



EUROPEAN COMMISSION

Environmental Management System

Environmental Statement 2020

2019 Results

Corporate Summary

FOREWORD

This Environmental Statement is the first one prepared under the Commission's new President, Ursula von der Leyen. The Commission recognises the importance of Europe continuing its leading role on the global stage in reducing environmental impacts. Its flagship *European Green Deal* emphasizes the importance of achieving tough emissions reductions in Member States while also signalling the importance of sustainable food supply chains (Farm to Fork strategy) and maintaining biodiversity.

The Commission, through its policies, directives and regulations, ensures that Member States set an example by developing more sustainable economies, through initiatives such as the Clean Energy Package, successive Water Framework Directives, the Circular Economy Package and support for the Paris climate agreement.

In order to reduce the environmental impact of its everyday activities, in 2005 the Commission became the first EU Institution to implement the Eco-Management and Audit Scheme (EMAS). Initially limited to Brussels, the scheme now includes its eight largest sites in Europe: Brussels, Luxembourg, Joint Research Centres Geel (Belgium), Petten (The Netherlands), Seville (Spain), Karlsruhe (Germany), and Ispra (Italy), along with Directorate General SANTE at Grange (Ireland). The Commission publishes its environmental performance results in the Environmental Statement.

This Corporate Summary of the Environmental Statement includes Commission results up to 2019 aggregated from the eight sites. It documents long-term trend towards reduced resource consumption and the excellent progress towards Corporate 2014-20 targets. The eight standalone annexes provide analysis for each site.

In 2019 the Commission was able, following a mid-term review, to set more ambitious 2014-20 targets for selected core performance parameters, and which it is largely on track to achieve. It is now formulating targets for 2030, including potential pathways towards greenhouse gas neutrality by 2030.

Gertrud Ingestad

Director-General
President of the EMAS Steering Committee

AENOR

ENVIRONMENTAL VERIFIER'S DECLARATION ON VERIFICATION AND VALIDATION ACTIVITIES

AENOR INTERNACIONAL, S.A.U., with EMAS environmental verifier registration number ES-V-0001, accredited for the scopes: 99 "Activities of extraterritorial organisations and bodies", 84.1 "Administration of the State and the economic and social policy of the community", 71.2 "Control activities and technical analysis", 72.1 "Research and experimental development in natural sciences and engineering", 72.2 "Research and experimental development on social sciences and humanities", 35.11 "Production of electricity", 35.30 "Steam and air conditioning supply", 36.00 "Water collection, treatment and supply", 37.00 "Sewerage" (NACE Code) declares

to have verified the sites as indicated in the environmental statement of **EUROPEAN COMMISSION**, with registration number BE-BXL-000003

meet all requirements of Regulation (EC) Nº 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community Eco-Management and Audit Scheme (EMAS), amended by Regulation (EU) 2017/1505 and Regulation (EU) 2018/2026.

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 amended by Regulation (EU) 2017/1505 and Regulation (EU) 2018/2026,
- the outcome of the verification and validation confirms that there is no evidence of non-compliance with applicable legal requirements relating to the environment,
- the data and information of the environmental statement of the sites reflect a reliable, credible and correct image of all the sites activities, within the scope mentioned in the environmental statement.

This document is not equivalent to EMAS registration. EMAS registration can only be granted by a Competent Body under Regulation (EC) Nº 1221/2009 amended by Regulation (EU) 2017/1505. This document shall not be used as a stand-alone piece of public communication.

Done at Madrid, on December 29, 2020

Signature



Rafael GARCÍA MEIRO
Chief Executive Officer

EMAS IN EC TODAY



Verified
environmental
management
REG. NO. BE-BXL-000003

EXTERNAL STAKEHOLDERS



35 000
STAFF & CONTRACTORS



1,6 Million m²



8 sites
7 COUNTRIES

INTERESTED PARTIES

COMMISSION'S ENVIRONMENTAL RESULTS 2014-2019 (VERSUS 2020 OBJECTIVES)

