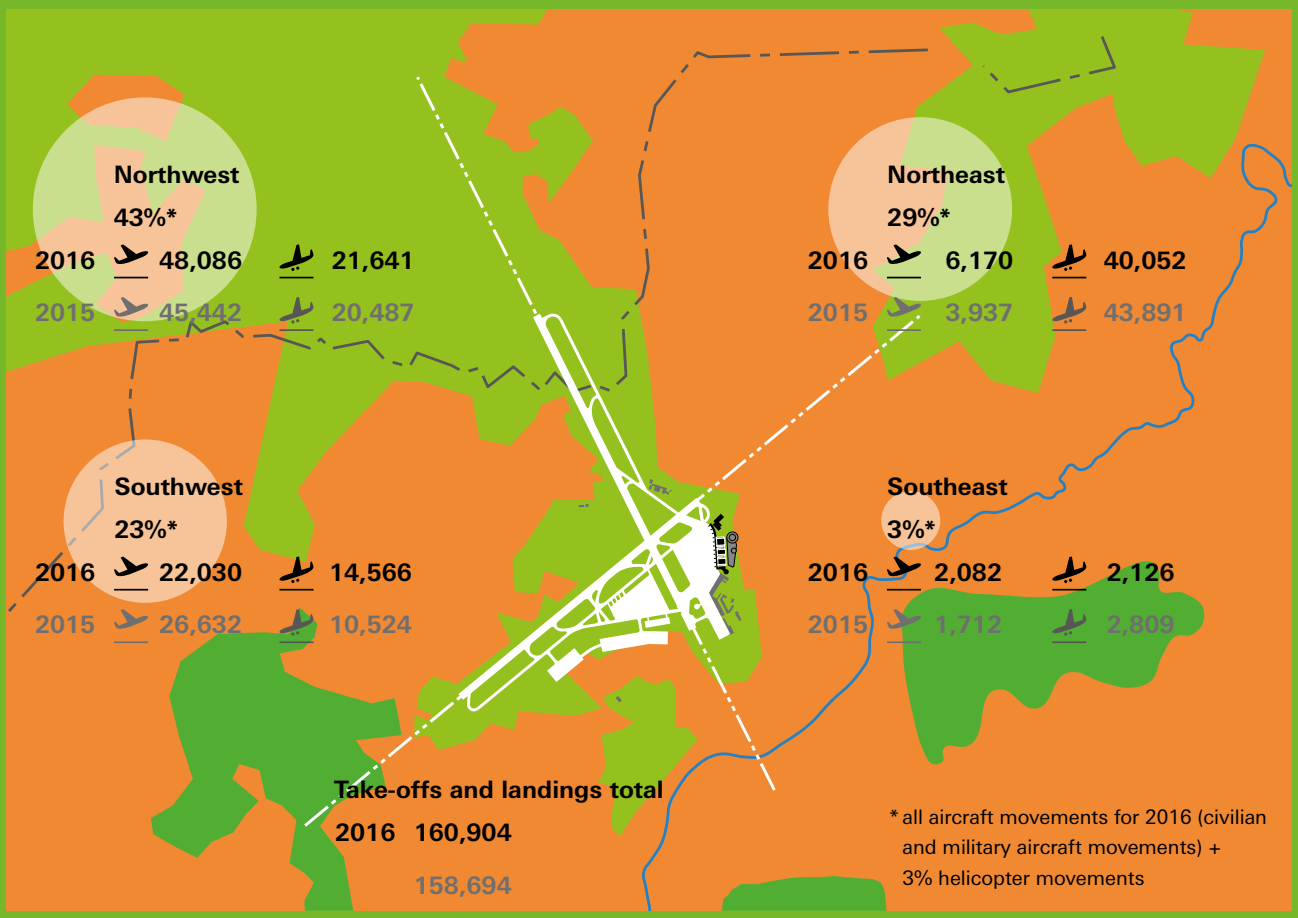
As long ago as 2001, a new Noise Protection Hangar, the first of its kind, was commissioned to limit noise pollution arising from engine tests. The resultant reduction in noise emissions means that engine tests are no longer a disturbing factor.

Night-flying restrictions at Hamburg Airport

Period	Restriction	Surcharge
10:00 – 10:59 p.m.		150%
11:00 – 11:14 p.m.	only	350%
11:15 – 11:29 p.m.	delayed	400%
11:30 – 11:44 p.m.	flights	450%
11:45 – 11:59 p.m.	permitted	550%
00:00 – 05:59 a.m.	no scheduled flights	700%

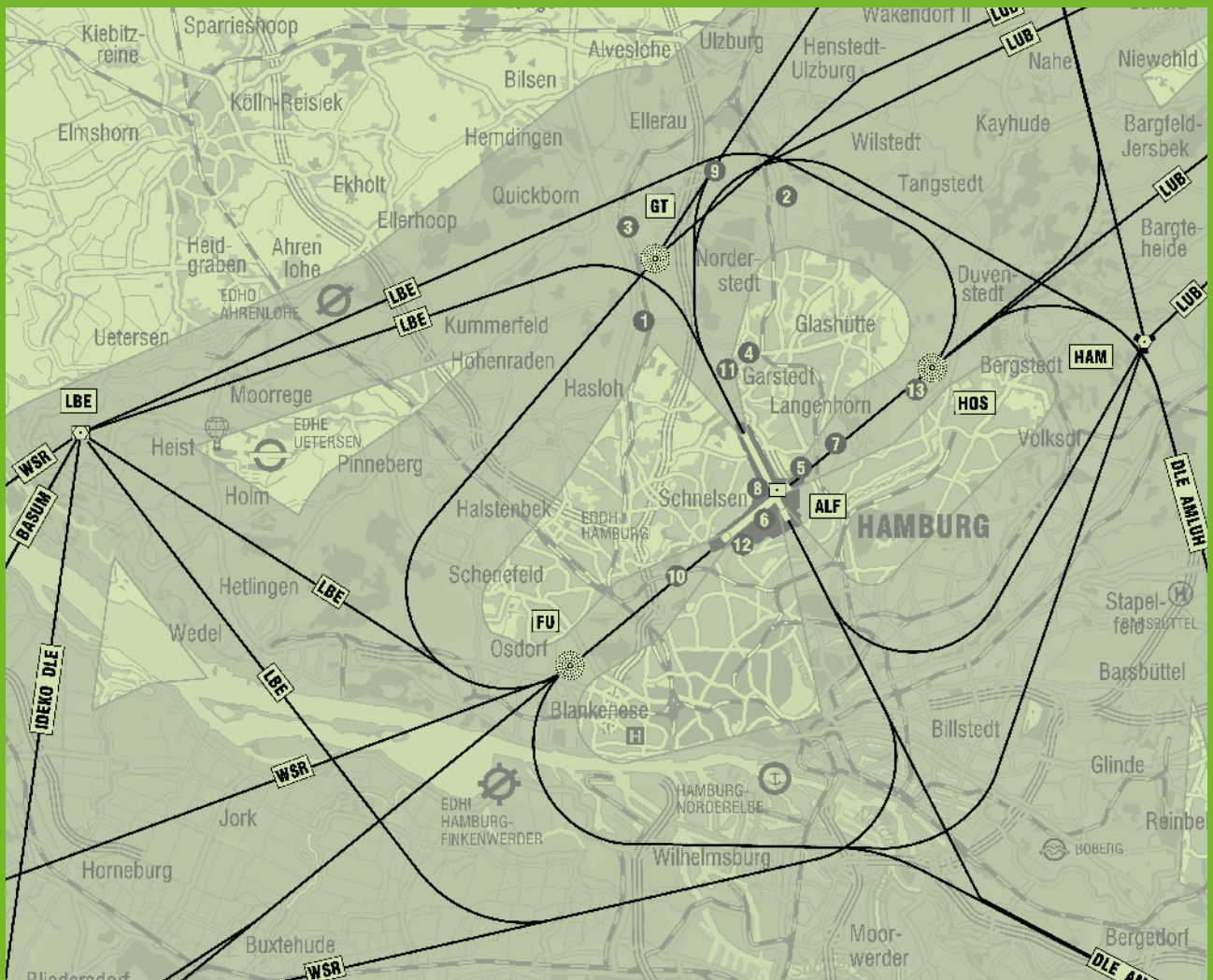
Prescribed Noise Quota , based on noise emissions in 1997 (area 20.39 km²) and equivalent noise quota from 2016 (area 13.96 km²)

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



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

Flight paths and locations of noise measurement stations at Hamburg Airport



The Noise Protection Hangar, designed and constructed by FHG, offers effective protection against noise generated by engine test runs.

