Europäisches Patentamt
European Patent Office
Office européen des brevets

Environmental Report 2016

In accordance with Regulation (EC) No 1221/2009

Environmental Report

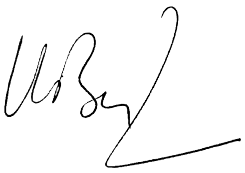
Foreword

Since 2009 the EPO has been implementing a comprehensive environmental policy that not only raises the importance of environmental protection, but also acts as a comprehensive framework for evaluation and action. The EPO has large office premises in Munich and The Hague, other offices in Vienna, Berlin and Brussels and nearly 7 000 staff; the mitigation measures we take help us to minimise our operations' impact on the environment.

This is now the 9th year in which we have published an Environmental Report, and its publication is regarded as an integral aspect of being a transparent and accountable organisation. To keep our environmental policy up to date with the latest standards, the 2016 report has been updated to reflect the most recent guidelines from EMAS, which stipulate a broader involvement of stakeholders within the Office.

This year's Environmental Report therefore also includes a chapter on indirect environmental aspects, which details how EPO services are supporting climate change mitigation technologies (CCMTs). In addition to providing legally robust patents for environmental technologies, the EPO has developed a specific patent classification scheme for CCMTs and makes patent documents, which contain information on sustainable technologies, available over the internet free of charge.

As with any effective report, this latest document does not just evaluate our past actions, but also looks to the future with a set of possible further measures. An extensive programme of actions for 2017/18 will build further on the initiatives taken this year and enable us to continue to make progress in meeting clearly defined objectives. As an organisation that supports innovation through the granting of robust patents, the EPO itself has to continue to innovate in its approach to environmental management. Investigating novel methods for limiting our waste, installing new building technologies and even encouraging biodiversity are all potentially set to play a role. By implementing this policy effectively and achieving our objectives, the EPO is continuing with its mission to provide the highest-quality patents while also building an environmentally sound future.



Benoît Battistelli,
President of the European Patent Office

1. Environmental policy

In 2009, the President approved the EPO's Environmental Policy. Our environmental policy provides a strategic framework for all activities at the EPO and emphasises the importance of environmental protection at the Office. The policy is binding upon all departments. Senior managers are committed to ensuring that this policy is well understood and applied in all departments.

Our environmental policy is formulated as follows:
The European Patent Office consumes energy for heating and electrical power, as well as large volumes of water and paper, and generates both waste and CO2 emissions. It has addressed these environmental issues by introducing an environmental management system that meets the requirements of the eco-management and audit scheme EMAS.

With a view to improving its environmental performance, the EPO continuously assesses the environmental impact of its operations. It sets objectives and targets and reviews them on a regular basis.

The following principles and objectives govern the EPO's actions:
- Promote responsible environmental awareness within the EPO and communicate and implement this policy at all levels of the Office
- Minimise the consumption of energy, water, paper and other resources
- Minimise waste and environmental pollution
- Comply with relevant environmental legislation, administrative regulations and other requirements
- Provide suitable resources to fulfil the Office's environmental policy obligations
- Promote local environment protection initiatives and schemes and encourage active involvement in them
- Communicate this policy to stakeholders

Since the EPO considers it the responsibility of every staff member to help meet the objective of achieving optimum environmental protection, it provides its staff with appropriate training, advice and information and encourages them to develop new ideas on how to implement the Office's environmental policy effectively.

In 2015 the President approved a supplementary document on environmental policy, enshrining this policy in the budget planning cycle and ensuring the involvement of senior management. The key elements of this new structure are:
- a framework for all environmental activities
- the integration of EMAS projects into the normal yearly budget cycle
- the clear commitment of the EPO's senior management to environmental topics
- an enlarged Environmental Report, part of which is the EMAS Environmental Statement
- the appointment of additional environmental representatives for all relevant EPO units.

2. The European Patent Office

The European Patent Office (EPO) with nearly 7 000 staff is the second-largest international organisation in Europe. It has its headquarters in Munich and offices in The Hague, Berlin, Vienna and Brussels. Since 2009 it has been certified as complying with the eco-management and audit scheme EMAS at all its sites apart from Brussels (due to its small size).

Total energy consumption in 2011: 108 million kWh

Total energy consumption in 2016: 76 million kWh

Saving: **29%**

The EPO's EMAS-certified sites are:

- European Patent Office Munich I (Isar building), Germany
  Bob-van-Benthem-Platz 1, 80469 Munich
- European Patent Office Munich II (PschorrHöfe 1–8), Germany
  Bayerstr. 34, 80335 Munich
- European Patent Office Berlin, Germany
  Gitschiner Str. 103, 10969 Berlin
- European Patent Office The Hague I (Main, Shell and Hinge), Netherlands
  Patentlaan 2, 2288 EE Rijswijk
- European Patent Office The Hague II (Le Croisé), Netherlands
  Verrijn Stuartlaan 2a, 2288 EL Rijswijk
- European Patent Office The Hague III (Rijsvoort), Netherlands
  Visseringlaan 19–23, 2288 ER Rijswijk
- European Patent Office Vienna, Austria
  Rennweg 12, 1030 Vienna

Another EMAS-certified site in Munich (European Patent Office Munich III (Capitellum), Germany, Landsberger Str. 30, 80339 Munich) was rented by the EPO until 31 March 2015, when it was vacated and the staff working there moved to other sites. This Environmental Report continues to show the consumption data for the Capitellum up to and including 2015, to ensure the consumption figures' comparability.

In accordance with EMAS Regulation (EC) No 1221/2009, the EPO issues an (updated) Environmental Report every year, setting out its environmental data and reporting on its progress in environmental performance. The present report is an updated version and can be downloaded from the EPO website (www.epo.org).

EMAS has helped the EPO to reduce its energy consumption by about 32 000 MWh since 2011, despite a slight increase in staff numbers. A number of campaigns by the central environmental team and the voluntary environmental group have increased awareness of EMAS and environmentally friendly behaviour.

2.1 EPO Munich

Munich is the largest of all the duty stations in terms of gross floor area and staff numbers. The condition of the buildings varies, some of them being relatively old, such as the Isar building (opened in 1980), others more recent, including PschorrHöfe 7 (2005) and 8 (2008). The Isar building was extensively renovated between 2010 and 2012 to improve its energy rating. The Isar building and the PschorrHöfe have district heating. Other facilities with environmental relevance are primarily situated in the Isar building. They include a repair shop and carpenter's workshop, a water treatment installation and tanks for acid and lye solutions for water treatment.

The Isar building and PschorrHöfe 1-8 have an oil and/or grease trap and a kitchen/canteen and dish-washing area. All the Munich buildings have (small) storage areas for cleaning agents and chemicals. There is no information to suggest any land contamination at the Munich sites. Hazardous waste consists mainly of spent batteries and fluorescent tubes.

Most relevant areas of environmental law	Relevant facilities/activities
Pollution regulations governing small and medium-sized heating systems	Heating system (natural gas)
Water regulations	Storage of diesel, acids and lyes, operation of oil traps, cooling and waste water discharge into sewage system
Regulations on climate protection and refrigerants	Cooling installations with at least 5 kg global warming potential (GWP)
Building energy efficiency regulations	Energy certification, building insulation, energy-efficient technologies
Health & safety, hazardous materials regulations	Risk assessment, fire prevention, requirements for use of hazardous substances (e.g. acids, lyes)
Pollution regulations governing sawdust	Carpenter's workshop
Waste regulations	Recycling/separation/disposal of various types of waste

Electricity consumption in 2011: 22 130 MWh

Electricity consumption in 2016: 19 720 MWh

Saving:
11%

Heat consumption in 2011: 21 640 MWh

Heat consumption in 2016: 18 570 MWh

Saving:
14%

Site/building	Gross floor area	Gross floor area without basement	Workplaces	Status
Isar building	91 400 m²	57 800 m²	806	Proprietor
PschorrHöfe 1-8	276 300 m²	210 600 m²	3 305	Proprietor

Figure 1

EPO Munich, Isar building

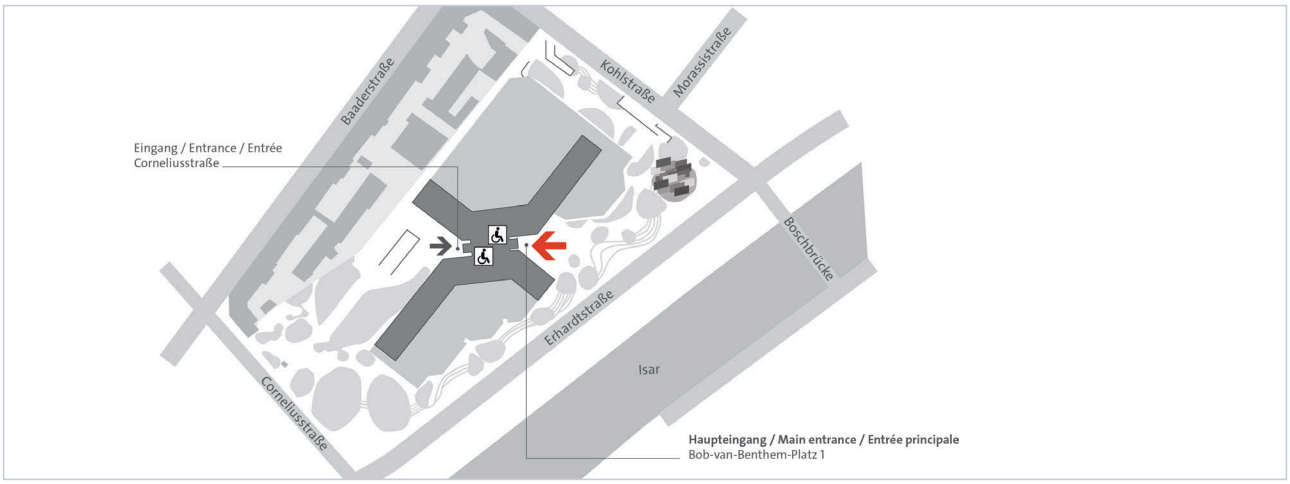
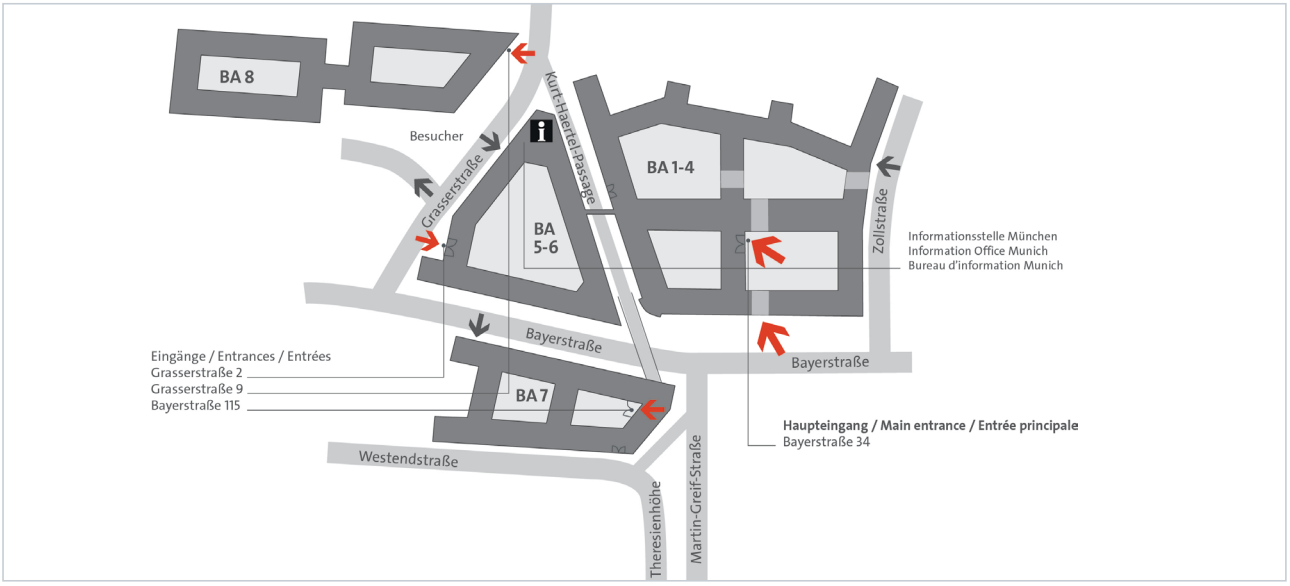
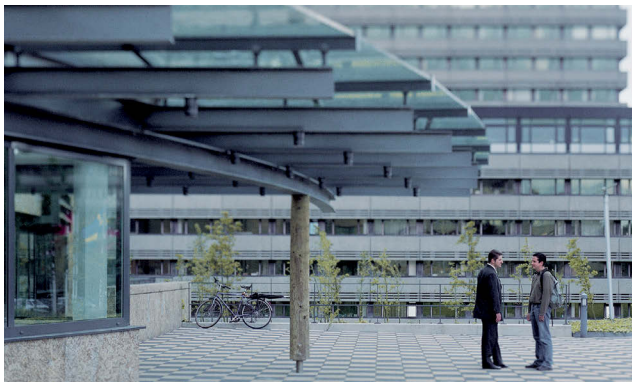


Figure 2

EPO Munich, PschorrHöfe





2.2 EPO The Hague

After Munich, The Hague is the second-largest duty station, comprising three building complexes in Rijswijk, one (by far the largest) owned by the EPO and two rented. On the largest of those sites, two new buildings – the New Main and the New Hinge – are currently being built; after their handover, which is planned for 2018, all buildings in The Hague will be EPO-owned, and the two rented buildings will be relinquished. Owing to the current buildings' size and condition, some of them consume a large amount of heat energy. All buildings are heated by natural gas. The gas-powered heating boilers are regularly inspected and comply with emissions thresholds. There are also regular leak tests on the air-conditioning units, which to date have detected no major leaks. All testing is performed by an external service provider in accordance with Dutch law.

Electricity consumption in 2011: 21 400 MWh

Electricity consumption in 2016: 17 140 MWh

Saving: **20%**

In the Shell building there are diesel fuel tanks which feed the emergency generators. Outside the building there is an underground storage area for diesel fuel (three tanks with a capacity of 5 000 litres each and one with a capacity of 4 000 litres). These likewise feed the emergency generators in the Shell building in the event of power outages. The three kitchens have grease traps and a dish-washing area. In various places there is storage for further hazardous substances. These include 400 litres of cleaning agents and approximately 400 litres of glycol for the ventilation system (Shell building). All substances are stored in accordance with legal requirements, for example using double-walled tanks or drip collectors.
The necessary information such as safety information sheets and operating instructions is available. There is no information to suggest any land contamination at the sites in The Hague. Hazardous waste consists of spent batteries, old fluorescent tubes and waste oil. Hazardous waste disposal includes recording, removing and then certifying the absence of asbestos in accordance with Dutch legislation. Under Dutch law the duty station is subject to an "activity decree", a simplified environmental permit.