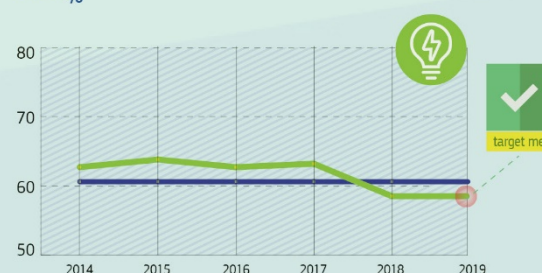
— Target 2014 - 2020

— Commission

Buildings' Energy Consumption MWh per person



Non Renewable Energy %



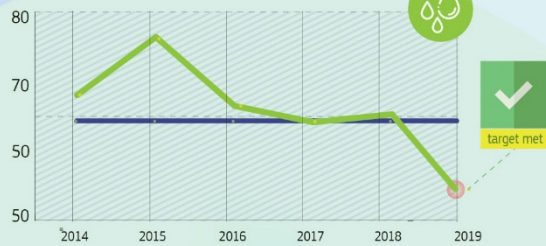
CO₂ Emissions (buildings) TCO₂ per person



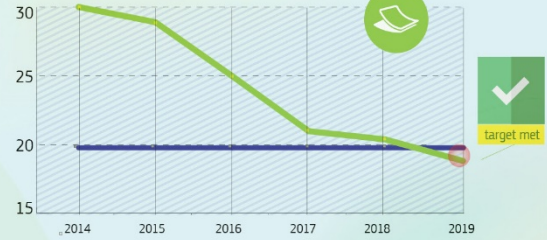
CO₂ Emissions (service vehicle fleet) gCO₂ per kilometer by manufacturer



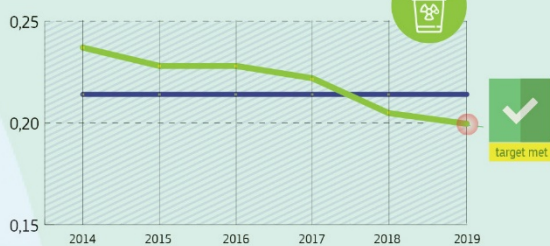
Water Use m³ per person



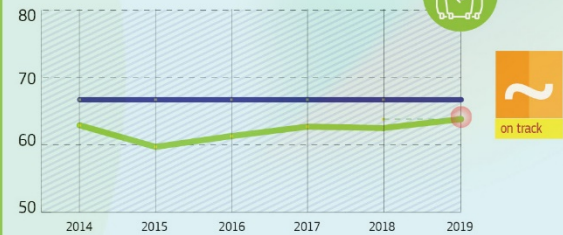
Office Paper Consumption Sheets per person per day



Non Hazardous Waste Tonnes per person



Separated Waste %



COMMISSION'S CARBON FOOTPRINT (EMAS PERIMETER)

BUILDINGS

- Buildings (Fuel for heating)
- Buildings (Electricity)
- Buildings - District heating / cooling
- Buildings - Coolant losses (CO₂e)
- Fixed assets * - buildings

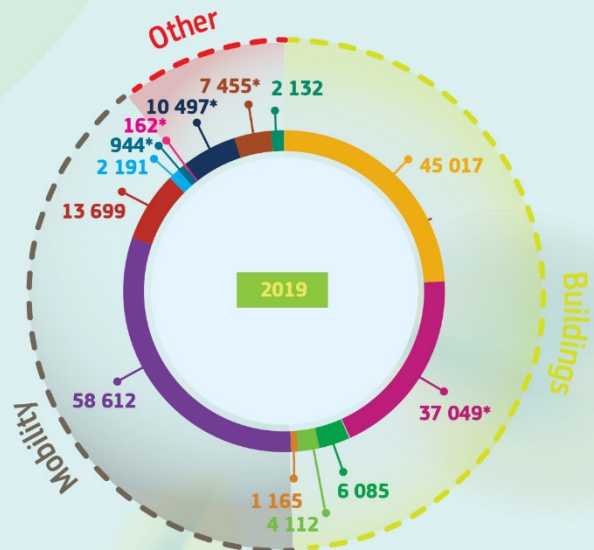
OTHER

- Fixed assets * - IT
- Goods & services contracts *
- Own waste *
- Fixed assets * - Commission vehicles

*New since 2018 (contributing sites)

MOBILITY

- Vehicle Fleet - Fuel Consumption
- Missions (air)
- Missions other
- Staff Commuting (contributing sites)



EMAS IS ALSO ABOUT ...