Aircraft noise is continuously measured, with the levels measured regularly evaluated.

Local Air Quality and the Generation of Greenhouse Gases

Emissions are generated as a result of airport operations, including gaseous organic and inorganic compounds, particulates and greenhouse gases. They come from aircraft operation, from energy generation facilities and from vehicles used for the airport and for transit to and from the airport. To reduce pollutant emissions, the airport is deploying modern, low-emissions technology and optimising operational processes. The air quality at Hamburg Airport is at a typical (good) level for an urban fringe area. Measurements conducted over several years by the Hamburg environment authority's air quality measurement station on the airport premises confirm this. The measurements fall significantly below current legal limits. The following substances are relevant in this context:

- nitric oxide (NO_x)
- unburnt hydrocarbons (CH)
- particulates (PM 10)
- particulates (PM 2,5)
- carbon monoxide
- carbon dioxide (as a measure for substances with climate-changing effect)

Aircraft operations:

The operation of aircraft is an important source for air pollutants. The following processes are pivotal in determining the quantity of substances emitted by aircraft:

- take-offs and landings/approach and departure
- taxiing operations including waiting times before take-off
- APU operation at aircraft parking positions

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

The supply of electricity and air conditioning by Hamburg Airport reduces surface noise emissions and results in a noticeable reduction in the emission volumes of air pollutants and greenhouse gases.

Energy production facilities:

The airport's energy requirements must also be taken into account in terms of air pollutants. Internal energy-generation facilities and externally purchased electricity, for example, produce some 80 percent of the greenhouse gases within the airport's scope of influence. The immediate correlation between energy requirements and emission levels mean that energy management has an important role to play in all measures to reduce emissions.

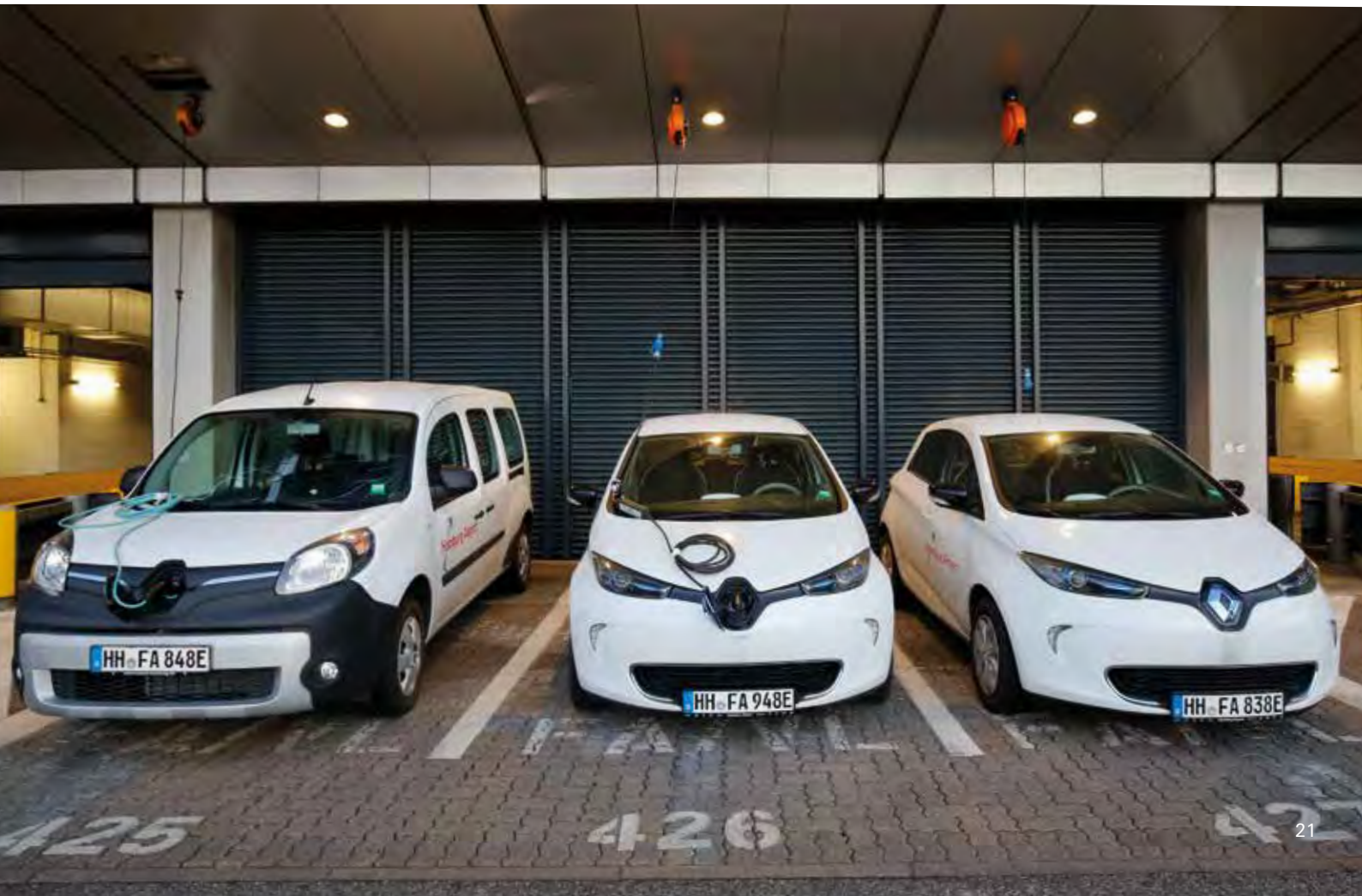
Vehicle operation:

Vehicle operation on the premises is the second source of emissions within the scope of the airport's direct influence. This also includes the provision of electricity to aircraft via mobile generators (Ground Power Units, GPUs). A portion of the airport's fleet of approx. 400 vehicles consists of powerful vehicles with very high fuel consumption. Furthermore, many vehicular operations are characterised by short distances and lengthy waiting periods, Both of these factors can result in high fuel consumption. It is currently assumed that the ground handling service vehicles constitute a relevant source of particles on the airport premises.

Landside traffic to the airport

In the airport vicinity, landside transit resultant from airport operations is the major source of emissions for all pollutants under consideration. The airport's catchment area is a factor in this landside traffic. It is primary the road-based traffic to and from the airport, in the airport vicinity, that is relevant to emissions — traffic consisting of private cars, taxis, buses, and heavy goods vehicles etc. delivering and collecting air cargo and other goods. The airport has relatively limited influence on this traffic.

The airport's vehicle fleet is becoming increasingly emission-neutral as the proportion of natural gas and electric vehicles increases.