Water consumption in 2011: 48 280 m^3

Water consumption in 2016: 42 830 m^3

Saving: **11%**

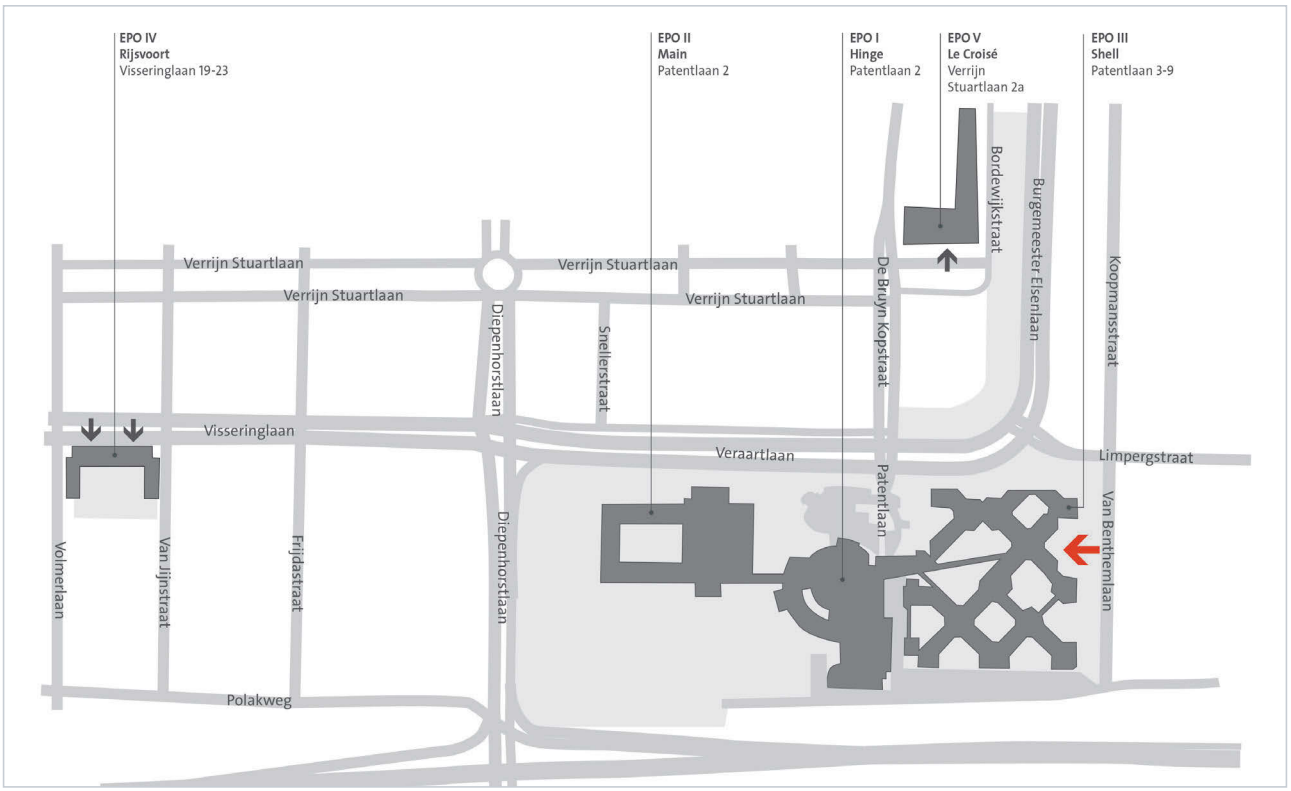
Since 2013 construction work has been in progress on the "New Main" building in The Hague, due to replace the present main building by 2018. In several respects "New Main" is being constructed on sustainable principles, e.g. minimisation of environmental impact in the construction phase, greatly reduced energy consumption once in use, optimum and particularly user-friendly air-conditioning. The EPO has voluntarily decided to comply with the certification criteria of multiple standards for sustainable buildings (Bouwbesluit 2012, BREEAM, BNB) and to aim for an energy efficiency rating 20% above the requirements in the 2012 Dutch building regulations. 15% of the energy required for building operation is likely to be generated on-site, e.g. from groundwater heat and solar power. The installation of cooled ceilings will increase basic energy needs.

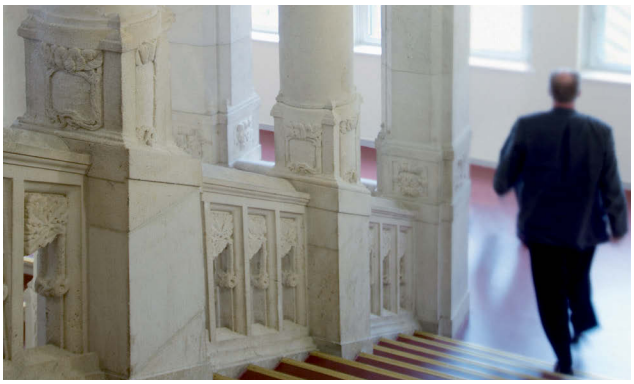
Most relevant areas of environmental law	Relevant facilities/activities
Rules on general environmental management	Environmental permit, annual environmental report to the municipality of Rijswijk
Pollution regulations governing combustion units of type B	Heating system
Water regulations	Water discharge into sewage system
Hazardous materials regulations	Handling/storage/transport of hazardous substances, e.g. glycol, asbestos; transmission of hazardous waste (potential); grease traps
Regulations on underground storage of hazardous substances	Underground storage area for diesel fuel
Regulations on climate protection and refrigerants	Cooling installations with at least 5 kg GWP
Waste regulations	Recycling/separation/disposal of various type of waste
Building regulations	Building activities: criteria for renovation/alteration and new buildings
Health & safety	Appropriate risk assessment, fire prevention, restrictions on certain chemical agents

Site/building	Gross floor area	Gross floor area without basement	Workplaces	Status
Main, Shell, Hinge	192 605 m²	176 421 m²	2 454	Proprietor
Le Croisé	28 700 m²	24 893 m²	424	Rented
Rijsvoort	12 600 m²	9 763 m²	188	Rented

Figure 3

EPO The Hague





2.3 EPO Berlin

The Berlin sub-office is housed in a building that was constructed in the early 20th century and thus has a historic structure; the age of the building also entails certain deficiencies in its insulation and energy efficiency. The proprietor regularly undertakes structural improvements, some of them extensive, with a view to enhancing the building's energy efficiency.
Major renovation work on the building is likely to start in mid-2017, including measures intended to enhance energy efficiency (e.g. in lighting systems). The cost of this work will primarily be borne by the proprietor, the Bundesanstalt für Immobilienaufgaben, with the EPO contributing to individual aspects. Much of the work will be devoted to energy-saving items such as cooled ceilings, thermal insulation and lighting control/modification. The work is likely to continue until 2021.

Facilities with environmental relevance include a gas-powered heating system, several cooling installations, a small storage area for cleaning agents, an X-ray machine in the post room and a kitchen/canteen operated by an external service provider. Responsibility for operating the building's heating systems and the canteen's refrigeration units lies with the proprietor; responsibility for operating the air-conditioning systems in individual meeting rooms lies with the EPO. According to the proprietor there is no land contamination at the Berlin site. The only forms of hazardous waste are spent batteries and fluorescent tubes.

Electricity consumption in 2011: 572 MWh

Electricity consumption in 2016: 436 MWh

Saving:
24%

Residual waste in 2011: 35 t

Residual waste in 2016: 26 t

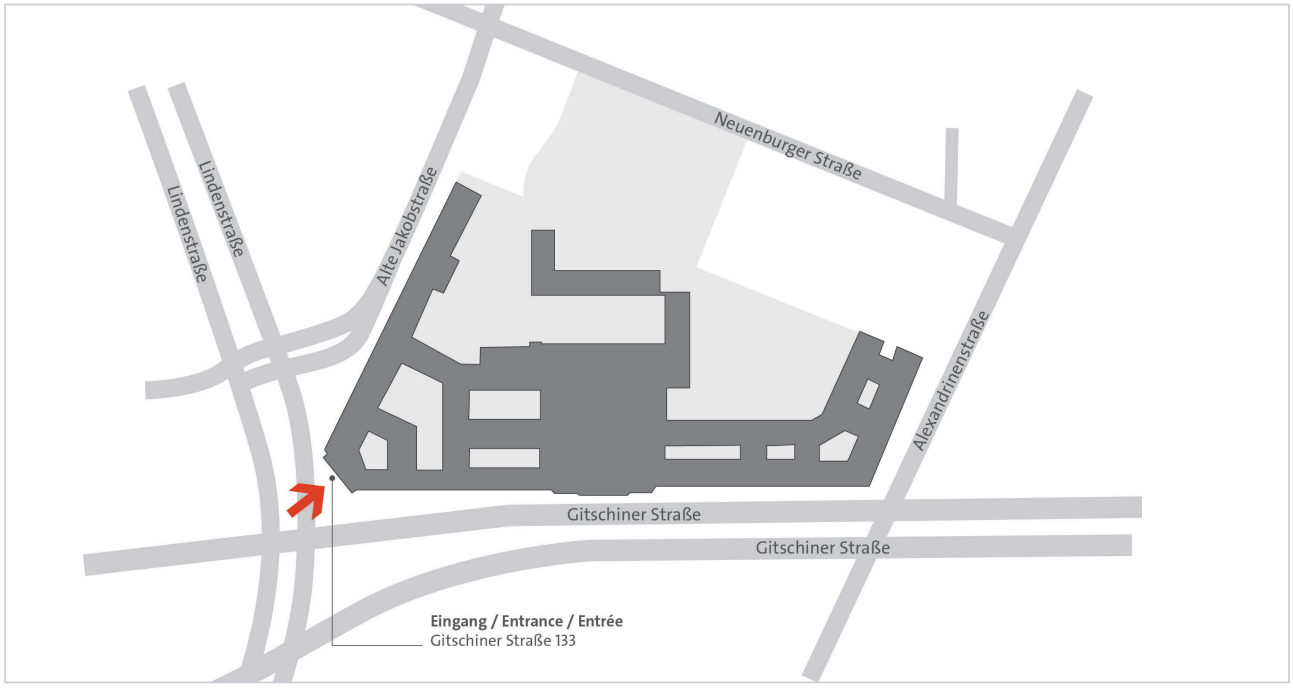
Saving:
26%

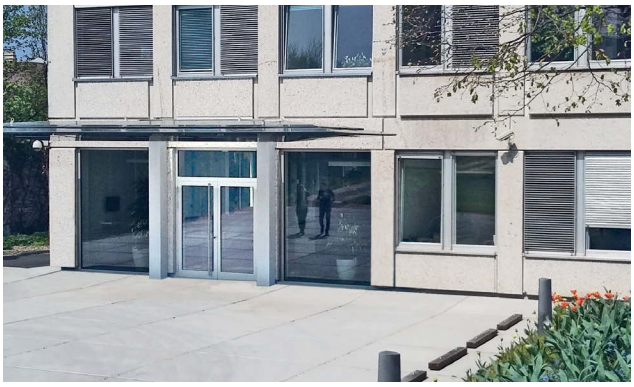
Most relevant areas of environmental law	Relevant facilities/activities
Water regulations	Water discharge into sewage system
Waste regulations	Recycling/separation/disposal of various types of waste
Building energy efficiency regulations	Building insulation, energy-efficient technologies
Health & safety, hazardous materials regulations	Risk assessment, fire prevention, restrictions on certain chemical agents

Site/building	Gross floor area	Gross floor area without basement	Workplaces	Status
EPO Berlin	18 100 m²	17 600 m²	278	Rented

Figure 4

EPO Berlin





2.4 EPO Vienna

Vienna is the smallest of all the sites, in terms of both gross floor area and staff numbers. The Vienna office uses district heating. Facilities with environmental relevance are limited to a small store for cleaning agents. There is no information to suggest any land contamination at the Vienna site. The only forms of hazardous waste are spent batteries and fluorescent tubes.

Electricity consumption in 2011: 766 MWh

Electricity consumption in 2016: 606 MWh

Saving: **21%**

Most relevant areas of environmental law	Relevant facilities/activities
Water regulations	Water discharge into sewage system
Waste regulations	Recycling/separation/disposal of various types of waste
Building energy efficiency regulations	Energy certification, building insulation, energy-efficient technologies

Site/building	Gross floor area	Gross floor area without basement	Workplaces	Status
EPO Vienna	12 300 m²	6 979 m²	104	Proprietor

Figure 5

EPO Vienna

3. Environmental management system

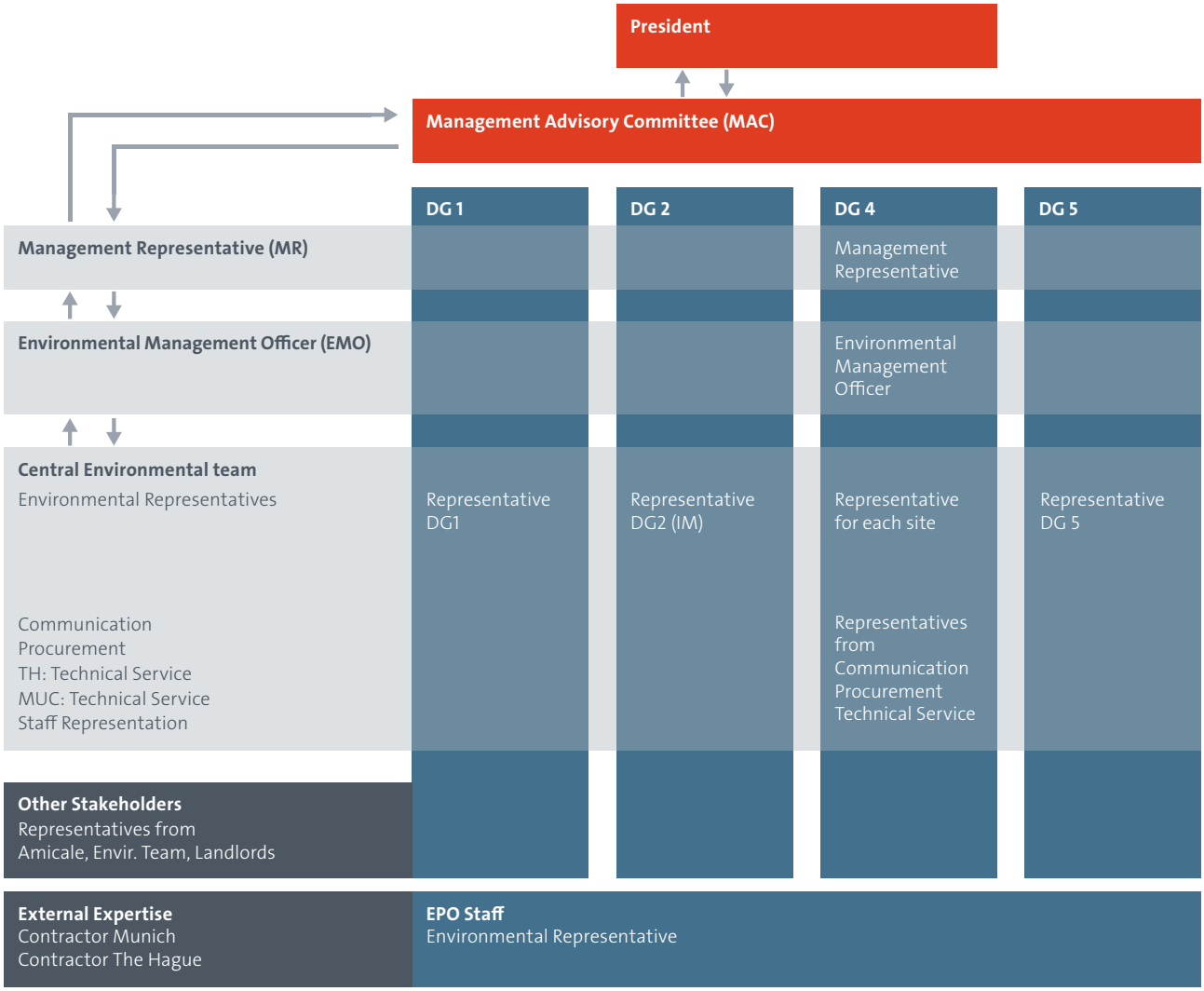
The 2009 environmental policy implemented an environmental management system under EMAS and the EPO took on a leading environmental role as an administrative institution. The management system integrates environmental aspects into all the Office's operational processes. All the EPO's processes are regularly assessed with a view to potential improvements to environmental protection. All employees are regularly addressed and encouraged through recommendations and information to adopt environmentally friendly behaviour.
The structure of the environmental management system is defined in our environmental management handbook, which applies to all sites.