Legal compliance



Employee involvement



Management commitment



External communication



Leading by example

Progress in implementing the EU's Eco Management and Audit Scheme (EMAS)

1) Current system scope: The Commission's EMAS system encompasses its eight largest sites in Europe:

- The main administrative sites of Brussels (starting in 2005) and Luxembourg (since 2011);
- The five Joint Research Centre sites:
 - JRC Petten (Netherlands), since 2012;
 - JRCs Geel (Belgium) and Seville (Spain), since 2013; and
 - JRCs Karlsruhe (Germany) and Ispra (Italy), since 2014;
- DG SANTE at Grange (Ireland), since 2014

While Brussels, DG SANTE at Grange and JRC Seville host mainly administrative buildings, (the latter for research), the remainder also have laboratories, the JRCs in particular have extensive technical infrastructure with JRC Ispra close to being a small town in its own right.

2) Changes in this report: The system has been relatively stable in geographic scope in recent years. Basic characteristics, and improvements incorporated in 2019 reporting are:

- Separate chapters addressing each of the main EMAS objectives, and including more references to actions in the EMAS Global Annual Action Plan. As previously, each of the eight EMAS site reports is a standalone annex to this report.
- More ambitious corporate 2014-20 targets for some core parameters have been adopted (Non-hazardous waste generation, water and paper consumption, vehicle fleet emissions).
- Shows the coherence of EMAS objectives and actions with UN Sustainable Development Goals
- Improved reporting on Green Public Procurement (GPP)
- Reference to the Sectoral Reference Document for Public Administrations
- Builds upon the expanded calculation of the carbon footprint introduced in 2018, taking into account more indirect (scope 3). The additional elements introduced in 2018/9 were:
 - fixed assets (buildings and IT, vehicle fleet),
 - purchased goods and services (including catering),
 - waste disposal, and upstream energy emissions.

The largest contributions to the carbon footprint in 2019 were emissions from buildings 47% (construction and energy consumption), and from air travel for staff missions (30%).

A particular effort was necessary to develop the carbon footprint, an important input to the DG CLIMA coordinated study on potential pathways towards reducing the Commission's greenhouse gas emissions that was mandated by the EMAS Steering Committee.

3) Performance summary for EMAS core indicators: The general positive trend observed for most core parameters continued in 2019, with many already achieving the 2014-20 target as shown below.

No	Indicator	Commission performance (%)	
		Target 2014-20 ⁽¹⁾	Performance 2014-19
1a	Total energy consumption (Bldgs) - MWh/p	-5.2	-8.2 (target met)
1a	Total energy consumption (Bldgs) - kW/m ²	-5.2	0.2 (off track) ⁽²⁾
1c	Non renewable energy (bldgs) - %	-3.3	-7.0 (target met)
1d	Water consumption - m ³ /p	-5.4	-25 (target met)
1d	Water consumption - L/m ²	-4.8	-18 (target met)
1e	Office paper consumption - Sheet/p/day	-34	-37 (target met)
1e	Office paper consumption - T/p	-34	-37 (target met)
2a	CO ₂ emissions (bldgs.) - TCO ₂ /p	-5.1	-22 (target met)
2a	CO ₂ emissions (bldgs.) - kgCO ₂ /m ²	-5.2	-15 (target met)
2c	CO ₂ emissions (vehicles) - gCO ₂ /km (manufacturer spec.)	-14	-27 (target met)
2c	CO ₂ emissions (vehicles) - gCO ₂ /km (actual)	-4.9	-0.1 (off track)
3a	Non hazardous waste - T/p	-9.7	-17 (target met)
3c	Separated waste (%)	+6.0	1.9 (off track)
Costs	Energy consumption (EUR/p)	749 EUR	538 EUR (target met)
	Water consumption (EUR/p)	55 EUR	47.9 EUR (target met)

Note ⁽¹⁾ Global Annual Action Plan 2020; ⁽²⁾ Climatic variations not considered. Performance improves when this is taken into account as 2014 was relatively mild.