Environmental Protection Measures

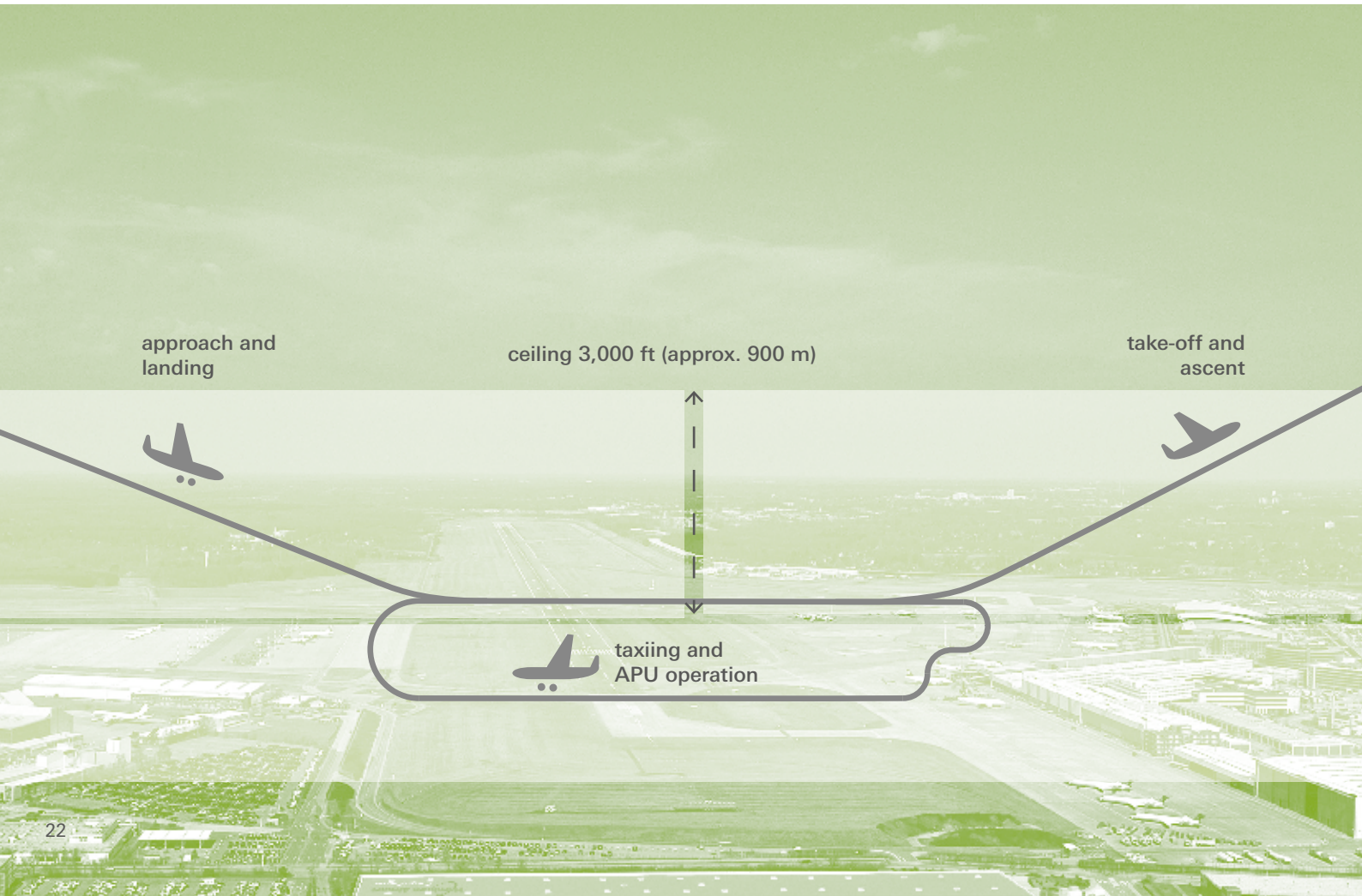
The limitation and reduction of emissions is the goal of environmental management. Hamburg Airport can only indirectly act to reduce emissions from aircraft, but guiding measures can be taken that effectively achieve a reduction in emissions. Landing charges are therefore also graduated according to the emission of pollutants. This is aimed at providing a financial stimulus for the deployment of aircraft that pollute less, similar to the approach to aircraft noise. Since 2016, for example, there has been an increase in the number of modern aircraft, such as the A320neo and B737 Next Generation, in deployment. The regulations relating to the deactivation of APUs on the aprons (see Noise) are effective in the reduction of emissions of air pollutants and greenhouse gases. 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. FHG is also involved in research projects aimed at the deployment and development of environmentally friendly aircraft fuels.

To reduce vehicular emissions, FHG is turning to vehicles that use alternative, more environmentally friendly, ideally renewable fuels. As market-ready fuels, natural gas and biogas play an important role. The baggage tugs on the apron, the majority of passenger buses, and many of the cars in the fleet use this technology. Electric vehicles are also increasingly being used. These are particularly effective where the vehicles are typically operated over short distances. Hydrogen-powered vehicles are an option for the future, when the technology has reached market readiness. FHG's Mobility Concept envisages at least half of all vehicles being powered with alternative energy by the year 2020. For some vehicle categories, this share has already been reached. Since the end of 2016, diesel-powered vehicles have been fuelled exclusively with C.A.R.E. diesel, a fuel based on waste, which makes a major contribution to emissions reduction.

Measures are targeted at three levels in order to reduce emissions from building operations: reducing the energy requirements of the buildings with modern technical building facilities, the operation of energy-efficient systems and information from all building users. Areas of focus are:

- A portion of the electricity and heat is produced in the airport's block-type power station (BHKW). The power-heat coupling gives this power plant a high efficiency level and makes it more environmentally friendly than other power stations. Furthermore, the

The LTO cycle describes aircraft movements on the airport premises and in the immediate vicinity.



facility uses natural gas, a comparatively environmentally friendly fuel.

- Energy flows are thoroughly traced, weak points are analysed and the efficiency of energy saving measures is verified.
- The thermolabyrinth in operation in the basement of Terminal 1 since 2005 further reduces energy requirements without generating any pollutants.
- Lamps and bulbs are regularly being replaced with LED-based lighting.
- The photovoltaic facility in operation on the roof of the main administration building since May 2011 provides climate-neutral electricity, albeit in limited quantities.
- 100 percent of externally sourced electricity comes from certified climate-neutral sources.
- Employees of the airport and other companies based here are informed regarding efficient energy use.
- Old buildings are being replaced with new ones where needed in order to fulfil higher standards.

A 240,000-m^2 woodland area, planted by the airport in the Kaltenkirchen district, compensates for CO_2 emissions arising from employee business trips. The forest counters approx. 230 t of CO_2 per year, which is more than is needed to compensate for these emissions.

Regular inspections and evaluations serve to verify the efficacy of all measures.

Lighting for airport buildings and facilities is based on modern, energy-efficient technology.

During wintry weather conditions, aircraft must be freed from snow and ice to ensure safe flight.

Water Management and Water Protection

The impact of airport operations on water and waterways varies. 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. This can have a certain risk for the protected resource, water, for example for groundwater or for local surface waterways. 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. Surface water contaminated by these processes must be treated accordingly. The feeding of clean surface water into drainage catchments must take into account the relevant water usage. 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 and contaminated surface water.

The number of persons making daily use of the airport is a factor in the requirements for drinking and industrial water. As such, both passengers and personnel influence the site's water needs. In addition, the airport also provides drinking water to the hotel which opened at the airport in mid-2010. There is also the need for industrial water, e.g. in restaurants. Industrial water is also needed for heating and cooling facilities in the buildings and to supply aircraft with water.

Environmental Protection Measures

Moderate and responsible use of drinking water plays an importat part in water protection. Water-efficient taps are used in all toilets and sanitary facilities. Waterless urinals are used wherever this is hygienically acceptable. A rainwater utilisation system, constructed in 2005, delivers between 6,000 and 10,000 m³ of water every year, which replaces drinking water in

De-icing agents are stored in facilities fulfilling the highest water protection standards.

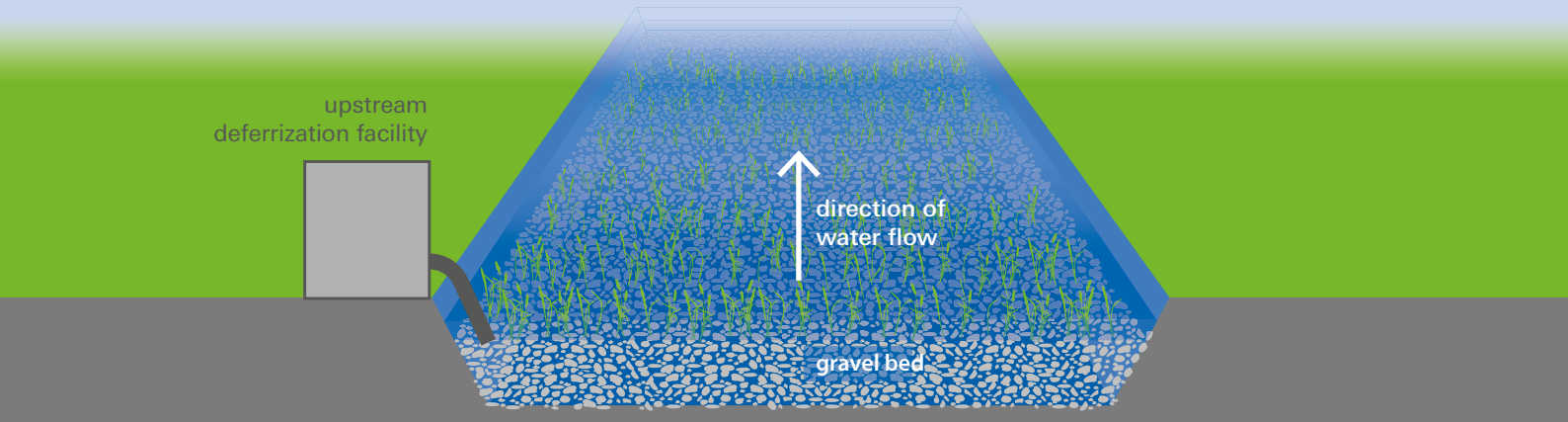
some areas. In conjunction with the modification of the Southern Passenger Pier, a further rainwater utilisation system is to be installed.