Environmental management is organised and co-ordinated centrally by the Environmental Management Officer located in Munich. In addition, there are site-specific procedures and documents for each location. These include environmental data and the environmental programme with suggestions for improvements at each site. The central Environmental Management Officer is in charge of implementing and further developing the environmental management system within the EPO. In addition, there are local environmental representatives from Directorate-General (DG) 4 at each site. They are in charge of planning, co-ordinating and monitoring local environmental activities and ensuring that environmental aspects are integrated into everyday operations at the sites. DGs 1, 2 (IM) and 5 also each have an environmental representative, who is in charge of integrating environmental aspects into the DG's specialist processes and environment-related activities. Appointing a representative from each DG that falls under the environmental management system strengthens the organisation-wide implementation of EMAS.

The Environmental Management Officer and environmental representatives, together with representatives from Procurement, Communication and Technical Services, form the EPO's central environmental team, which meets at least twice a year. A voluntary environmental group initiated by staff in Munich and The Hague supports the team's work and adds its own proposals to the environmental programme. The Office's environmental management system is also regularly assessed in internal audits, thus ensuring a continuous improvement process. All relevant information is communicated to our staff members through the intranet, regular articles in the staff gazette, etc., and is made available to the public in this Environmental Statement.

Figure 6

EMAS organisational structure



4. Compliance with legal requirements

EMAS and the applicable environmental law for the different duty stations constitute external requirements to be met by the EPO and its environmental management system. We have identified the legal requirements which are relevant and obligatory for each duty station. They are documented in the legal register for each country in which the EPO is situated. By continuously reviewing and updating the legal register, we identify changes to environmental laws and implement new requirements. Moreover, all periodic obligations at the different sites (e.g. periodic inspection of diesel tanks) are documented in local registers of periodic duties. Compliance with legal requirements is verified in yearly internal audits. These have not identified any violations of the legal requirements.

5. Direct environmental aspects[1]

Our activities have an environmental impact. In accordance with our environmental policy we aspire to reduce this impact by applying our environmental management system and continually improving our environmental performance. All significant environmental aspects are recorded and assessed on an annual basis. This evaluation serves as a basis for developing new environmental objectives and measures for further improvement.
Environmental aspects are subdivided into direct and indirect aspects. The indirect aspects are described in section 6. The main direct environmental aspects at the EPO include

- energy consumption for electricity and heating,
- CO_2 emissions from heating energy consumption and business travel,
- water and paper consumption, and
- residual waste generation.

The environmental data has been compared across all sites in order to assess the relevance of the environmental aspects. The electricity and heating energy data has also been compared with external benchmarks.

Not all these aspects apply at all sites. In Vienna and Berlin, for example, the nature of the meter infrastructure means that the recording of electricity consumption is not as detailed as in Munich and The Hague. In these cases that aspect is either assessed at a higher level (e.g. “Overall aspect/Resource consumption/Electricity”) or not assessed at all (e.g. “Resource consumption/Cooling water/Water for other systems”).

The environmental aspects have been assigned to the following categories to help assess their relevance and the need for action:

A = very significant environmental aspect with above-average need for action
B = significant environmental aspect with average need for action
C = less significant environmental aspect with low need for action

In addition, the extent to which the various aspects can be controlled is classified in the following categories:
I = short-term control possible
II = mid- to long-term control possible
III = control not possible or only in long term or subject to third-party decisions

All direct environmental aspects under the EMAS III Regulation have been assessed for relevance to the EPO. Only the aspects that were found to be relevant are included below.

[1] The EMAS core indicators have moved to Annex.

Table

Direct environmental aspects

		Berlin	MUC Isar	MUC PH 1-8	TH Hinge	TH Shell	TH Main	TH Le Croisé	TH Rijsvoort	Vienna
Resource consumption Electricity	Overall aspect Resource consumption Electricity	A II	A II	A II	A II	A II	A II	A II	A II	A II
	Computer centre	-	A II	A II	-	A III	-	-	-	A II
	Garages	-	A I	A I	A I	A I	-	-	-	A I
	HVAC	-	A II	A II	A II	A I	A II	-	-	A II
	Canteen	-	A III	A III	A III	-	-	-	-	-
	Cooling/cold water	-	A II	A II	A II	A II	-	-	-	A II
	Humidification	-	B II	B II	A I	A I	-	-	-	-
Emissions from electricity generation		C II	C II	C II	C I	C I	C I	C III	C III	C I
Resource consumption Heating energy	Overall aspect Resource consumption Heating energy	A II	-	-	-	-	-	B II	B II	B II
	Building heating	-	A I	A II	A II	A II	A II	-	-	-
	Hot water	-	B III	B II	A II	B II	-	-	-	-
	Humidification	-	B II	-	B III	A II	-	-	-	-
Emissions from district heating		B III	B III	B III	-	-	-	-	-	B III
Emissions from gas		-	-	-	A III	A III	A III	A III	A III	-
Emissions from business travel by air		A II	A II	A II	A II	A II	A II	A II	A II	A II
Emissions from other business travel		C II	C II	C II	C II	C II	C II	C II	C II	C II
Resource consumption Water for sanitary facilities/canteen		B II	B II	A II	A II	A II	A II	B II	B II	B II
Resource consumption Cooling water/Water for other systems		-	B II	B II	B II	B II	-	-	-	-
Hazardous substances in waste water		B II	B II	B II	B II	B II	B II	B II	B II	B II
Waste – non-hazardous		B II	B II	B II	C II	C II	C II	C II	B II	B II
Waste – hazardous		C III	B II	B II	B II	B II	B II	C II	C II	C II
Resource consumption - paper		B II	A II	A II	A II	A II	A II	A II	A II	B II
Risk of environmental accidents		C II	B II	B II	B II	B II	B II	B II	C II	C II

Some aspects have a different rating from the last report to reflect changes in 2016. For Vienna, influence over energy consumption has been downgraded from A I to A II: the limited available budget means little can be done to reduce it. For the underground garages in Munich and The Hague, a similar downgrade from A I to A II has occurred, because of energy-consumption reductions already achieved by fitting LEDs and cutting lighting run-times. In The Hague, heating energy consumption rose because of the ongoing building work, but very little can be done to reduce it because large amounts of heat are being lost through the temporary building-site walls. In Munich, a timer program malfunction last year increased heating energy consumption in the Isar building, but the introduction of Meteoviva in PschorrHöfe Phase 7 has improved the Office's control over its heating energy consumption.

5.1 Overview of all sites

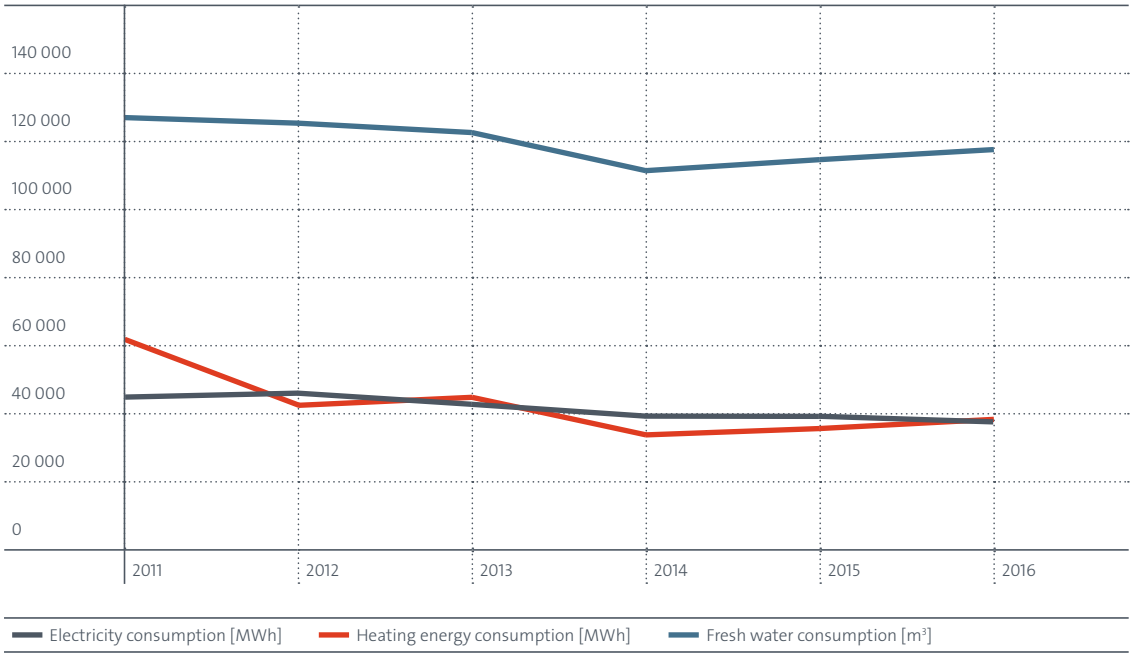
The consumption data for each site and the resultant index figures are an important instrument for assessing current environmental performance, planning and monitoring environmental activities and regularly reviewing the continuous improvement process.

The following table summarises the chief environmental data for all buildings.

Input	Unit	2011	2012	2013	2014	2015	2016
Electricity consumption	MWh	45 893.39	46 196.88	42 958.73	39 491.47	39 225.88	37 902.22
Heating energy consumption (all factors)	MWh	62 112.16	41 561.62	44 985.77	33 973.13	35 739.12	38 141.38
Fresh water consumption	m^3	127 091	125 203	122 555*	111 515	114 806	112 400

Figure 7

Input (all buildings)

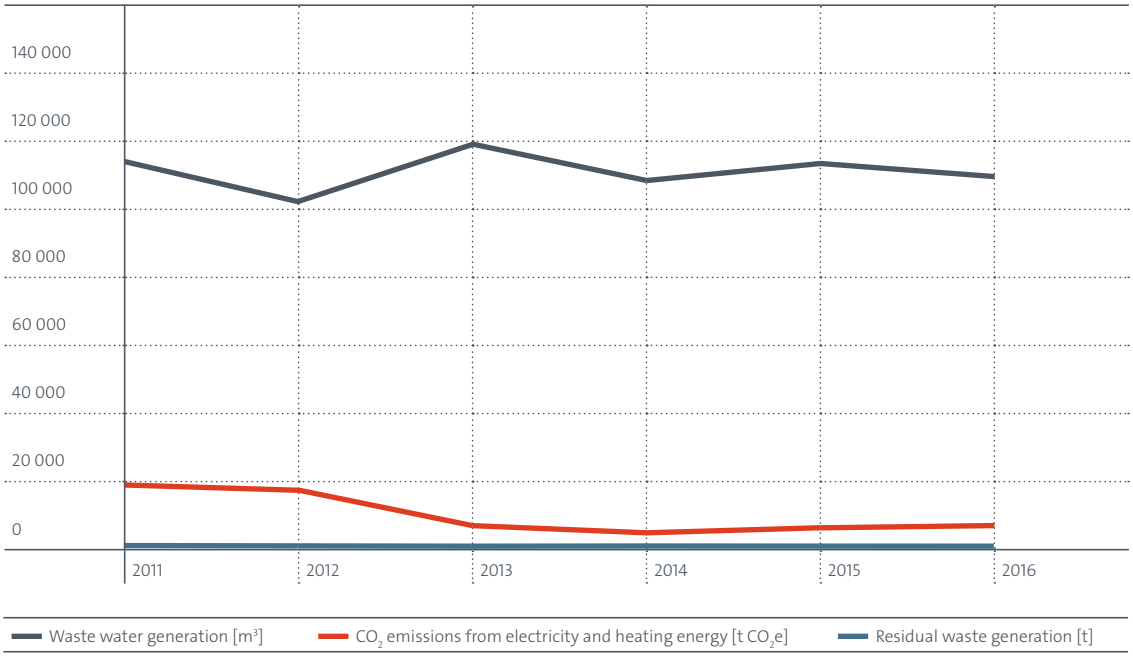


Output	Unit	2011	2012	2013	2014	2015	2016
Residual waste generation	t	565	474	509	560	415	429
Waste water generation	m^3	114 284	101 554	119 472*	108 537	103 470	98 248
CO_2 emissions from electricity and heating energy	t CO_2e	19 674	17 618	7 792	5 800	6 613	6 922

* Consumption data for TH Rijsvoort not supplied by proprietor.

Figure 8

Output



5.2 Energy

Energy consumption in the form of electricity and heating is the most significant environmental aspect at the EPO and generates the highest costs. Electricity consumption is essentially made up of:
– cooling/ventilation and air-conditioning
– IT
– PCs and printers
– lighting in offices and public areas.

Heating energy at the different sites is generated from various sources. While Munich Isar, Munich PschorrHöfe and Vienna use district heating, Berlin, Munich Capitellum and all the buildings in The Hague use natural gas.

The tables and charts below offer a comparison of the total electricity and heating energy consumption at each site. They show both the absolute figures and index figures relative to the size of the sites (shown as consumption per square metre of heated area and per employee).

In The Hague, Munich and Vienna, the energy monitoring and control system provides valuable information on load points (installations, production areas, etc.) where there might be energy saving potential. This information can be used to optimise installations such as HVAC systems, thereby helping to reduce electricity consumption.