The eight EMAS sites reported improved environmental performance for most parameters in 2019, one of the best years so far. Reasons for reduced per capita energy consumption and emissions from buildings include technical measures such as improved infrastructure at several sites and better use of building management systems. However operational decisions such as increasing the number of buildings that are closed during holidays has also been important in Brussels. And more sites now contract electricity from renewable sources.

Water consumption has similarly reduced, owing to a raft of measures including improved leak detection, distribution network maintenance, and the replacement of cooling systems that used water with ones that rely on air. Paper consumption continues its long term downward trend, assisted by new more intelligent centralised printing and copying facilities that have replaced individual printers, and reinforced by campaigns to promote more digitally based ways of working.

However, some of the most impressive improvements have been in relation to waste management, notably reductions in non-hazardous waste generation and an increase in the proportion of waste sorted. This is partly due to improved, and more centralised waste collection points but also due to campaigns and awareness particularly to reduce single use plastic and that have been the focus of global attention in the last couple of years. The network of correspondents across DGs and services responsible for spreading environmental awareness and good practice has become more active partly, it seems since late 2019, driven by enthusiasm for the Green Deal.

Buildings' energy consumption is by far the most important per capita resource cost monitored under EMAS, and it continued its year on year drop. In Brussels it is estimated to have reduced from over 1 100 EUR in 2005 to under 400 EUR in 2019. This is equivalent to saving well over 10 million EUR per year (in recent years) compared with 2005 consumption rates, and cumulative (unadjusted) savings of well over 100 Million EUR since 2005.

4) Going forward: High on the agenda for 2020 and beyond will be the need to,

- Contribute to the GHG emissions reduction strategy for 2030 under the Green Deal;
- Work with Commission services to deliver improved definition of missions based emissions;
- Develop, with the EMAS sites, Commission level targets for 2030;
- Formally incorporate in the Executive Agencies in Brussels (that are under OIB Facilities Management Control) in the Commission's buildings; and
- Continue discussions with DG COMM to agree how to roll out EMAS implementation to EU Representations, possibly including the European Parliament Houses of Europe in the approach, and develop a gap analysis at two locations as a first step;

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ANNEXES A TO H ARE THE SITE REPORTS VALIDATED SEPARATELY DURING THE VERIFICATION AUDITS AT EACH SITE, BUT WITH COMMON STRUCTURE PAGE NUMBERS AS FOLLOWS:

		ANNEX A: ABRUSSELS	ANNEX B LUXEMBOURG	ANNEX C: JRC PETTEN	ANNEX D: JRC GEEL	ANNEX E: JRC SEVILLE	ANNEX F: JRC KARLSRUHE	ANNEX G: JRC ISPRA	ANNEX H: SANTE AT GRANGE
1	Overview of core indicators	A4	B4	C3	D4	E3	F3	G4	H4
2	Description of activities, context, stakeholders	A5	B5	C4	D6	E6	F4	G6	H5
3	Environmental impact of activities	A9	B8	C9	D12	E14	F11	G15	H10
4	More efficient use of natural resources	A10	B10	C10	D13	E15	F12	G17	H12
5	Reducing carbon footprint and air emissions	A15	B15	C13	D20	E22	F19	G26	H15
6	Improving waste management and sorting	A22	B20	C19	D28	E28	F23	G36	H18
7	Protecting biodiversity	A24	B21	C19	D30	E33	F26	G44	H19
8	Green public procurement	A24	B22	C20	D32	E33	F27	G47	H20
9	Legal compliance and emergency preparedness	A25	B22	C20	D33	E34	F28	G49	H20
10	Communication	A26	B23	C20	D35	E35	F29	G51	H22
11	Training	A287	B25	C21	D36	E36	F32	G56	H23
12	EMAS costs and savings	A28	B26	C22	D37	E38	F33	G56	H23
13	Conversion factors	A29	B26	C23	D38	E39	F33	G58	H24
14	Summary buildings table (optional)	A30	B27	C23	D39			G59	H25

1 INTRODUCTION AND BACKGROUND INFORMATION

1.1 About this Environmental Statement

The European Commission (EC) implements the Eco-Management and Audit System (EMAS) Regulation which requires organisations to publish an Environmental Statement (ES). The EC achieved its first EMAS registration in 2005 which covered part of its activities in Brussels.