All facilities dealing with water-hazardous substances satisfy the highest safety standards and are subject to regular inspection. There is continuous operational monitoring. In the event of an accident with water-hazardous substance, specific emergency alert plans are in place to ensure that the airport fire brigade is summoned immediately. The fire brigade is also appropriately equipped for such incidents.

Operational waste water is treated before being fed into the municipal sewerage system. A total of 27 oil and fat separators ensure that waste water from restaurants and workshops along with surface water from refuelling areas, etc., is free of fat, oil, grease and fuel residue. To protect Tarpenbek, which serves as a catchment drainage for uncontaminated surface water, a total of eight rainwater purification basins have been equipped as safety separators.

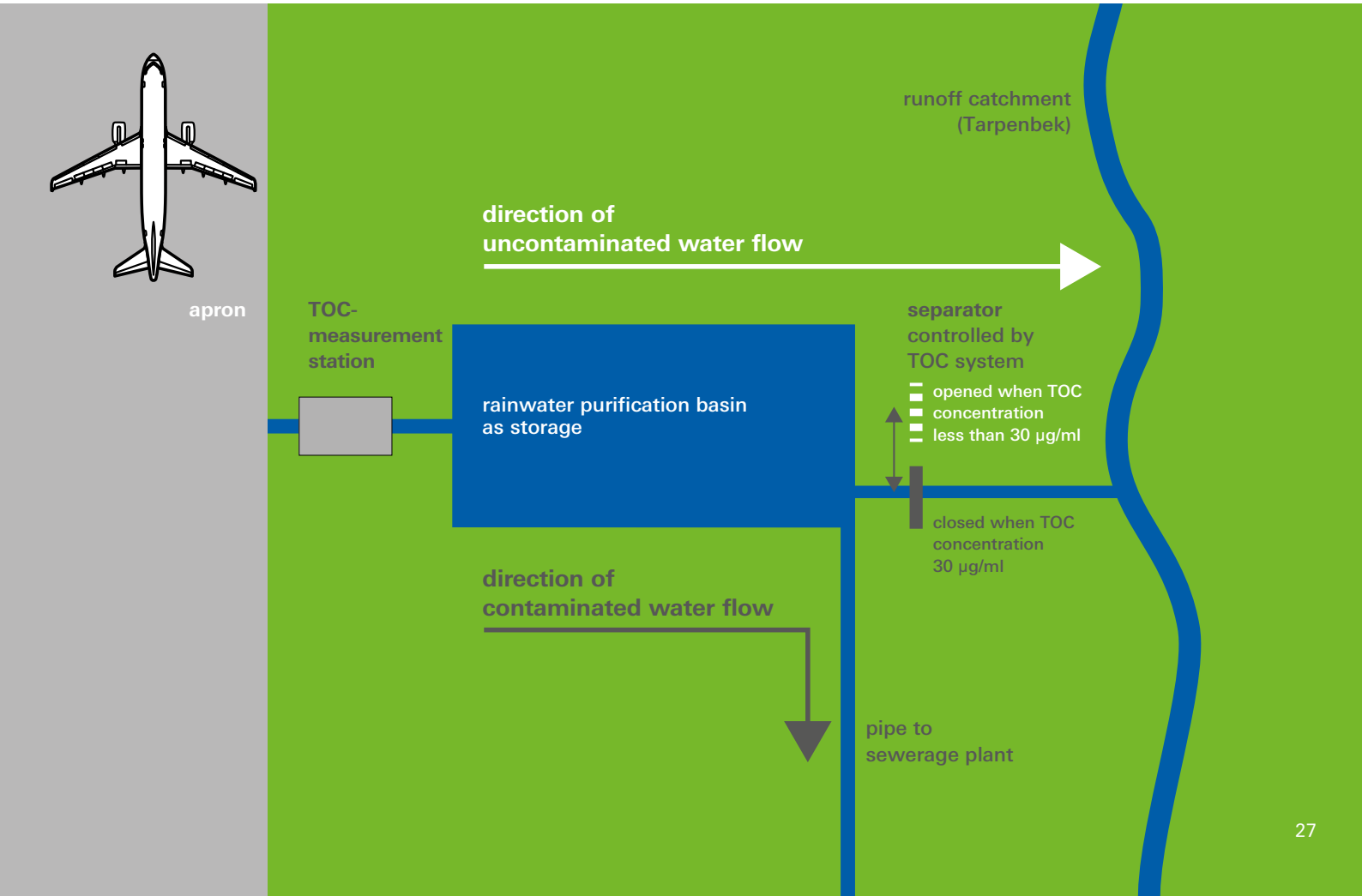
A gravel bed filter, in operation since 2018, provides an extra layer of protection against contamination. Regular automated measurements monitor the functioning of these basins. Surface water accumulating on the aprons can be contaminated in winter, particularly from the glycol-based aircraft de-icing agents. A TOC measurement station automatically determines the glycol levels in the water every 20 minutes (see diagram on page 27). As soon as measurements show a concentration above the threshold value of 30 µg/l, 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 has enabled Tarbenbek to be kept free of contamination for a long time now. A network of groundwater measurement stations can be activated as required to provide information on the status of surface and soil water.

The gravel bed filter (as illustrated in this diagram) was put in place to make surface water protection even more effective. The primary aim is to treat potential sedimentary contamination. The deferrization facility removes naturally occurring ferric oxide from near-surface groundwater at the airport.



A total of nine rainwater retention basins protect Tarbenbek from any contamination that may occur.

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



Waste Management

The operation of terminals, workshops, the vehicle fleet, restaurants, etc., along with the presence of passengers on the airport site, generates large quantities of waste. So-called commercial waste is produced in offices, shops and restaurants and also 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 food & beverage outlets and the site canteen; this waste must be disposed of appropriately. The maintenance workshops are also a source of so-called hazardous waste, including used oil, oil-contaminated supplies, slurry from oil separators and residue from marking paints. The quantity of hazardous waste to be disposed of depends above all on the necessary maintenance operations carried out at the airport. As a rule, objects confiscated from passengers at the security checkpoints must be disposed of as waste. The quantities of waste here are small but the composition can be very heterogenous.

Environmental Protection Measures

The airport's waste management goals consist of clear-cut separation of waste at the on-site interim storage; assignment of waste quantities to individual producers; increasing the recycling ration for individual types of waste; legally compliant disposal and documentation, especially of hazardous waste; and the use of products which produce low or harmless waste when disposed of. In this way, environmental pollution resulting from waste can be kept to a minimum. Employees of the airport and companies based at the airport are informed about, and trained in, the avoidance and/or reduction of waste generation. The compilation of waste statistics serves to monitor the success of measures already introduced to avoid or separate waste.

An important goal of waste management at the airport is to achieve the highest possible recycling ratio.

Waste occurring in the aircraft cabin is collected separately.