In 2016, absolute electricity consumption fell in Berlin (-0.5%), The Hague (-1.5%), the Isar and PschorrHöfe buildings in Munich (-4.6% and -1.2% respectively) and Vienna (-7.4%). There had been a 7% increase in electricity consumption in Vienna from 2014 to 2015, which was attributable to the alteration work in the foyer; the decrease by 7.4% again was therefore mainly due to the work's completion. In Munich, the fall was partly due to the cooler weather in 2016 compared with 2015, which led to less demand for ventilation. In addition, electricity-saving improvements were made (e.g. daylight-dependent lighting control in offices and adaption of ventilation to needs in PschorrHöfe 4).

The EPO's heating energy demand rose by 6.7% overall in 2016 (Berlin +3.99%, Munich +9.85%, The Hague +5.4%, Vienna +6.02%). Weather-adjusted[2] figures show a 3.76% rise (Berlin -0.54%, Munich +5.52%, The Hague +5.39%, Vienna -1.47%). The rise in The Hague is primarily due to the alteration and partial demolition of the existing buildings as part of construction work on the new buildings, which led to cold bridges, particularly in the canteen area.

In Munich, the rise is primarily due to the 19.66% increase in demand (weather-adjusted figure: 14.90%) in the Isar building. In the PschorrHöfe, demand rose by 3.25% in 2016, but the weather-adjusted figure was a 0.81% fall. Consumption rose in the Isar building because of a malfunction in the building management system timer program.

In terms of heating energy too, the energy monitoring and control system supplies valuable information on load points where there might be saving potential, allowing optimisation action to be taken in the heat/heating energy field as well.

[2] Weather adjustment of consumption figures allows controlling for the influence of the weather. Weather-adjusted figures show what would have been consumed if the weather had conformed to normal or the longtime average. The influence of e.g. particularly cold winter and hot summer months can thus be extracted.

Climate optimisation in PschorrHöfe 7: MeteoViva

In PschorrHöfe 7 in Munich, the EPO is optimising the heating control, which could cut heat consumption by up to 22% and cooling demand and electricity consumption by 18%.
The method – MeteoViva Climate – uses a server-based model to predict the building's HVAC requirements two to three days in advance based on weather data. It generates savings because there is a delay between changes in the outside temperature and in a building's heating needs, which is caused by factors such as the storage effect of walls, ceilings and furniture. Heating that is controlled only based on the current outside temperature also fails to account for heat gains from solar radiation or heat loss due to the wind.
MeteoViva takes all these factors into account when calculating the HVAC requirements, and so can bring about timely climate control.
However, how much the savings in PschorrHöfe 7 will actually be will only become apparent in 2018, once the system has been in use for a whole year.

Figure 9

Absolute electricity consumption (MWh per year)

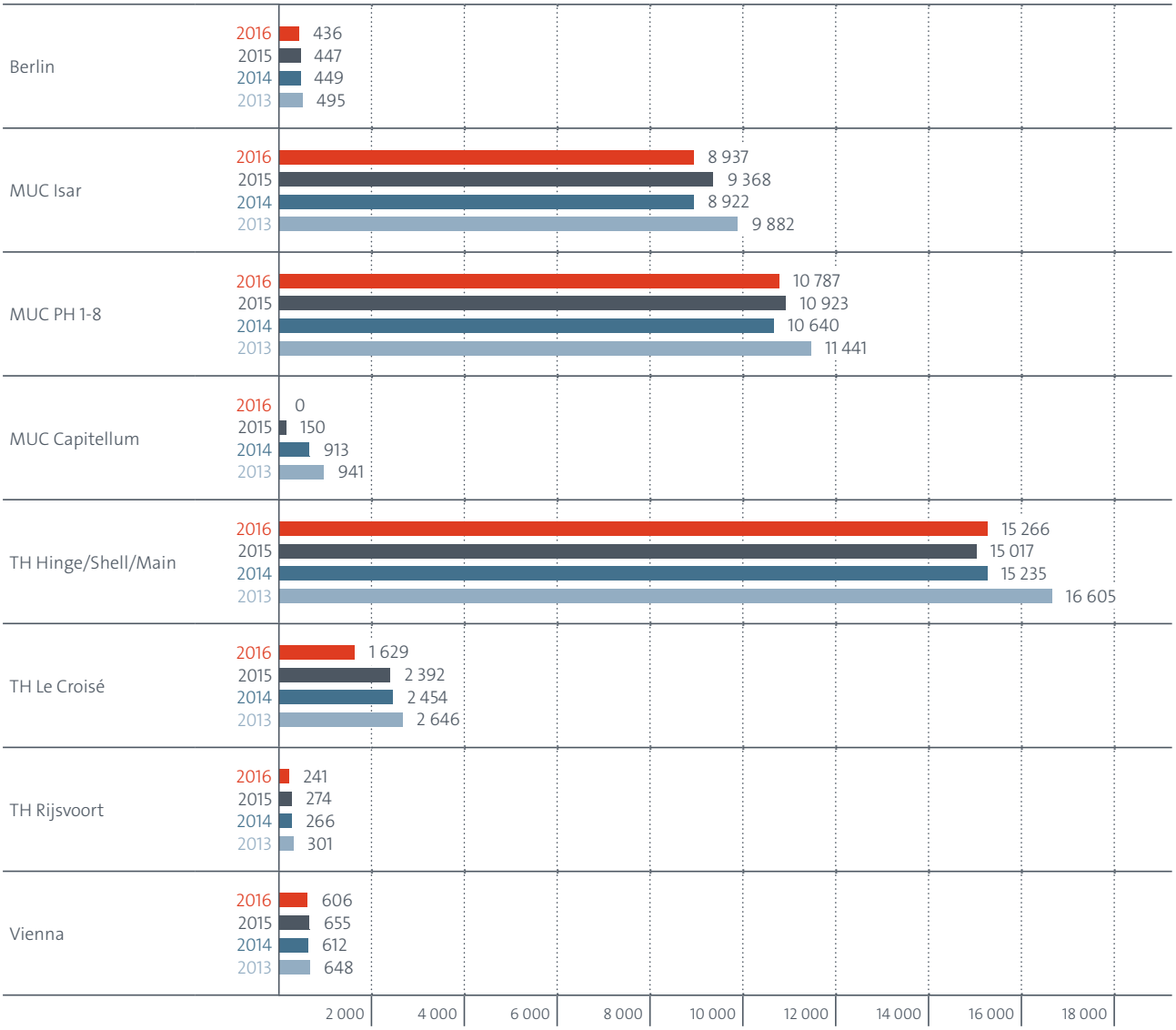


Figure 10

Specific electricity consumption (kWh per m² floor area)[3]

[3] The 2014 and 2015 figures may differ from those previously published on account of a better data basis for calculating the square-metre floor area.

Figure 11

Absolute heat energy consumption (MWh per year)

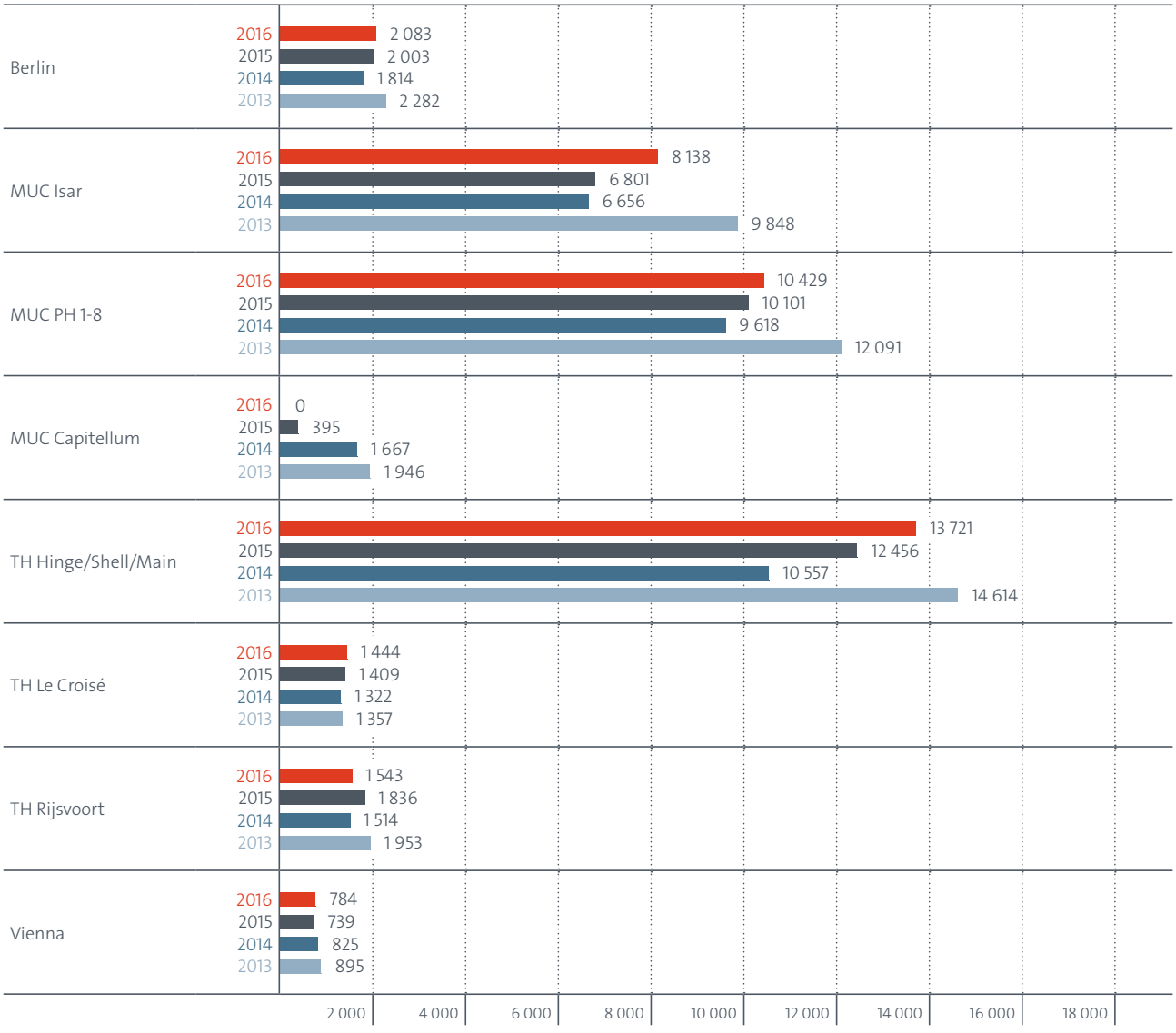


Figure 12

Weather-adjusted heat energy consumption (MWh per year)

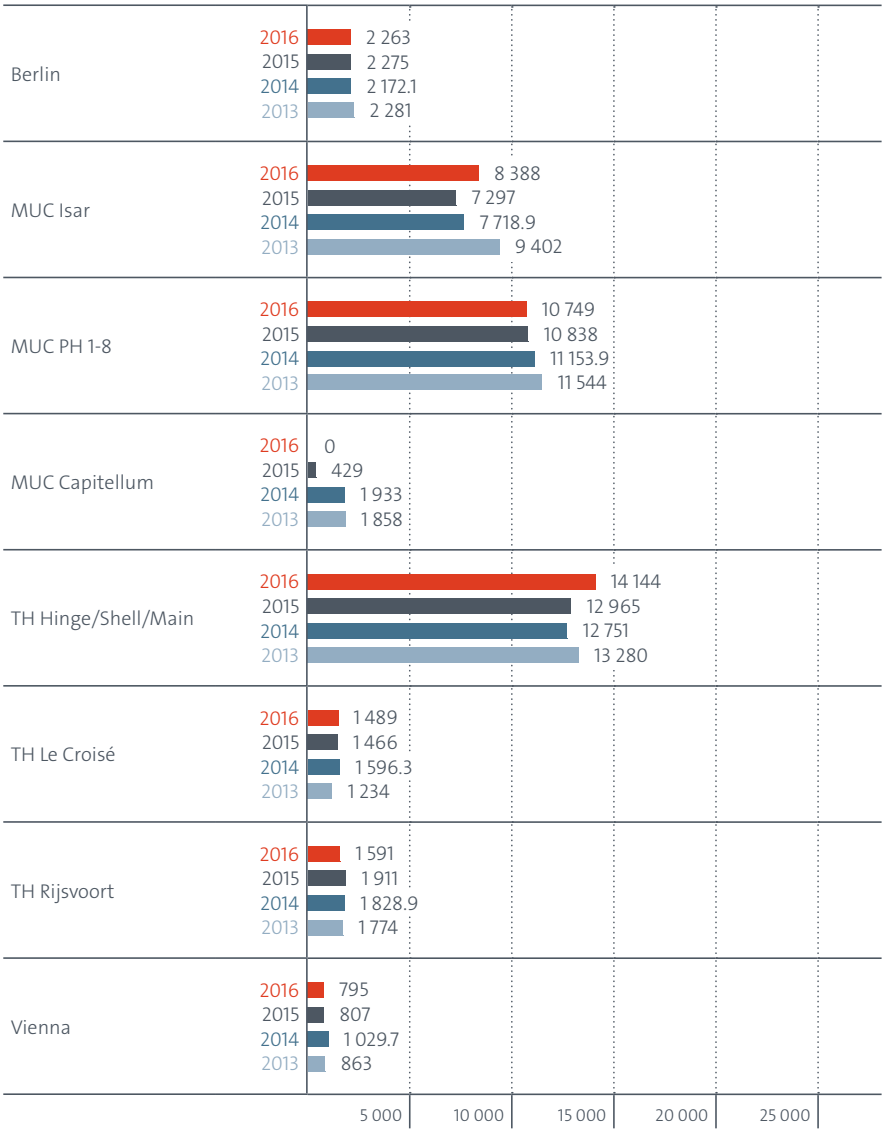
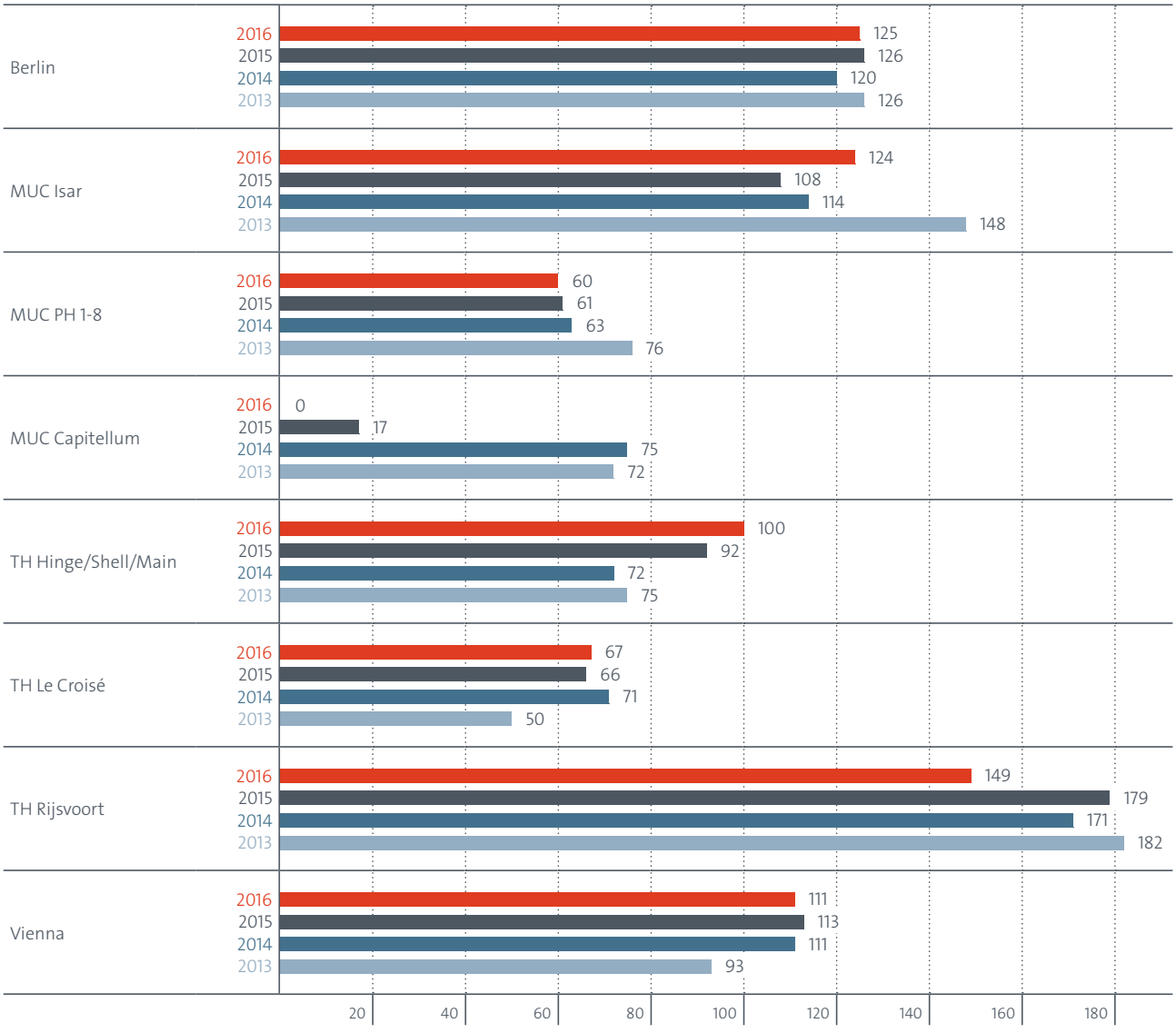


Figure 13

Specific weather-adjusted heat energy consumption (kWh per m² floor area)[4]



[4] The 2014 and 2015 figures may differ from those previously published on account of a better data basis for calculating the square-metre floor area.

5.3 Water/waste water

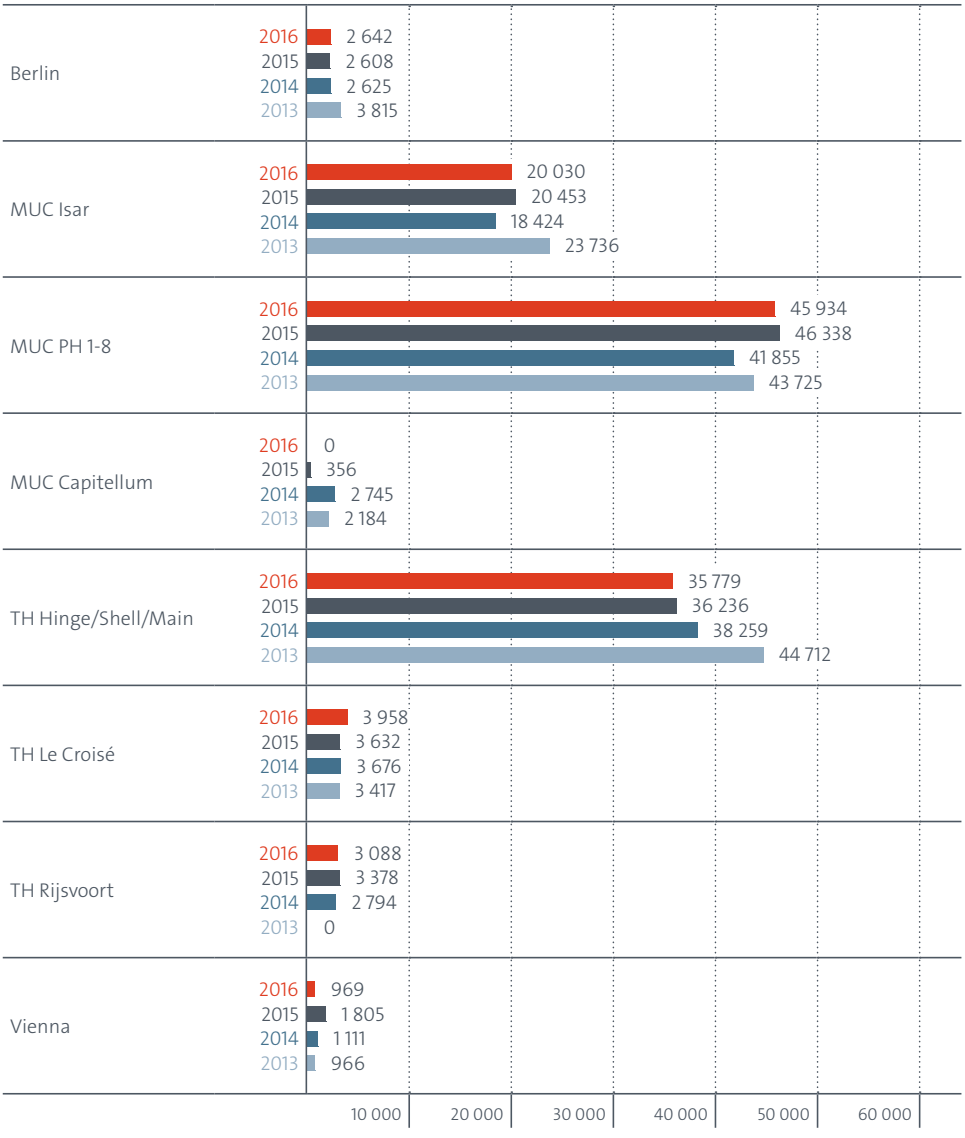
At all sites we receive our fresh water from the municipal provider. Most of it is deployed in sanitary facilities and kitchens and (in individual cases) for washing vehicles. Moreover, at the Isar and PschorrHöfe buildings in Munich and the Main, Shell and Hinge buildings in The Hague, fresh water is used for the air-conditioning system and for watering plants and green spaces on-site. That explains the high water consumption there compared with other sites.
Waste water contamination consists mainly of organic substances. Where needed, oil and grease traps are installed in specific locations to remove contaminants from waste water.

The EPO's water consumption in 2016 was 2.1% lower than the year before. At the individual sites there were differing trends. At some, water consumption fell (MUC Isar -2.1%, MUC PschorrHöfe 1-6 -3.8%, MUC PschorrHöfe 7 -12.8%,TH Hinge/Shell/Main -1.3%, TH Rijsvoort -8.6%, Vienna -46.3%), while at others it rose (Berlin +1.3%, MUC PschorrHöfe 8 +17.11%, TH Le Croisé +9.0%). The main reason for the increase in Munich PschorrHöfe 8 was a technical fault with the water treatment installation, which has since been fixed.

There was a sharp fall in Vienna because the gardens were watered less; in 2016, watering was more needs-based than in preceding years.

Figure 14

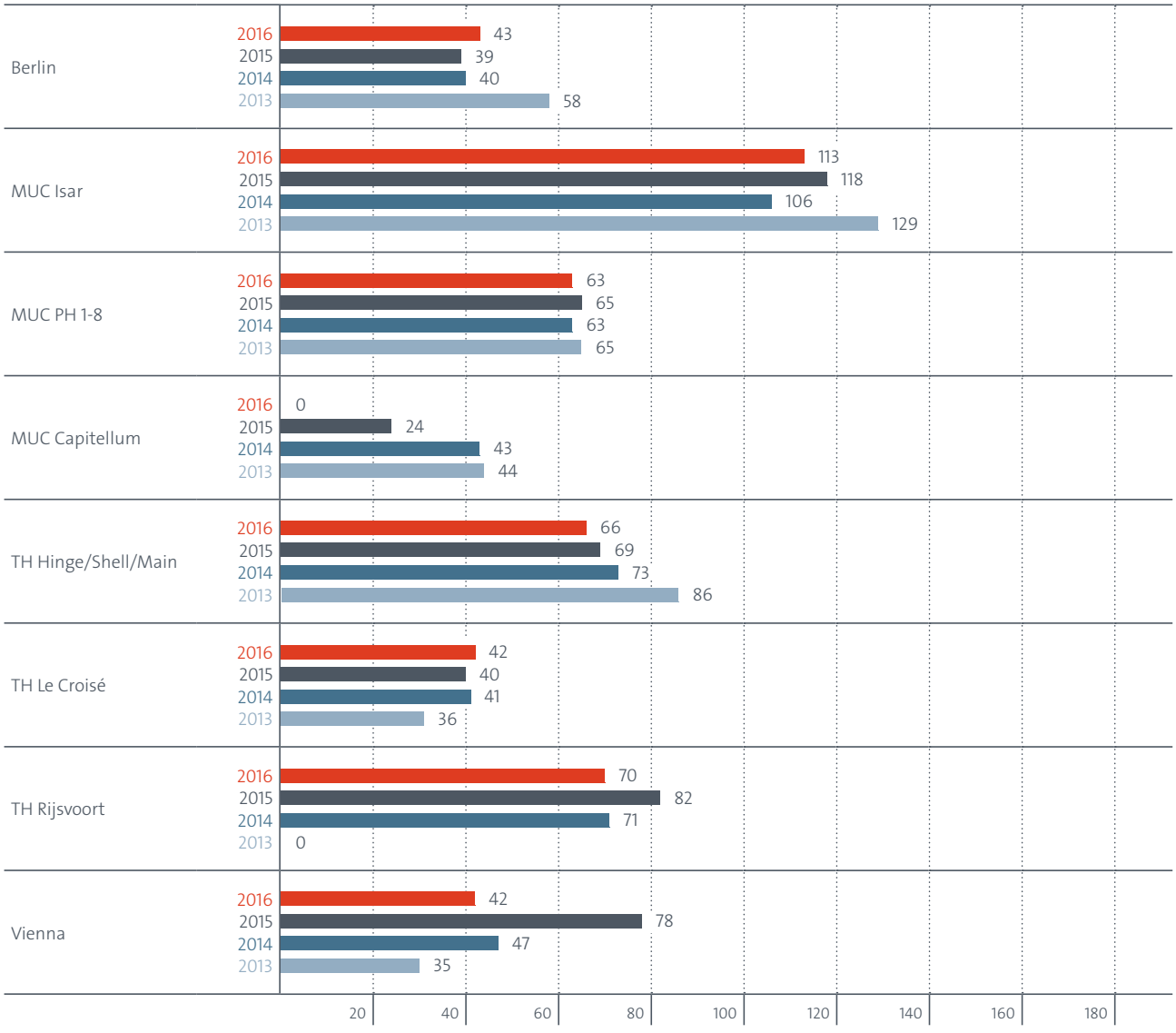
Fresh water consumption (m³ per year)



TH Rijsvoort 2013: No figures received from proprietor.
MUC Capitellum 2015: Sharp fall attributable to vacation of building on 31 March 2015.

Figure 15

Fresh water consumption per employee and day (l/employee/day)



TH Rijsvoort 2013: No figures received from proprietor.
MUC Capitellum 2015: Sharp fall attributable to vacation of building on 31 March 2015.

5.4 Waste

To guarantee that waste is collected and disposed of separately, we have established a waste separation system with clearly identifiable and distinguishable waste containers in all rooms and work areas at all our sites. Our staff are briefed on waste avoidance, recycling and correct disposal. From day to day, residual waste and waste paper constitute the main categories of waste at all sites.

In 2016 the quantity of residual waste was 3.4% higher than the previous year, particularly due to an increase in The Hague (+11.1%), where shutting down several archives enabled the Office to dispose of large amounts of paper and other waste.

In Munich, residual waste decreased only slightly (-1.0%), although waste bin and compactor emptying was optimised. The amount of waste paper increased considerably compared with 2015 (+25.7%) because large amounts of data were destroyed in PschorrHöfe 8 and the Isar building.

In Berlin residual waste fell by 3.7%. The proprietor of the Berlin site does not record values in terms of weight, only in terms of the number of waste collections. Hence the weight figures always have to be extrapolated from the annual cost of waste disposal. In terms of the number of waste collections, the quantity of residual waste fell 3.7% year-on-year.

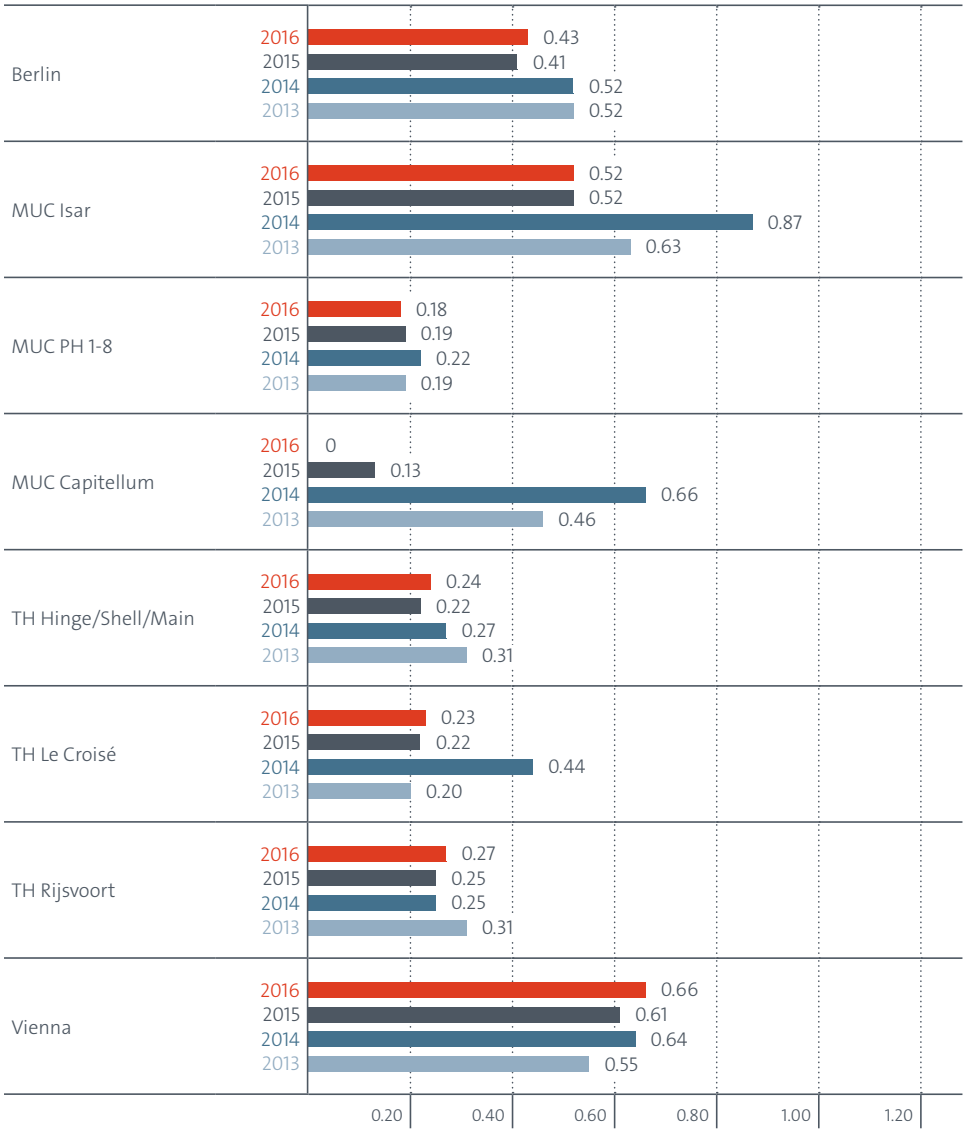
Figure 16

Total residual waste generation (t per year)

MUC Capitellum 2015: Sharp fall attributable to vacation of building on 31 March 2015.