Electromagnetic Radiation

At the airport site, German Air Traffic Services operate various radar-based systems to monitor airspace. These systems are indispensable for air safety. Two radar systems (primary and secondary airspace surveillance radar), erected directly adjacent to Terminal 2 at a height of 35 meters a.s.l. have a transmission power of 1.2 MW (primary) and 2 kW (secondary). The DFS Control Tower is also equipped with a radar system with substantially lower transmission power. The tower is located on the airport site.

An additional surface radar system, consisting of several elements including a radar tower approximately 25 meters in height, has been constructed in the west of the airport site. This radar system has a transmission power of 16 kW. A total of 23 smaller transmitters are located at ground level around the airport site, each with a transmission power of 100 W.

All deployed systems fulfil the requirements of the 26th Federal Immission Protection Ordinance (BImSchV). This prescribes limits for electromagnetic radiation in the vicinity of radar facilities and other high-frequency systems. It also defines values for electromagnetic tolerance (EMT), represented as 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

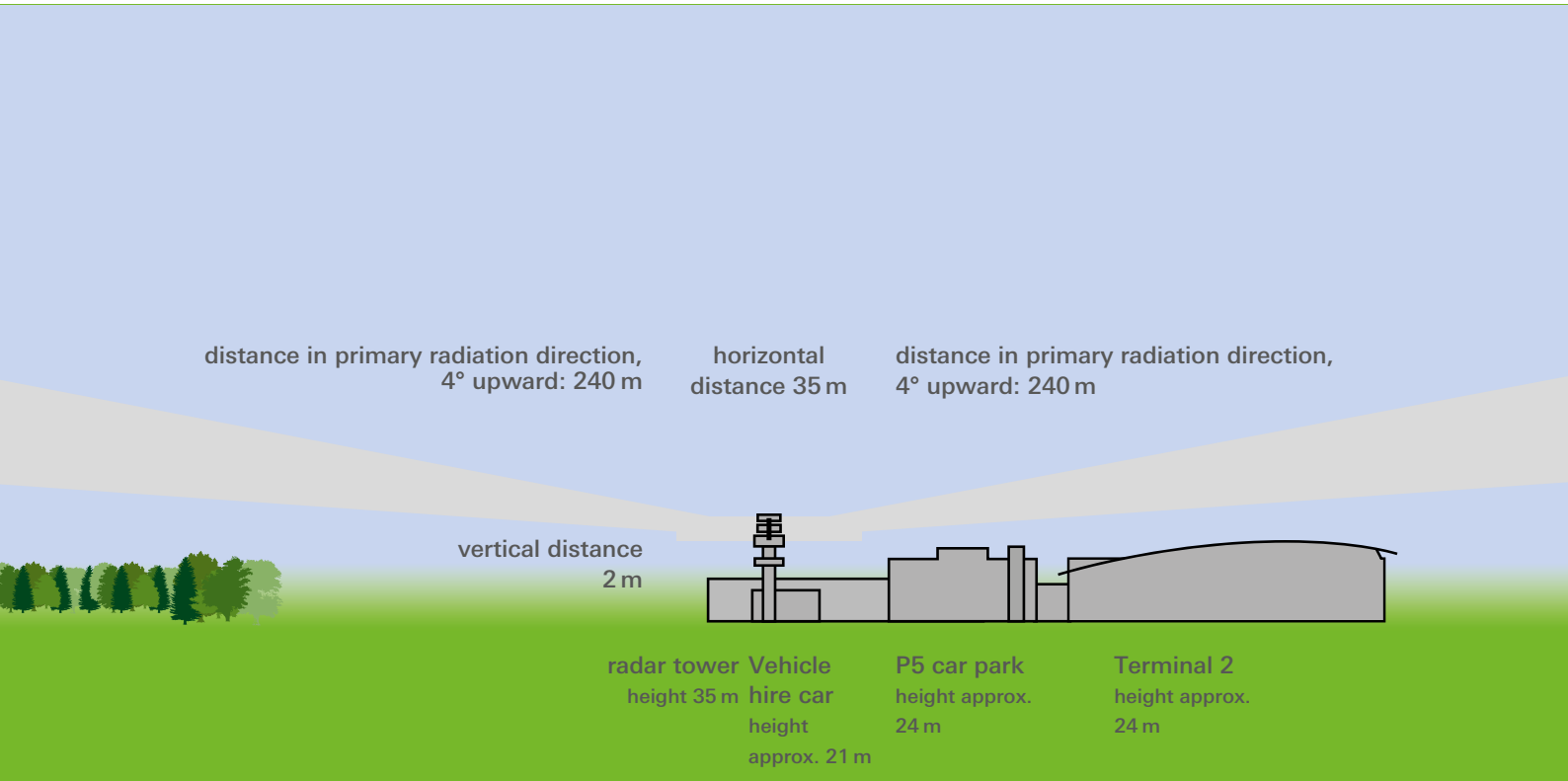
The location and height of the transmission facilities mean that the protective zones are located above surrounding buildings. Without exception, they are located on or above the airport site. As such, they do not contain any buildings or areas with ongoing human presence. The facilities thus have no 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. When the facilities first entered operation, the electrical field strength in the nearest residential households or workplaces were determined by calculation and on-site measurement. This showed that the exposure of persons was only a very small fraction of the level permitted by the 26th BImSchV (61 V/m).

Protective distance from radar (in m.)			
Radar type	**Primary direction**	**Horizontal**	**Vertical** downwards
Primary radar	240[1]	35	2
Secondary radar	13[2]	4	0
Surface radar tower	32	32	3
Surface radar sensors	1	32	1

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

The radar facilities in operation at the airport fulfil all legal criteria for protection from electromagnetic radiation.

Protective distances for primary airspace monitoring radar



Care for Open Spaces, Flora and Fauna

The airport site consists, to a great extent, of open meadow and grassland, consisting mostly of ecologically relatively valuable vegetation suited to low-nutrient and poor quality soils. This provides undisturbed, relatively unspoilt habitats for the flora and fauna of this area of Hamburg. The care of these spaces is aimed at maintaining their 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 open spaces of the airport site present an attractive environment for colonisation by various bird species. Although this is a positive aspect, the airport has to take measures to keep the bird population as low as possible in order to reduce the risk of birdstrike (collision between aircraft and birds). One such measure is the thinning out of the areas (less frequent fertilisation) to reduce the food supply. Mowing also only takes place once or twice a year, reducing the attraction for birds that prefer open, unobscured terrain. The following measures further reduce the risk of birdstrike:

- regular bird censuses, recording findings
- inspection of the airport site by vehicle, especially at times of poor visibility
- usage of blank ammunition and natural predators (trained hawks) to drive away birds

In order to keep the airspace in the immediate airport vicinity free of obstacles, in accordance with the provisions of the Air Traffic Act ("Luftverkehrsgesetz"), treetops which reach into the airspace must be pruned regularly (every few years). This also applies to trees located outside of the airport site itself. As a matter of principle, tree-pruning is carried out in agreement with the responsible authorities and the owners of the affected properties. The scrubland along the airport fence is also subject to pruning. Pruning is based on the requirements of air safety laws, whereby the land directly ad-

Undeveloped green spaces and various grassland biotopes make up more than half of the airport site.

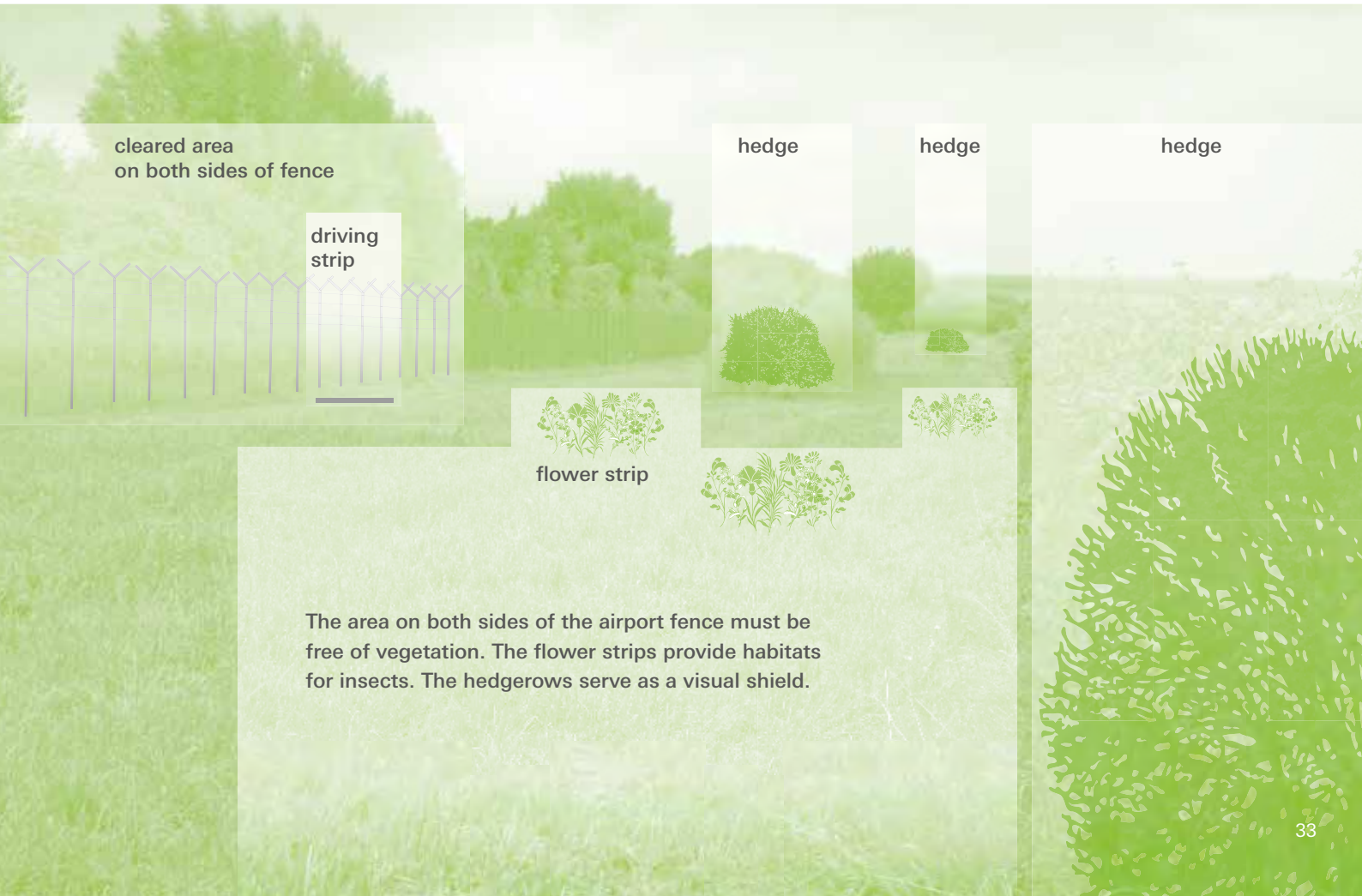
jacent to the airport fence (at a distance of 3 meters on each side) must be kept free of vegetation.

Measures Adopted

The green-space management goals relevant to environmental protection relate to the maintenance of natural function and the promotion of the economic value of grassland. Operational demands and ecological necessities are thus compatible, as thinning out of grassland to reduce bird population encourages the development of rare, and therefore ecologically valuable, grass vegetation. These spaces are important habitats for rare animal species, in particular insects. Targeted support of this development includes the regular removal of neophytes. Success is monitored through regular charting of the areas in terms of vegetation and fauna.

As compensatory areas, some of these areas benefit from particularly strict legal protection. They have been created to compensate for the sealing of green spaces elsewhere on the airport site (for construction purposes). The development of these areas is monitored by regular inspections. Additional investigations into the condition of surface water and groundwater also provide further information on the development of these biotopes. Replacement areas close to the airport are the equivalent of the compensatory areas but located outside the airport site. New trees are planted to replace those felled at the site. All of these measures are aimed at maintaining the green character of the airport aesthetic.

A bee project has been running since 1999. Every year, from April to around August, up to eight colonies of bees are situated close to the runways. A form of biomonitoring, they provide indicators as to the quality of the air, the soil and the flora. Pollen collected by the bees and honey they produce are examined for pollutants. Since 2015, FHG has been involved in a project, initiated by the German Wildlife Foundation, to boost



The area on both sides of the airport fence must be free of vegetation. The flower strips provide habitats for insects. The hedgerows serve as a visual shield.

the communal bee population, which is on the decline in Germany. Flower strips are planted on the airport grounds, serving the communal bees — including bumblebees — as a habitat and place of refuge. These areas have been planted in such a way as to create an extensive network. Two “bee hotels” have been erected on the airport premises and provide additional refuge for the insects.

Flowering plants have been planted in many areas of the airport site. Apart from the aesthetic boost, this also increases the habitat quality for insects.

Since 1999, Hamburg airport has used bee colonies as part of its monitoring system.

The airport's green spaces are left in as natural a state as possible.

Entering service in 2016, the new Air Cargo Center fulfils all current sustainability standards.

Apron 1 is being comprehensively refurbished.

The Airport's Development Projects

The airport is currently in a rebuilding process aimed at continually improving its services. In May 2016, a new cargo facility entered operation. This replaced the old cargo terminal. Two buildings are currently being built to house government authorities (Customs, Federal Police) and ground handling services. There, too, the buildings currently in use will be demolished. In all three cases, the replacement buildings deliver improved energy efficiency for airport facilities. Apron 1 is being comprehensively refurbished in several phases to conform with applicable ICAO and EASA standards. It is an aim of the refurbishment to ensure the continuing effective protection of soil and groundwater against contamination. Modern lighting and a dynamic surface guidance system will reduce the airport's energy and fuel consumption. The refurbishment work will continue until 2020.

The previous Environmental Statement contained a report on the construction project for six handling positions on the rear side of the Southern Passenger Pier. As of 2018, the old cargo terminal and buildings are being demolished for this project. The demolition was planned in such a way as to avoid detrimental environmental impact. This is being achieved by establishing alternative nesting aids for birds, investigations, clear separation of construction waste, and comprehensive green compensation concepts. The building being constructed at the rear of the Passenger Pier was designed to create the smallest possible increase in the airport's energy and water needs.

The infrastructure in the existing terminals is to be modernised in the coming years to make terminal-side passenger handling more comfortable and efficient at peak periods (holidays, etc.). In particular, the baggage conveyor system and the rear of the Southern Passenger Pier will be renewed. There are also plans to upgrade the Airport Plaza and add a central front annex. As these plans make use of already developed areas, the associated environmental impact is minimal. During the construction phase, some existing gates will be temporarily unusable. In order to ensure uninterrupted flight operations during the construction work, Hamburg Airport plans to construct a modern interim building on Apron 2. From mid 2018, so-called shuttle gates (interim structure) will be built, to operate as Walk-In-Walk-Out gates. These gates will simplify the construction work during ongoing operations.

Environmental Management ensures that all projects contribute to an improvement in the airport's environmental impact.

The two new buildings — for the authorities based at the site (top) and for ground handling services (bottom) are characterised by high levels of energy efficiency.

The Southern Passenger Pier will be remodelled in the coming years.

To ensure smooth flight operations during the upgrade to the plaza and some departure gates, temporary gates are being established on Apron 2.

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 heating system)

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) 9

Fuel Station for Light Aircraft 10

General Aviation Terminal 11
(decentralised heating system, heating oil storage)

Tower 12
(decentralised heating system, heating oil storage)

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 hire car 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

Increasing energy efficiency of, for example, the lighting of buildings and outside areas is an important goal of Hamburg Airport's Environmental Programme.

Environmental Programme 2014–2017

Many of the measures specified in the 2014 - 2017 Environmental Programme have been largely completed over the past three years or are currently in the final phase. Projects that are as yet incomplete are either long-term projects or characterised by lengthy planning phases.

Climate Protection/Energy Efficiency

Renewal of the block-type thermal power station

The BHKW was not totally rebuilt, but important components were fundamentally renewed. Furthermore, other measures have ensured that the amount of energy generated in the BHKW is significantly lower, so that the planned emissions reduction of six percent has been exceeded.

○ ○ ○

Renewal of the ground services building

The building has been newly constructed. An assessment of the associated energy consumption reductions will be carried out after approximately one year of use.