Figure 17

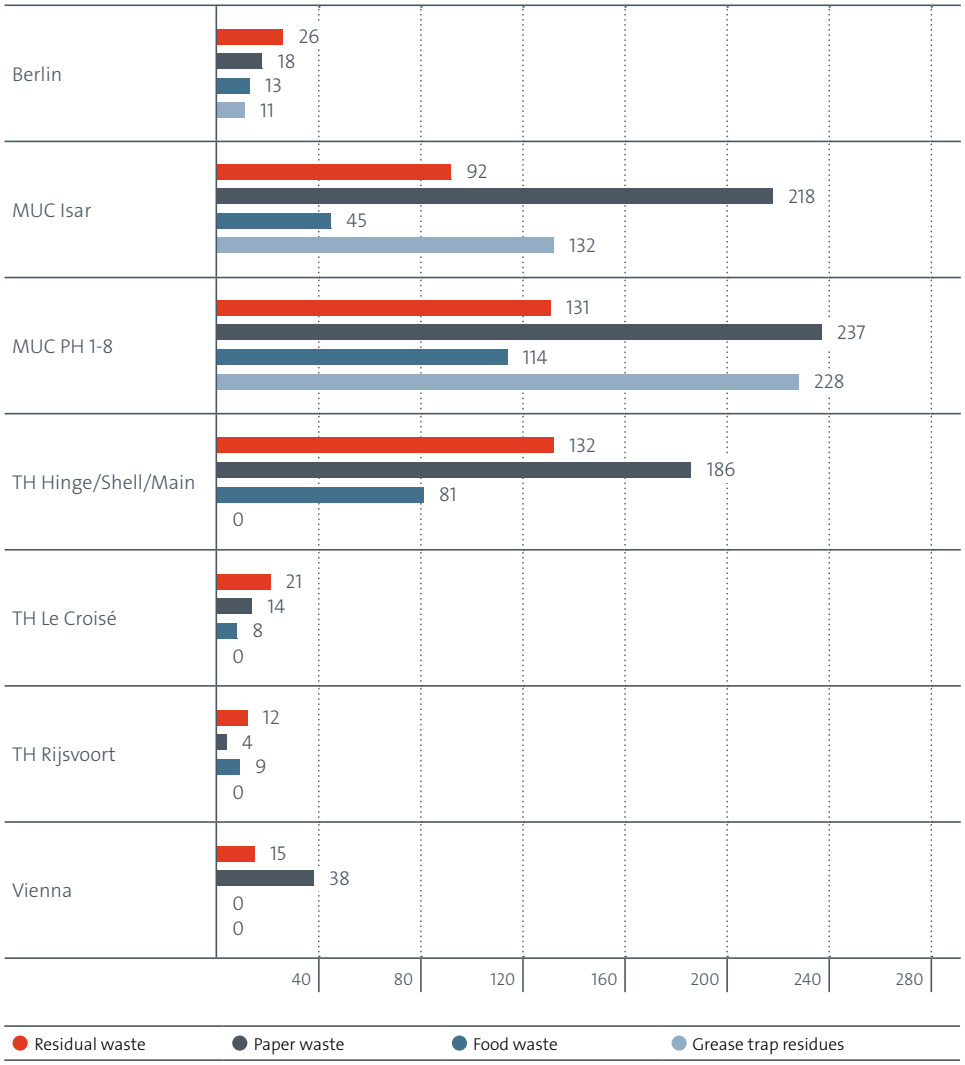
Residual waste per employee and day (in kg)



MUC Capitellum 2015: Sharp fall attributable to vacation of building on 31 March 2015.

Figure 18

Composition of waste in 2016 (in tonnes)



5.5 Mobility

Business trips between the EPO sites constitute the main component of travel at the EPO. To a lesser extent, employees travel to meet customers and other partners or attend conferences and other events. To date, only data for business trips between sites has been collected.

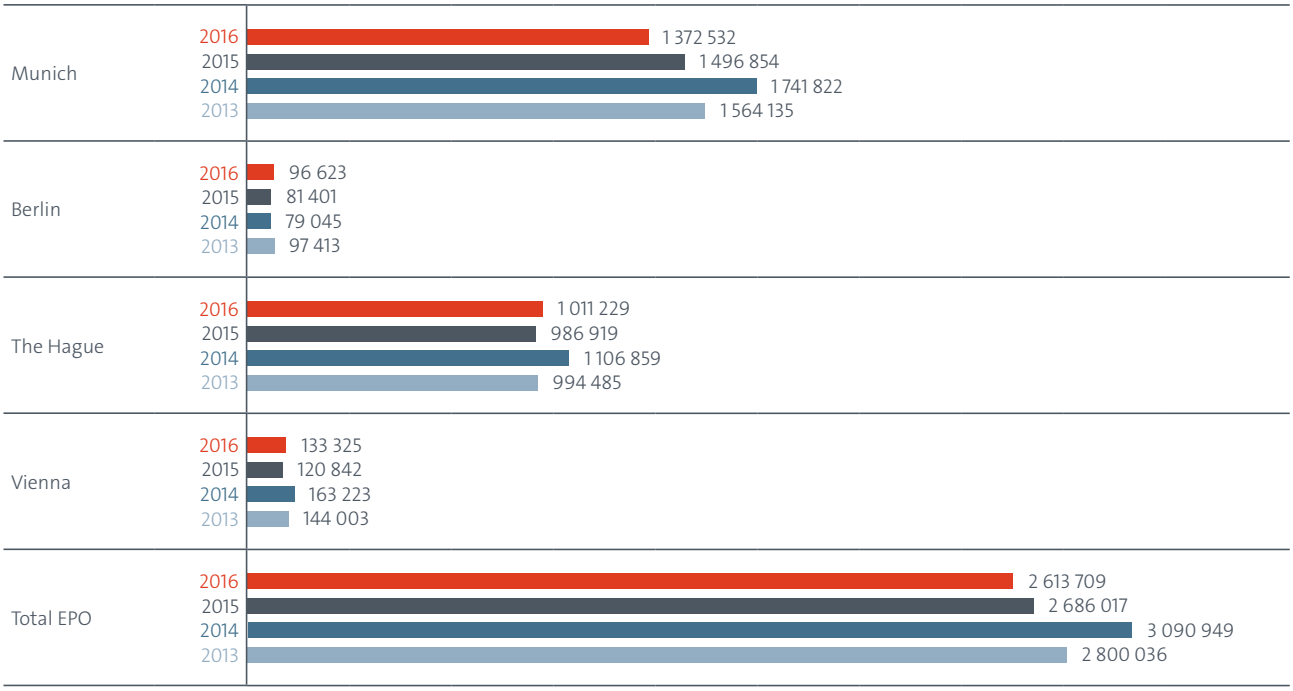
In the light of the EPO's efforts to reduce its carbon footprint, employees at all sites are informed of the CO_2 emissions associated with business travel and are encouraged to use the videoconference rooms.

Fig. 19 below shows a fall in emissions from air travel in 2016 of more than 70 000 kg CO_2 equivalent (2.7%) for all sites considered together. At the same time, use of the videoconference rooms fell from 10 700 hours in 2015 to 9 060 hours in 2016. A contributory factor in this is probably the installation of the Lync system in 2014, which allows staff to conduct videoconferences from their own PCs, without using the videoconference rooms.

Fig. 20 shows CO_2 emissions from train travel. There has been another fall in the use of trains for business travel: having already fallen by 11% the previous year, in 2016 the distance travelled by train fell by a further 43%, from 277 160 km to 158 937 km. Consequently the resultant CO_2 emissions also fell by 43%.

Figure 19

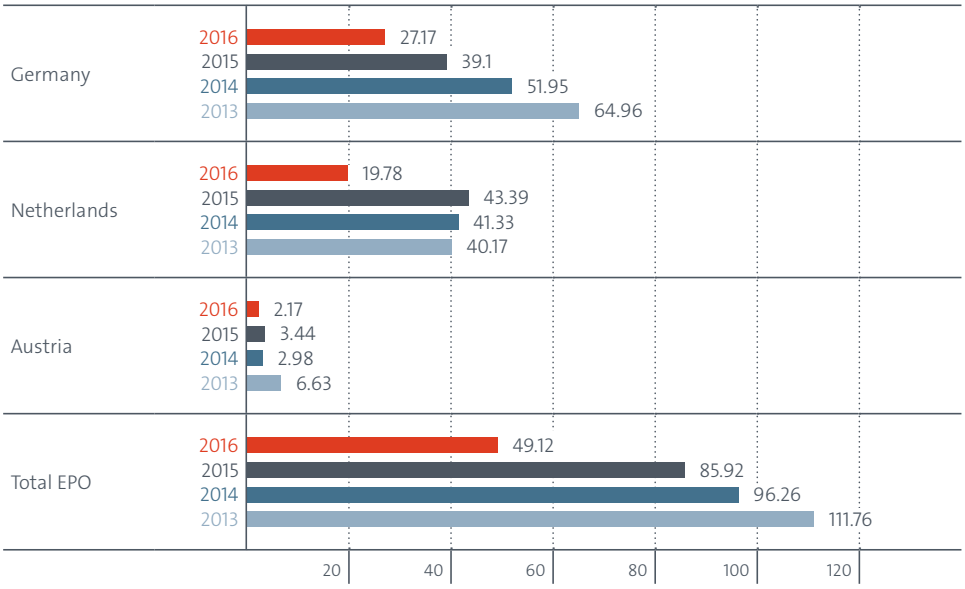
CO_2 emissions from air travel (in kg CO_2e)



Source: BCD Travel data manager/DEFRA 2015.
Note: Emissions allocated to place of departure.

Figure 20

CO_2 emissions from train travel (in kg CO_2e)



Source: BCD Travel data manager/DEFRA 2015.
Note: Emissions allocated to place of departure.

5.6 Other emissions

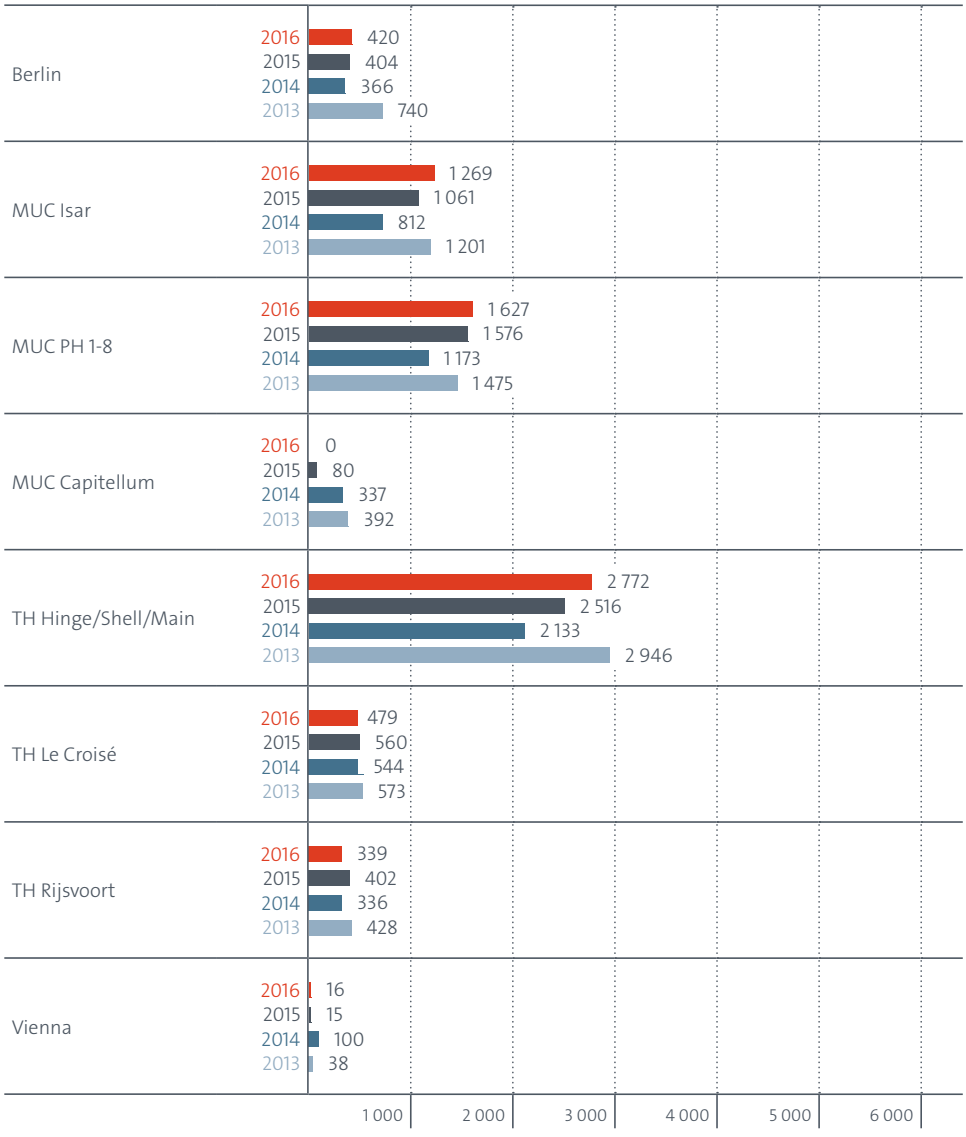
Electricity and heating energy consumption gives rise primarily to CO_2 emissions. SO_2 (sulphur dioxide), NO_x (nitrogen oxide) and particulates are considered only if they arise directly at the building in question. Our primary objective in minimising emissions is the reduction of energy consumption. We also regularly inspect and maintain our heating systems. In addition, we aim to use district heating and “green” electricity.

The factors for converting electricity and heating energy into individual emission types (kg/kWh) are based on the GEMIS database (Global Emissions Model for Integrated Systems) and the information supplied by the energy providers at each site.

All the Munich sites were converted to green electricity in 2013, and in 2014 Berlin followed suit. The Vienna site was switched to a provider with 100% green electricity in 2015. So there have since been no emissions from electricity consumption at the Munich, Berlin and Vienna sites. Emissions from heating energy consumption rose by 19.7% at the Munich Isar building in 2016. At the Le Croisé and Rijsvoort buildings in The Hague, total CO_2 emissions fell by 14.4% and 15.6% respectively. At Le Croisé, this can be attributed mainly to fewer electricity-related emissions (31.9%); at Rijsvoort, electricity-related (-11.8%) and heating-related (-15.9%) emissions both fell. Office-wide, emissions from electricity consumption fell by 30%, while those from heating energy consumption rose by 7%.

Figure 21

Total CO_2 emissions from electricity and heating (t per year)



2013: The sharp fall in emissions in Munich is primarily attributable to the switch to green electricity.
MUC Capitellum 2015: Sharp fall attributable to vacation of building on 31 March 2015.

5.7 Paper consumption

Large amounts of paper (green and white) are consumed at the Office. In 2016 paper consumption fell by 2.4% from around 125 million sheets to around 122 million.
For Munich and The Hague, paper consumption can be indicated only for the entire duty station, not for the individual buildings. The fall in paper consumption can be attributed to Munich in particular, where 9.5 million fewer sheets were used (down 15.3%).

Paper consumption in Berlin fell by 3.5% in 2016. The sharp rise from 2014 to 2015 is probably because the 2014 figure was too low.

Paper consumption in The Hague rose by 6.6 million sheets (11.2%) in 2016, due to the increase in staff numbers and in archiving operations, which entails more printing.

Paper consumption in Vienna rose by 44 500 sheets (13.5%) owing to greater demand for printing from other sites.

As part of the increasing digitisation of administrative processes we are aiming to significantly reduce paper consumption. Staff will continue to be encouraged to avoid unnecessary printing or to print double-sided or condensed. There has already been a fall in paper consumption per product of 18%.

eDrex was launched at the beginning of 2017, meaning that the patent specification intended for publication ("Druckexemplar") is no longer collated and edited on paper in most cases. Paper consumption in the patenting process is expected to fall by around 10% as a result.

Figure 22

Paper consumption per site (sheets)

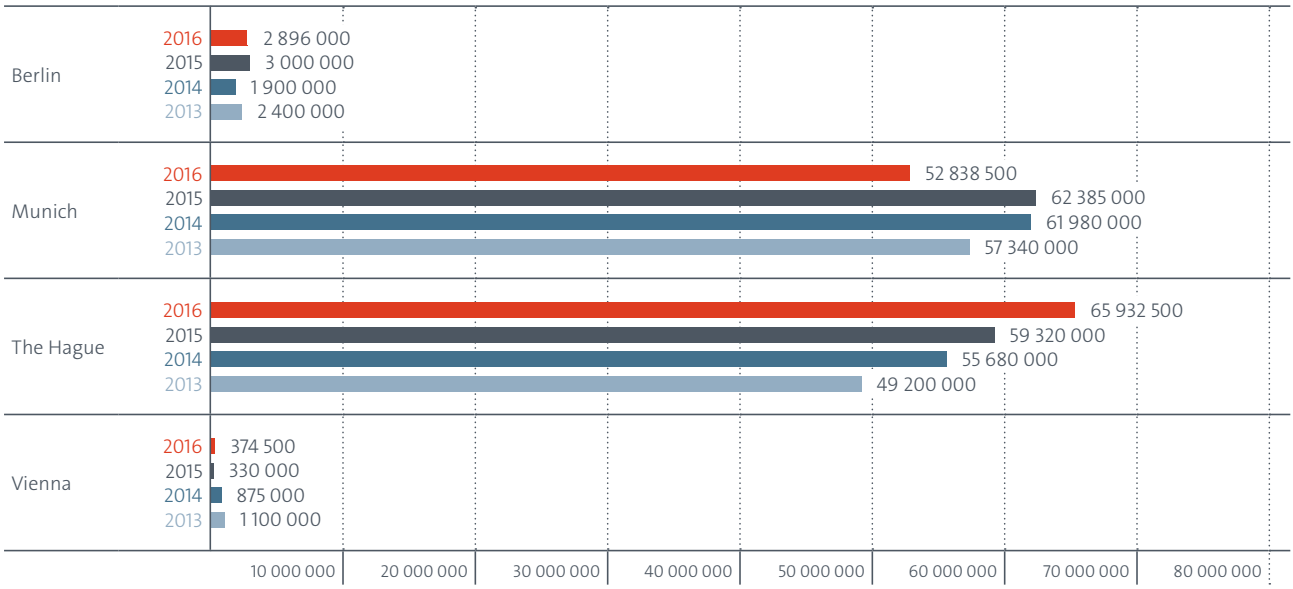


Figure 23

Sheets of paper consumed per product

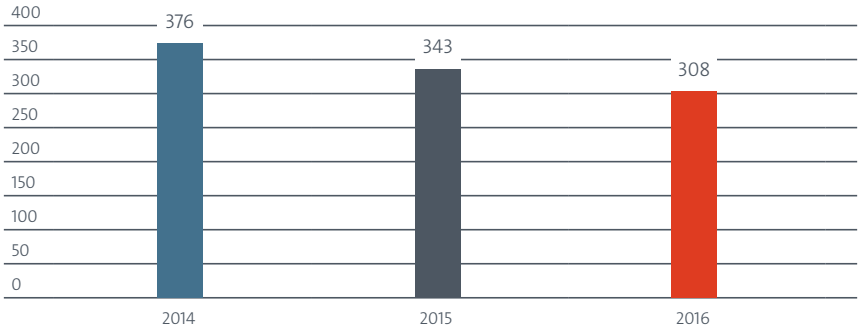
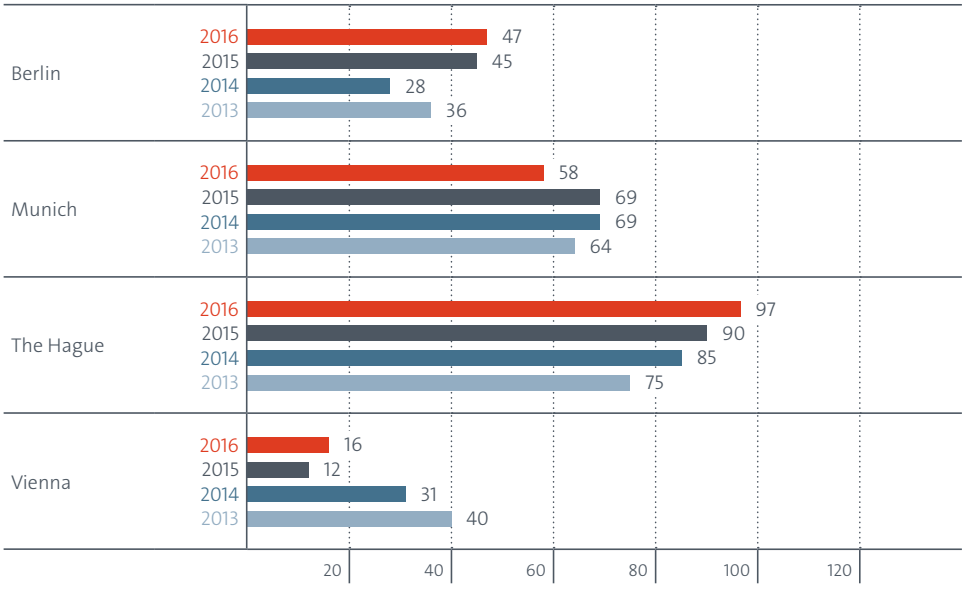


Figure 24

Paper consumption per employee and day (sheets)



6. Indirect environmental aspects

Indirect environmental aspects are negative or positive environmental consequences of our activities which we cannot fully control or directly influence. For instance, they result from the behaviour of our suppliers and contractors or our employees' journeys to and from the office. The table below provides an overview of our indirect environmental aspects and the priorities we have set in respect of them (for assessment categories see section 5, "Direct environmental aspects").

The EPO considers the patent grant procedure to be a significant indirect environmental aspect. Its free public patent document database can be viewed as a lever to promote the development of environment-friendly technologies, but also to stimulate political action. A simplified patent classification scheme has been developed over the past few years that makes patents in the field of climate change mitigation easier to find and access. Progress is also currently being made on classifying climate change adaptation technology patents in a similar way. Continuous updates will ensure comprehensive information for inventors, scientists and politicians.

We are focusing on long-term co-operation with contractors and suppliers, such as cleaning and canteen services. In doing so, we are aiming in particular to achieve the following objectives:
- supplying regular information on the EPO's environmental activities to contractors and suppliers to encourage them to improve their environmental performance
- promoting local/regional food in canteens

In goods and services procurement, all departments are encouraged to consider environmental impact as an additional factor in tender procedures and contract award decisions. To this end, a change was made to Article 2 of the Financial Regulations in 2016 that explicitly calls for environmental aspects to be considered in procurement. Moreover, environmental aspects are specified in procurement guidelines and handbooks and dedicated procurement catalogues. These documents offer guidance for all procurement units.

We are promoting a job ticket for public transport to and from the Office for our staff. We are also supporting part-time home working.

The indirect environmental aspects have been identified for all EPO sites and assessed as equally relevant for all sites. All indirect environmental aspects under the EMAS III Regulation have been assessed for relevance to the EPO. Only the aspects that were found to be relevant are included below.

The EPO has spent a considerable amount of money on the creation and maintenance of its patent databases, which now contain over 100 million documents from some 100 patent authorities worldwide. A significant amount of information relating to sustainable technologies is recorded in patent documents, which are available on the internet free of charge. This technical information is often published in patent applications long before it appears in any other source, such as relevant scientific reviews.

To help engineers, scientists, institutions and decision-makers use this wealth of knowledge in their work, the EPO has developed a patent classification scheme dedicated to climate change mitigation technologies (CCMTs). CCMTs focus on controlling, reducing or preventing anthropogenic emissions of greenhouse gases, as covered by the Kyoto Protocol.

By tagging patent documents, which traditionally fall under a wide range of technical areas, the so-called "Y02/4S" scheme groups under a common umbrella all mitigation technologies as well as smart grids. The scheme was devised in close co-operation with expert partners in the field, using technology guidelines produced by the United Nations Framework Convention on Climate Change (UNFCC) and the Intergovernmental Panel on Climate Change (IPCC).

As a result, the scheme makes it easier to retrieve relevant information quickly and accurately. It also makes it possible to map sustainable technologies, identify trends and facilitate further R&D. Y02/Y04 has become a standard for searching for CCMT patents and is commonly used by patent offices, intergovernmental organisations and academia for producing empirical analysis to support decision-making in the field of climate technology.

In particular, the EPO, in co-operation with the United Nations Environment Programme (UNEP), has produced four studies on patenting trends in CCMTs worldwide (2010), in Africa (2013), in Latin America and the Caribbean (2014) and in Europe (2015).

Using the features of the patent system to produce structural transparency regarding CCMTs, the EPO is making a significant contribution to the fight against climate change and sending a strong signal of its willingness to assume broader social responsibilities.

The EPO is taking various steps to raise awareness of the use and benefits of the Y02/Y04S scheme, including participating in specialised conferences and seminars targeting industry and academics in the field of climate technologies and organising information sessions aimed at policymakers at national, European and international level.

The EPO is an accredited observer at the United Nations Framework Convention on Climate Change (UNFCC) and participates regularly in the Conference of the Parties meetings, where it follows discussions on innovation and technology. The Office also attends the UNFCCC Technology Executive Committee in its observer capacity.

The table below shows the current technology sub-groups in the Y02/Y04S scheme.

Sub-group	Description	Comment
Y02B	Climate change mitigation technologies related to buildings, including housing and appliances or related end-user applications	Integration of renewables in buildings, lighting, HVAC (heating, ventilation and air conditioning), home appliances, lifts and escalators, constructional or architectural elements, ICT, power management
Y02C	Capture, storage, sequestration or disposal of greenhouse gases (GHG)	CO_2 capture and storage, also of other relevant GHG
Y02E	Climate change mitigation technologies in energy generation, transmission and distribution	Renewable energy, efficient combustion, nuclear energy, biofuels, efficient transmission and distribution, energy storage, hydrogen technology
Y02P	Climate change mitigation technologies in the production or processing of goods	Metal processing, chemical/petrochemical industry, minerals processing (e.g. cement, lime, glass), agro-alimentary industries
Y02T	Climate change mitigation technologies related to transport	E-mobility, hybrid cars, efficient internal combustion engines, efficient technologies in railway and air/waterway transport
Y02W	Climate change mitigation technologies related to waste water treatment or waste management	Waste water treatment, solid waste management, bio-packaging
Y04S	Smart grid technologies	Power network operation, end-user application management, smart metering, electric and hybrid vehicle interoperability, trading and marketing aspects

Each of these sub-groups is further divided into more specific technology tags. There are over 1 300 tags, all relating to sustainable technologies. Over 3 million documents are currently tagged under the Y02/Y04S scheme.

	Indirect environmental aspects	Rating
Services	Patent grant procedure	B III
	"Green" patent classification scheme	A I
Environmental performance and conduct of contractors/Procurement	Environmental impact of canteen operators/catering companies	A II
	Environmental impact of technical maintenance providers	A II
	Environmental impact of cleaning companies	B II
	Environmental impact of other contractors	B II
	Procurement, e.g. of furniture	B II
	Purchasing of food for canteens	A II
	Use of ecological resources for building/renovation, e.g. paint	A I
Travel	To and from work	A III
	Capital investments	B III

7. Improvements: objectives and actions

In accordance with its environmental policy the Office primarily seeks to:
- minimise the consumption of energy, water, paper and other resources, and reduce costs
- reduce its CO_2 emissions through optimised energy and mobility management
- standardise procedures within and between the different sites
- act as a role model for its contractors and suppliers
- regularly inform all members of staff and the public of its environmental activities

To achieve these overall goals, the central environmental management team each year defines an environmental programme with targets and improvement measures. It takes account of developments in environmental aspects, suggestions for improvements from internal audits and external inspections, and suggestions from local employees and environmental groups. The tables below present an extract including the chief actions from 2016 and for 2017/2018. The technical measures of the environmental programme essentially relate to the EPO's own buildings. The Office has less influence over rented buildings, though here too we try to exert some influence on the proprietors, to implement improvements and to make our staff more environmentally aware.