● ● ●

Deployment of vehicles with alternative power sources

An appreciable share of FHG's company car fleet now uses alternative fuels. Passenger buses and baggage tugs have largely been replaced. For larger vehicles, alternative technologies are not yet available. Introduced in October 2016, the use of CARE diesel (a synthetic diesel fuel produced from organic waste) has reduced the emissions of remaining diesel vehicles by approx. 70 percent.

● ● ○

Installation of charging stations for electrically-powered company vehicles

Charging stations for electric cars have been installed both airside and landside in recent years. This is an ongoing process and will be continued.

● ● ●

Water Protection

Installation of a rainwater utilisation system

A rainwater utilisation system is currently in planning, to be implemented in the course of the rebuilding of the rear side of the Southern Passenger Pier.

● ○ ○

Installation of a gravel bed filter for surface water

The gravel bed filter will enter service at the beginning of 2018. Planning is already complete.

● ● ○

Waste Management

Use of waste lock systems

Waste locks have not been used to date. This measure will be deferred to the new Environmental Programme.

○ ○ ○

Noise Protection

Acquisition of additional mobile heating equipment for remote parking positions:

Over recent years, no additional heating equipment has been acquired, as this would not yet have been justified by demand. This measure will be deferred to the new Environmental Programme.

○ ○ ○

Reduction of delays for evening and night landings

The provisions for this goal are in place and go beyond what was agreed in the concluded Environmental Programme. This goal, a priority, is to limit delays to an unavoidable minimum.

● ● ○

Encouraging the deployment of newer, quieter aircraft

These newer aircraft models have been in deployment since mid 2016. The number will continue to rise.

● ● ○

General Environmental Management

Inspection of the quality of surface water occurring on the site

All surface water quality measurements are carried out constantly. The findings show no contamination of the water. The measurement scope will continue.

● ● ●

Measuring the concentration of ultrafine particles

Constant measurement of the concentration of these substances will continue. Due to the current situation (lack of legal regulations and only limited scientific basis), these measurements serve only as a reference.

● ● ●

Legend

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

Environmental Programme 2017 – 2020

Waste

Construction of waste locks

As foreseen in the previous Environmental Programme, the operation of waste locks for the terminals is still planned, dependent on need and feasibility. These should allow for more effective waste separation.

Investigation into the construction of a facility for generating energy from waste

A study will be conducted to investigate the possibility of generating energy from on-site waste and at the same time improving waste separation.

Biodiversity

The project to protect and preserve communal bees will continue.

Climate / Energy

The airport's CO_2 emissions are to be reduced further in the coming years. A reduction of 1,000 t is the target, to be achieved by the following measures:

LED-based lighting for buildings and roadways

The lighting in buildings and on operational areas is being replaced over time with LED technology. This is taking place within the context of regular replacement. The lighting for the baggage conveyor system is amongst that being renewed. Each replacement reduces that installation's energy requirements and the associated CO_2 emissions by at least 50 percent.

Energy renovation of buildings / energy management:

Energy renovation of the airport's buildings is carried out as part of regular modernisation work. The long-term goal is to increase the building-related energy efficiency by 15 percent per building.

Modernisation of heating

More energy efficient and ecologically effective alternatives are being developed for the oil-based decentralised heating systems. These will be implemented as financial feasibility allows. The goal is a long-term reduction of CO_2 emissions by 25 percent for the systems under consideration.

Climate-neutral electricity purchasing

The electricity bought in by FHG comes from climate-neutral sources. The resultant CO_2 reduction of 15,000 t per year is to be maintained.

Modernisation of block-type thermal power station

An investigation is to be carried out into options for a long-term replacement for the block-type thermal power station (rebuilding, alternatives, etc.). This will take place in 2018.

Environmentally friendly technology for noise measurement container

An additional mobile noise measurement station is planned, with a fuel cell for autonomous electricity supply.

Alternative fuel vehicles

As part of the "Mobility 2020" concept, further vehicles with electric or natural gas power are to be acquired in the coming years. Half of the fleet is to consist of such vehicles by 2020.

Promoting bicycle usage amongst employees

The opportunity for employees to come to work by bike will be further improved. Free bike maintenance will be available.

Noise Protection

Noise protection programme for the north:

the current voluntary soundproofing programme will be continued.

Air Quality

Acquisition of a PM2,5 analyser for the air measurement container

The air measurement container on the airport site, operated by the Department for the Environment and Energy, is to be equipped by FHG with an additional analyser for PM2,5 concentrations in the air.

Deployment of alternative fuel vehicles to reduce emission of air pollutants:

the planned operation of electric and natural gas vehicles (see climate protection) is aimed at improving air quality.

Water / Waterway Protection

Construction of a rainwater utilisation system

The rainwater utilisation system planned in the previous Environmental Programme will, as originally planned, be implemented with the construction of the new building section. The facility is to replace approx. 3,000 m^3 of drinking water per year.

Construction of a gravel bed filter

The gravel bed filter planned in the previous Environmental Programme, to purify surface water, will be constructed at the start of 2018. It will also be equipped with a mechanism for the removal of ferric oxide.

Improvement of water quality examination options

The investigations into water quality in the rainwater retention basins, introduced approx. three years ago, will be continued permanently. A dedicated investigation site with analytical options will be established.

FHG uses alternative, climate-friendly energy sources wherever it makes sense

Hamburg Airport in Figures

Shareholders of Hamburg Airport	Holding in %
Free and Hanseatic City of Hamburg	51
AviAlliance GmbH, Essen	49

Year	2014	2015	2016
Turnover in € million	271.3	288.1	244.1
Employees*	1,841	1,864	1,908
Total passengers	14,760,371	15,610,054	16,223,918
of which:			
Transit	16,995	23,771	29,742
Domestic	5,252,115	5,284,895	5,342,075
International	9,491,261	10,301,388	10,852,101
Average passengers per aircraft movement	106.6	110	112
Total air cargo in t	53,889	52,599	65,547
of which:			
Flown air cargo	29,119	31,236	35,280
HGV cargo	24,770	21,365	30,259
Transit	0	0	8
Airmail in t	15	56	18

* Annual mean values excluding trainees/apprentices and Executive Board

Year	2014	2015	2016
Aircraft movements (total)	**154,133**	**158,684**	**160,904**
of which:			
Non-commercial	14,805	15,494	15,639
Commercial traffic	139,328	143,190	145,265
of which over Alsterdorf			
Take-offs (15)	721	1,712	2,082
Landings (33)	2,452	2,809	2,126
of which over Langenhorn			
Take-offs (05)	10,193	3,937	6,170
Landings (23)	30,677	43,891	40,052
of which over Niendorf			
Take-offs (23)	25,998	26,632	22,030
Landings (05)	15,862	10,524	14,566
of which over Ohmoor			
Take-offs (33)	38,647	45,442	48,086
Landings (15)	26,566	20,487	21,641
Usage of delay provisions			
(Scheduled and charter traffic)			
11 p.m. – midnight	571	652	774
Individual exemptions from night flying restrictions			
midnight – 6 a.m.	15	18	22

* In individual cases, the Aircraft Noise Protection Compliance Officers may grant exemptions to the night flying restrictions, especially if this is necessary to avoid significant disruption to air traffic or due to special public interest. Flights for medical emergencies and rescue operations along with sovereign service flights (military, state or federal police) are exempt from the night flying restrictions and are therefore not listed.

Year	2014	2015	2016
Noise Complaints	**3,624**	**9,340**	**86,120***
Annual noise levels (L_{eq3}) at aircraft noise measurement points			
Measurement point			
1 Hasloh	62.2 (53.6)	59.4 (54)	66.7 (54.1)
2 Norderstedt	53.5 (41.1)	57.6 (41.9)	58.3 (41.1)
3 Quickborn School	56.3 (54.5)	56.1 (53.9)	57.7 (53.9)
4 Norderstedt	55.9 (47.9)	53.6 (48.9)	56.4 (49.1)
5 Langenhorn	61.0 (59.3)	60.6 (58.9)	60.9 (59.2)
6 Fuhlsbuettel	63.3 (61.3)	64.4 (62.6)	64.6 (62.4)
7 Receiver station	58.9 (51.3)	57.7 (51.7)	61.9 (53)
8 Quickborn Heide	55.0 (45.8)	53.4 (46.5)	55.6 (46.6)
9 Stellingen	61.6 (59.7)	60.0 (58.8)	60.2 (59.3)
10 Norderstedt	59.3 (58.2)	59.8 (58.9)	60.1 (59.3)
11 Gross Borstel	56.8 (54.8)	57.2 (55.4)	56.8 (54.7)
12 Poppenbuettel	55.1 (53.3)	55.9 (54.4)	56.6 (54.1)
Energy			
Natural gas usage in MWh	**84,301**	**79,641**	**80,466**
of which:			
in BHKW	72,058	64,147	59,352
in the central heating plant	12,243	15,494	21,114
Energy production in MWh	**97,185**	**90,772**	**90,112**
of which:			
in BHKW (electricity)	21,314	19,096	17,693
in BHKW (heat)	64,852	57,732	53,416
in the central heating plant	11,019	13,944	19,003
Consumption of electrical energy in MWh (climate neutral)	**38,690.49**	**39,011.51**	**40,906.70**
Total energy consumption per traffic unit in kWh **and per employee** in MWh			
per traffic unit	8.91	8.56	8.25
per employee	73.80	73.80	73.03
Emission of CO_2 per traffic unit in kg **and per employee** in t (including CO_2 from vehicles)			
per traffic unit	1.65	1.14	1.11
per employee	13.67	9.82	9.80
CO_2 emissions from energy produced and consumed on site in t			
	21,930.98	14,884.07	15,122.45

*751 Complainants (complainants counted by Hamburg Department for the Environment and Energy since July 2016)

Year	2014	2015	2016
Usage of natural gas as vehicular fuel in kg			
Business unit			
CATS	–	–	–
STARS	102,911	118,174	149,716
GroundSTARS	278,756	349,689	380,754
SAEMS	–	181	315
AIRSYS	212	204	204
RMH	5,971	8,911	8,997
FHG	1,332	3,310	3,266
SecuServe	–	–	–
Gasoline and diesel consumption of FHG and individual holdings in t			
Business unit			
CATS	54	69	70
STARS	547	611	702
GroundSTARS	1.876	1.930	2.004
SAEMS	5	6	6
AIRSYS	9	8	7
RMH	357	363	367
FHG	395	396	396
SecuServe	33	28	17
Generation of CO_2 by operation of vehicles (gasoline, diesel and natural gas) in t			
Business unit			
CATS	54	69	70
STARS	547	611	702
GroundSTARS	1.876	1.930	2.004
SAEMS	5	6	6
AIRSYS	9	8	7
RMH	357	363	367
FHG	395	396	396
SecuServe	33	28	17
Emission of other greenhouse gases and air pollutants in t CO_2 equivalent, kg - CO2 equivalent/employee and air pollutants in kg according to EMAS III from energy generated on site			
	Total / per employee	Total / per employee	Total / per employee
CH_4	15.2 / 8.2	14.3 / 7.7	14.5 / 7.6
CH_4 Hydrofluorocarbon	– / –	– / –	– / –
Perfluorocarbon	– / –	– / –	– / –
SF_6	– / –	– / –	– / –
SO_2	151.74 / 82.4	143.35 / 76.9	144.84 / 75.9
NO_x	18,208.8 / 9.9	17,202.2 / 9.2	17,380.5 / 9.1
PM10	60.70 / 33.0	57.34 / 30.8	57.94 / 30.4

* Including heating oil for ground power units (GPU)

Year	2014	2015	2016
Energy consumption of holdings and subsidiaries in kWh			
Business unit			
SecuServe	31,196.56	28,845.11	27,111.04
AIRSYS	611,258.01	602,654.41	612,242.76
CATS	13,401.06	23,902.72	24,525.07
RMH	469,995.36	451,721.37	552,923.79
SAEMS	147,323.52	127,205.64	158,451.12
STARS	71,292.98	127,536.15	102,627.39
GroundSTARS	211,993.71	363,411.51	330,611.05
HAM GH			249,220.61*
Immission (long-term mean) in µg/m³			
Eastern airport premises			
Particulate dust	21	19	17
Nitrogen dioxide	22	21	23
Nitrogen monoxide	8	8	10
Drinking water consumption			
Total consumption in m³	201,387	240,065	216,129
per passenger in l	14.64	14.85	13.20
per employee in m³	130	128	110
Resource consumption			
Lubricant oils in l	n/a	n/a	1,575
Lubricant grease in kg	n/a	n/a	1,484
Commercial waste in t			
Total	3,220	3,174	3,153
of which:			
Sheeting, DSD	19	13	14
Mixed paper	459	436	402
Waste wood	85	52	68
Non-recyclable waste	2,657	2,673	2,670
Hazardous waste (selection of most important materials)			
Waste oil (in l)	24,016	28,878	24,634
Oil filters/oil-contaminated materials in m³	9.21	7.30	7.05
Fluorescent tubes	6,675	10,045	4,875
Paint shop waste in kg	775	1,061	909
Fat separator contents in m³	374	211	394
Dry batteries in t	n/a	n/a	2.4

*Consumption figures for CATS, STARS and GroundSTARS for the year 2016 include only the period 01 Jan. to 19 July. After this, HAM GH was established, and consumption for the rest of the year was assigned there.

Year	2014	2015	2016
Development of waste quantity per passenger in g **and per employee** in t			
per passenger	280	172	165
per employee	1.44	1.43	1.40
Paved area in ha			
Area	196	196	196

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 GAT	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

Facilities dealing with water-hazardous substances(AwSV substances)*			
Identifier/ Site	Type of Facility	substance	Capacity
Central kerosene storage of fuel services	Storage and and filling	Kerosene	4,150 m^3 (2 tank complexes)
Fuel station for light aircraft Apron 2	Storage and filling	Aviation gasoline	50 m^3
FHG site fuel station	Storage and filling	Diesel/Gasoline	230 m^3 (5 individual tanks)
Car hire center fuel station	Storage and filling	Diesel/Gasoline	100 m^3 (3 individual ltanks)
De-icing storage STARS	Storage and filling	Aircraft de-icing agents	10 x 30 m^3 1 x 20 m^3
Emergency power supply	Storage	Diesel	30 m^3
Heating facility General Aviation Terminal.	Storage	Heating oil	50 m^3
Heating facility Weather station	Storage	Heating oil	6 m^3
Heating facility Tower	Storage	Heating oil	30 m^3
De-icing storage RMH	Storage and filling	Surface de-icing agents, solid and liquid	30 m^3
Waste oil tank SAEMS	Storage tank	Waste oil from vehicle repairs	5 m^3
FHG main storage	Containerised storage	Various products	approx. 1 m^3

*AwSV: 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).

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 Units)
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.

AwSW Ordinance
New federally applicable ordinance on Installations for the Handling of Substances Hazardous to Water. Replaces VAwS, which was separately implemented in each state.

Gasoline separator (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.

Benzene
Hydrocarbon compound with an aromatic ring system. Benzene (C_6H_6) is 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.

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.

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.

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.

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").

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.

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

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.

Commercial waste
Commercial waste are similar in nature and consistency to waste generated in private households.

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.

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.

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.

Leq_3
See Continuous noise level.

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.

PM 10
Specialist term for airborne particles 10 µm or less in size.

PM 2,5
Specialist term for airborne particles 2.5 µm or less in size.

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

Pushback
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 at a position with a jetbridge. This procedure is known as "pushback".

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 protection areas. Amongst issues covered by these guidelines are the criteria for constructing separator systems.

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

Soot

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

Sulphur dioxide (SO2)

Colourless, foul-smelling, cough-inducing gas. Reacts with water to form an acid which can be harmful to plants and buildings.

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.

Take-off power

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

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.

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 company´s 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.

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.

Effectiveness level

See Energy efficiency level

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), in conjunction with amending Commission Regulation (EU) No. 2017/1505, 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 in conjunction with the amending Commission Regulation (EU) No. 2017/1505.
- 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 in conjunction with the amending Commission Regulation (EU) No. 2017/1505. This statement must not form the sole basis of communications with the general public.

Hamburg, 01/11/2017

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Credits

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