7.1 Action taken in 2016

Site	Action	Savings
Munich	Daylight-dependent lighting control in offices	40 000 kWh electricity
	Cafeteria and foyer ventilation run-times in PschorrHöfe 1-4 adapted to actual needs	50 000 kWh electricity, 100 000 kWh heat
	Optimisiation of HVAC system in Isar building completed	Verification yet to take place. Originally predicted savings: 260 000 kWh; already achieved in 2015: 168 000 kWh heat and 75 000 kWh electricity
	Recycling campaigns to raise employee awareness: donation campaigns for clothing, toys, glasses, etc.	Indirect, CO_2
	"Food & climate" campaign week to raise employee awareness	Unquantifiable
	E-bike campaign day	Indirect, CO_2
	Regular "bike doctor" visits; bike repairs all year round	Indirect, CO_2
	Co-operation with organic-certified caterers	Unquantifiable
The Hague	Garage lighting system replaced with LEDs	52 000 kWh electricity
	New cleaning contract: glass, paper, plastic and residual waste separated	Unquantifiable

In Munich, the planned replacement of sports hall lighting with LEDs had to be postponed because it took longer than expected to find a suitable supplier. And rather than just replace the escalator lighting in the Isar building, it has now been decided to replace the escalators completely.

In The Hague, it had been planned to optimise the first-floor insulation in the Shell building in 2016, but implementation was postponed because the medium-term strategy for the building's maintenance is currently under review. This includes environmental aspects.

7.2 Action planned for 2017/2018

Table

Munich

	Action	Savings
Electricity and heating	Renew four garage ramp heating systems and associated control cabinets, including central components for the canopy, expansion joint and drain heating systems	300 000 kWh electricity
	Daylight-dependent lighting control in core areas	30 000 kWh electricity
	Modernise corridor lighting	65 000 kWh electricity
	Convert emergency lighting in PschorrHöfe to LED	1 700 kWh electricity
	Optimise cooling units in Isar building (EOI project)	300 000 kWh electricity
	Weather-dependent control of heating and cooling equipment in PschorrHöfe 7	280 000 heat and 70 000 kWh electricity
	Replace gym lighting (PschorrHöfe) with LED	95 000 kWh electricity
	Convert lighting in staircases B and E to LED	6 000 kWh electricity
	Partially modernise garage lighting in PschorrHöfe 1-8	17 000 kWh electricity
	Gradually replace conventional electric motors in cooling and ventilation equipment with frequency-controlled motors	17 000 kWh electricity Pilot project in 2017; data not yet available
	Replace gutter heating system for frost protection in Isar building	300 000 kWh electricity
CO_2	Collect clothing and toys for donation campaign	Indirect, CO_2
	Charging stations for electric cars in PschorrHöfe 7 and 8 for four cars each	Indirect, CO_2
	Greater proportion of organic produce in catering	Data not yet available
	Feasibility study on installing photovoltaic modules on Isar building roof; study still ongoing	CO_2
Waste	Switch milk supply for coffee machines from Tetra Pak cartons (70 a day) to large containers with pumps	525 kg waste a year
Biodiversity	Install beehives on Isar building roof. An initial roof inspection took place in March 2017	Biodiversity

Table

The Hague

	Action	Savings
Energy	Replace boilers in Hinge with more efficient models	Electricity
	Investigate future of Shell building as regards general maintenance in terms of environmental aspects	
CO_2	Install new meters	Indirect, CO_2
	Collect books and toys for donation campaign	Indirect, CO_2
	Amicale Repair Café and bike workshop once a month	Indirect, CO_2
Water and hazardous substances	Green car washing	Water, hazardous substances
Paper	Use green printer paper for notebooks	Paper
Waste	Tender for new coffee machines ongoing, which will lead to better waste separation and less waste because the new coffee cups will be collected separately	Residual waste

Table

Berlin

	Action	Savings
CO_2	Berlin would like to take up the idea of a toy and clothing collection	Indirect, CO_2
	Planning for charging stations for electric cars ongoing with proprietor	Indirect, CO_2
	Bike repairs once a year in spring	Indirect, CO_2
Waste water	Check whether and to what extent cleaning agents used by the cleaning company can be replaced with biodegradable ones	Less contaminated waste water
Miscellaneous	Regularly inform DG 1 staff about EMAS	Awareness
	Investigate possible co-operation with the Bundesanstalt for Immobilienaufgaben regarding synergies from the two organisations' environmental management systems	Synergies from inter-institutional co-operation

Table

Vienna

	Action	Savings
Electricity	Install low-energy cooling system for the data centre	77 000 kWh electricity
	Install motion sensors for lighting in sanitary rooms, corridors and staircases	Data not yet available
CO_2	Charging station for electric cars	Indirect, CO_2

Table

DGs 1, 2 and 5

	Action	Savings
Paper	DG 1: Use of eDrex removes the need for the "Druckexemplar" in patent applications as of 1 December 2016	Approx. 10% paper in application process
	DG 5: Assess processes' paper needs, and whether some could be switched to paperless information exchange	Paper
	IM will further contribute to green IT with the electronic patent granting process and its projects (e-filing, eDrex, eDossier for Search, eDossier for Examination, etc.)	Paper
CO_2	DG 5 has developed a patent classification scheme simplifying the search for climate change mitigation technology patents and will make available an easily accessible database for patented climate change mitigation technologies	Indirect, CO_2
	DG 2: Integrate ICT sustainability criteria in MPAS tenders, and where possible in other large tenders Discuss integrating ICT sustainability criteria in business cases to raise awareness	Indirect, CO_2

Annex

EMAS core indicators

The following tables present the EMAS core indicators for environmental aspects. The emission values for SO_2 (sulphur dioxide), NO_x (nitrogen oxide) and particulates are shown only if they arise directly at the building in question. They are not calculated for electricity and district heating. The value for paper consumption in Munich and The Hague is in each case the average of the values for all sites there.

The EPO considers some of the core indicators to be irrelevant on the basis of its assessment of the environmental aspects, so it does not include them below. At the same time, this report goes into more detail on other criteria more relevant to the EPO.

EPO Berlin	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	7.44	8.09	9.06
Renewable energy as percentage of total consumption (electricity and heat)	%	19.85	18.25	17.31
Paper consumption (material efficiency)	sheet/empl	6 250	9 901	10 417
Water consumption	m^3/empl	8.72	8.61	9.50
Total hazardous waste generation	kg/empl	0	0	0
Built surface area (sealed)	m^2	11 250	11 250	11 250
Total waste generation				
Residual waste	t/empl	0.12	0.09	0.09
Paper/card	t/empl	0.14	0.06	0.06
Food waste	t/empl	0.04	0.04	0.05
Grease trap residues	t/empl	0.04	0.04	0.04
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	1.20	1.33	1.51
SO_2	kg/empl	0.007	0.008	0.008
NO_x	kg/empl	0.11	0.13	0.14
Particulates	kg/empl	0.04	0.05	0.06

EPO Munich – Isar building	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	19.64	20.55	21.18
Renewable energy as percentage of total consumption (electricity and heat)	%	57.31	57.97	52.38
Paper consumption (material efficiency)	sheet/empl	15 128	15 216	12 897
Water consumption	m^3/empl	23.23	25.99	24.85
Total hazardous waste generation	kg/empl	5.37[1]	8.63[1]	20.73
Built surface area (sealed)	m^2	18 113	18 113	18 113
Total waste generation				
Residual waste	t/empl	0.19	0.11	0.11
Paper/card	t/empl	0.72[1]	0.15	0.27
Food waste	t/empl	0.07	0.07	0.06
Food waste as percentage of food served	kg/food	-	-	0.27
Grease trap residues	t/empl	0.16	0.17	0.16
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	1.02	1.35	1.58
SO_2	kg/empl	0	0	0
NO_x	kg/empl	0	0	0
Particulates	kg/empl	0	0	0

[1] The higher value is attributable to renovation and clearance work due to removals.

EPO Munich – PschorrHöfe 1-8	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	6.72	6.48	6.42
Renewable energy as percentage of total consumption (electricity and heat)	%	52.56	51.99	50.88
Paper consumption (material efficiency)	sheet/empl	15 128	15 216	12 897
Water consumption	m^3/empl	13.89	14.28	13.90
Total hazardous waste generation	kg/empl	2.04	0.92	3.48
Built surface area (sealed)	m^2	42 641	42 641	42 641
Total waste generation				
Residual waste	t/empl	0.05	0.04	0.04
Paper/card	t/empl	0.11	0.07	0.07
Food waste	t/empl	0.03	0.03	0.03
Food waste as percentage of food served	kg/food	-	-	0.27
Grease trap residues	t/empl	0.06	0.07	0.07
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	0.39	0.49	0.49
SO_2	kg/empl	0	0	0
NO_x	kg/empl	0	0	0
Particulates	kg/empl	0	0	0

EPO Munich – Capitellum[1]	Unit	2014	2015[2]	2016
Total direct energy consumption (electricity and heat)	MWh/empl	8.87	8.08	-
Renewable energy as percentage of total consumption (electricity and heat)	%	35.40	27.63	-
Paper consumption (material efficiency)	sheet/empl	15 128	15 216	-
Water consumption	m^3/empl	9.43	5.27	-
Total hazardous waste generation	kg/empl	0	0	-
Built surface area (sealed)	m^2	3 502	3 502	-
Total waste generation				
Residual waste	t/empl	0.14	0.03	-
Paper/card	t/empl	0.15	0.14	-
Food waste	t/empl	0.02	0.01	-
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	1.16	1.18	-
SO_2	kg/empl	0.01	0.01	-
NO_X	kg/empl	1.07	1.09	-
Particulates	kg/empl	0.04	0.04	-

[1] The Munich Capitellum site was vacated on 31 March 2015.
[2] Extrapolated values for whole of 2015 for comparability with previous years.

EPO The Hague – Main, Hinge, Shell	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	10.79	11.45	11.81
Renewable energy as percentage of total consumption (electricity and heat)	%	59.07	54.66	52.67
Paper consumption (material efficiency)	sheet/empl	18 690	19 747	21 421
Water consumption	m^3/empl	16.01	15.10	14.58
Total hazardous waste generation	kg/empl	5.63[2]	23.93[3]	7.6
Built surface area (sealed)	m^2	86 450[4]	81 450[4]	81 450[4]
Total waste generation				
Residual waste	t/empl	0.06	0.05	0.05
Paper/card	t/empl	0.07	0.08	0.08
Food waste	t/empl	0.04	0.04	0.03
Food waste as percentage of food served	kg/food	-	-	0.36
Grease trap residues	t/empl	0.01	0.00[1]	0.00[1]
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	0.89	1.05	1.13
SO_2	kg/empl	0.01	0.01	0.01
NO_x	kg/empl	0.83	0.97	1.00
Particulates	kg/empl	0.03	0.04	0.05

[1] Value could not be established due to change of provider as from 1 January 2016.
[2] Rise attributable to increase in building waste disposal work and improved availability of disposal data.
[3] Rise attributable to major renovation work producing large volumes of building waste.
[4] Values differ from those published in previous reports due to the buildings' partial demolition to make way for the New Main building.

EPO The Hague – Le Croisé	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)[1]	MWh/empl	9.19	9.11	7.25
Renewable energy as percentage of total consumption (electricity and heat)	%	n.a.[2]	n.a.[2]	n.a.[2]
Paper consumption (material efficiency)	sheet/empl	18 690	19 747	21 421
Water consumption	m^3/empl	8.94	8.71	9.33
Total hazardous waste generation	kg/empl	0	0	0
Built surface area (sealed)	m^2	4 200	4 200	4 200
Total waste generation				
Residual waste	t/empl	0.04	0.05	0.05
Paper/card	t/empl	0.04	0.04	0.03
Food waste	t/empl	0.02	0.02	0.02
Food waste as percentage of food served	kg/food	-	0.36	
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	1.32	1.34	1.13
SO_2	kg/empl	0.004	0.004	0.004
NO_x	kg/empl	0.60	0.63	0.60
Particulates	kg/empl	0.02	0.02	0.03

[1] Electricity consumption extrapolated as only values for less than a year are available.
[2] Values not available.

EPO The Hague – Rijsvoort	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	10.00	11.22	8.92
Renewable energy as percentage of total consumption (electricity and heat)	%	n.a.[1]	n.a.[1]	n.a.[1]
Paper consumption (material efficiency)	sheet/empl	18 690	19 747	21 421
Water consumption	m^3/empl	15.70	17.97	15.44
Built surface area (sealed)	m^2	4 558	4 558	4 558
Total waste generation				
Residual waste	t/empl	0.05	0.05	0.06
Paper/card	t/empl	0.02	0.02	0.02
Food waste	t/empl	0.09	0.05	0.04
Food waste as percentage of food served	kg/food	-	-	1.38
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	1.89	2.14	1.70
SO_2	kg/empl	0.01	0.02	0.01
NO_x	kg/empl	1.59	1.82	1.37
Particulates	kg/empl	0.06	0.07	0.06

[1] Values not available.

EPO Vienna	Unit	2014	2015	2016
Total direct energy consumption (electricity and heat)	MWh/empl	13.42	13.28	13.37
Renewable energy as percentage of total consumption (electricity and heat)	%	10.76[1]	47.09[1]	0.11[1]
Paper consumption (material efficiency)	sheet/empl	8 178	3 143[2]	3 601
Water consumption	m^3/empl	10.38	17.19[3]	9.32
Total hazardous waste generation	kg/empl	2.43	0	0
Built surface area (sealed)	m^2	2 547	2 547	2 547
Total waste generation				
Residual waste	t/empl	0.14	0.13	0.14
Paper/card	t/empl	0.23	0.22	0.37
Food waste	t/empl	n.a.[4]	n.a.[4]	n.a.[4]
Emissions (electricity and heat)				
CO_2 equivalent	t CO_2e/empl	0.93[5,6]	0.14[5]	0.15[5]
SO_2	kg/empl	0	0	0
NO_x	kg/empl	0	0	0
Particulates	kg/empl	0	0	0

[1] Fluctuating values owing to repeated change of electricity provider, with varying proportions of green power.
[2] Lower value due to less demand for printing from other sites.
[3] Rise attributable to increased water requirements for building work on outside installations during forum alteration.
[4] Disposal handled by canteen service provider. Waste removed and disposed by head office.
[5] Fluctuating emission factors for electricity owing to repeated change of provider.
[6] Value corrected compared to previous Environmental Report.

ENVIRONMENTAL VERIFIER'S DECLARATION

Dr. Hans-Peter Wruk, with EMAS environmental verifier registration number DE-V-0051 accredited or licensed for the scope 841 (NACE-Code) "administration of the state" declares to have verified whether the whole organization

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By signing this declaration, I declare that:

- the verification and validation has been carried out in full compliance with the requirements of Regulation (EC) No 1221/2009,
- the outcome of the verification and validation confirms that there is no evidence of non-compliance with applicable legal requirements relating to the environment,
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This document is not equivalent to EMAS registration. EMAS registration can only be granted by a Competent Body under Regulation (EC) No 1221/2009. This document shall not be used as a stand -alone piece of public communication.

Done at Pinneberg on 11th of June 2017

Dr.-Ing. Hans-Peter Wruk
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