The EC has since expanded the scope of its EMAS registration considerably and developed a site based approach. This ES, which reports on 2019 activities, is the basis for the EMAS registration update for the EC's eight main sites in Europe as listed in Table 1.1 in their order of incorporation into the EC's EMAS registration.

Table 1.1 Commission sites included in the EMAS registration

Country	Commission site	For further detail, see Annex
Belgium	Brussels (EC main administrative centre, with over 40 Directorates and Services plus 5 Executive Agencies), with buildings located in the Brussels Region and in Flanders. (further detail in Annex A)	A
Luxembourg	Luxembourg (EC second administrative centre plus one Executive Agency)	B
Netherlands	JRC Petten, (near Alkmaar)	C
Belgium	JRC Geel, (east of Antwerp)	D
Spain	JRC Seville	E
Germany	JRC Karlsruhe	F
Italy	JRC Ispra (JRC's largest site and administrative centre)	G
Ireland	Facility of the Directorate General of Health and Food Safety, located at Grange, near Trim, County Meath (DG SANTE Grange)	H

This ES was produced in two phases:

- **Phase 1:** Separate "stand-alone" reports were prepared for each of the eight sites, as Annexes A to H of this report. The same structure was adopted for reporting at each site as described in the previous page; and
- **Phase 2:** The site data was aggregated where possible to produce Commission results which are described in Chapter 2 of this report. Virtually all data included in this volume originates in the site annexes.

The remainder of this chapter provides information on EC activities and its environmental management system, as required by the EMAS Regulation.

1.2 What is the European Commission?

The European Commission is the executive arm of the European Union. Alongside the European Parliament and the Council of the European Union, it is one of three main institutions that govern the Union, and by far the largest. The Commission's activities are steered by 27 Commissioners, assisted by over 30 000 civil servants and other staff working in 31 Directorates-General (DGs), 15 services/offices¹ and departments all over the world. Each Commissioner takes responsibility for a particular area of policy and heads one or more entities that are generally known as DGs.

The Commission's primary role is to propose and enact legislation, and to act as 'Guardian of the Treaties', which involves responsibility for initiating infringement proceedings at the European Court of Justice against Member States and others whom it considers to be in breach of the EU Treaties and other Community law. The Commission also negotiates international agreements on behalf of the EU in close cooperation with the Council of the European Union.

The Commission's headquarters are in Brussels (Belgium), but it also has offices in Luxembourg, Ispra (Italy), Grange (Ireland) and many other places, agencies in a number of Member States and representations in all EU countries. On 1st December 2009, the Treaty of Lisbon entered into force giving the Commission the institutional tools needed for the various enlargements and for meeting the challenges of an EU of 27 Member States.

1.3 Assessing the environmental impacts of European Union policies

The Commission takes environmental issues into account when drafting and revising EU policies, through the impact assessment system usually managed through the Secretary General. It provides financial support for environmental projects via the LIFE programme and has policies on combating global warming and on energy and transport.

The impact assessment system and its application to the myriad of EU policies are not considered in this document², but you can find information on these on the Commission's EUROPA website. The following pages are among those dedicated to particular policies and important initiatives:

1. Impact assessment system:

https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/impact-assessments_en

2. EU environment policy and evaluation: http://ec.europa.eu/environment/index_en.htm

3. LIFE+ programme: <http://ec.europa.eu/environment/life/index.htm>

4. Global warming policy: http://ec.europa.eu/climateaction/index_fr.htm

5. Energy policy: http://ec.europa.eu/energy/index_en.htm

6. Transport policy: http://ec.europa.eu/transport/index_en.htm

The environmental aspects of EU policies for Member States are therefore addressed by the impact assessment system that applies to each legislative initiative, and not under EMAS. All draft impact assessment reports have to be submitted for quality and scrutiny to the Regulatory Scrutiny Board (RSB)³ which replaced the Impact Assessment Board in July 2015. A positive opinion is in principle needed from the Board for an initiative accompanied by an impact assessment to proceed. RSB opinions⁴ are alongside the final impact assessment report and proposal at the time of adoption. As the responsibility of the adoption of EU policies is shared with the European Council and European Parliament, the EMAS management system is not the appropriate tool for managing these policies. **The Commission's management system**

¹ http://ec.europa.eu/about/ds_en.htm

² Detailed information on EU policies available on www.europa.eu

³ http://ec.europa.eu/info/law-making-process/regulatory-scrutiny-board_en

⁴ http://ec.europa.eu/smart-regulation/impact/ia_carried_out/cia_2015_en.htm

therefore addresses the Commission's operational activities, i.e. those that are under the control of or can be influenced by EC management.

1.4 Corporate responsibility and environmental management at the Commission

The Commission does not look at environmental management in isolation, but rather within the broad context of its approach to corporate social responsibility. One important way in which the Commission has begun to emphasize and encourage its employees to have a positive impact on their communities local communities is through encouraging them to participate in volunteering.

Staff in Brussels have been encouraged once again in 2019 to participate in a range of voluntary activities across the city, that were concentrated within a volunteer week. While directly benefitting the local community, including disadvantaged groups such as the homeless and refugees, participation also enabled small groups of Commission staff to get to know one another.

The importance of using a holistic approach to staff wellbeing and working conditions has been highlighted as one DG HR's directorates is dedicated to Health, Wellbeing and Working Conditions and has a Corporate Social Responsibility adviser. An initiative entitled *fit@work* has been established which brings together a wide range of corporate services with a focus on:

- improving physical health by focussing on disease prevention though promoting more active lifestyles, and based on health data;
- improving mental health, for example by dispelling myths and stigma associated with certain health conditions;
- promoting exercise and leisure activities for example though the Commission's 30 sport clubs;
- promoting a healthy work/life balance, for example recognising the additional stresses caused by an expatriate lifestyles and offering flexible work patterns to accommodate this;
- improving the quality of the physical working environment particularly aspects such as ventilation and light levels which significantly effect staff comfort and motivation; and
- providing supportive working conditions (for example by making it easier to obtain psychological support).

There are obvious synergies between initiatives such as *fit@work* and environmental management (EMAS). Taking the stairs instead of the lift not only improves staff fitness, but reduces buildings energy consumption and CO₂ emissions. And cycling or walking to work instead of driving will reduce energy consumption and CO₂ emissions associated with commuting. Encouraging staff to think about eating less meat similarly reduces the amount of non renewable energy used in the food chain, and consequently CO₂ emissions and may also have health benefits. These issues that can be influenced through our building and mobility policies.

1.5 Why implement EMAS?

The EC developped EMAS in the 1990s as a tool to improve environmental management across Europe. It was designed first for implementation in industrial sectors and then later modified so that it could be used for less energy intensive and polluting sectors such as public administration.

Since EMAS was introduced, the International Standards Organisation (ISO) developped ISO 14001, the international standard for environmental management which has been more widely adopted both in Europe and worldwide. EMAS remains however a more rigorous system than ISO 14001, with additional requirements such as:

- A commitment to continual improvement;
- An obligation to publish results (Environmental Statement);
- Commitment to demonstrating legal compliance;

- Employee involvement; and
- Registration by a public authority after verification by an accredited/licensed verifier.

The latest version of ISO 14001, (ISO14001:2015) incorporated some elements of the EMAS Regulation, but not some important ones such as mandatory reporting. So while the annexes of the EMAS Regulation have been updated to incorporate the ISO 14001:2015 requirements so that it remains attractive for those who also need ISO 14001 certification, especially for commercial reasons, EMAS will still be considered the "premium" environmental management system. The new version of the EMAS Regulation came into force in September 2018⁵.

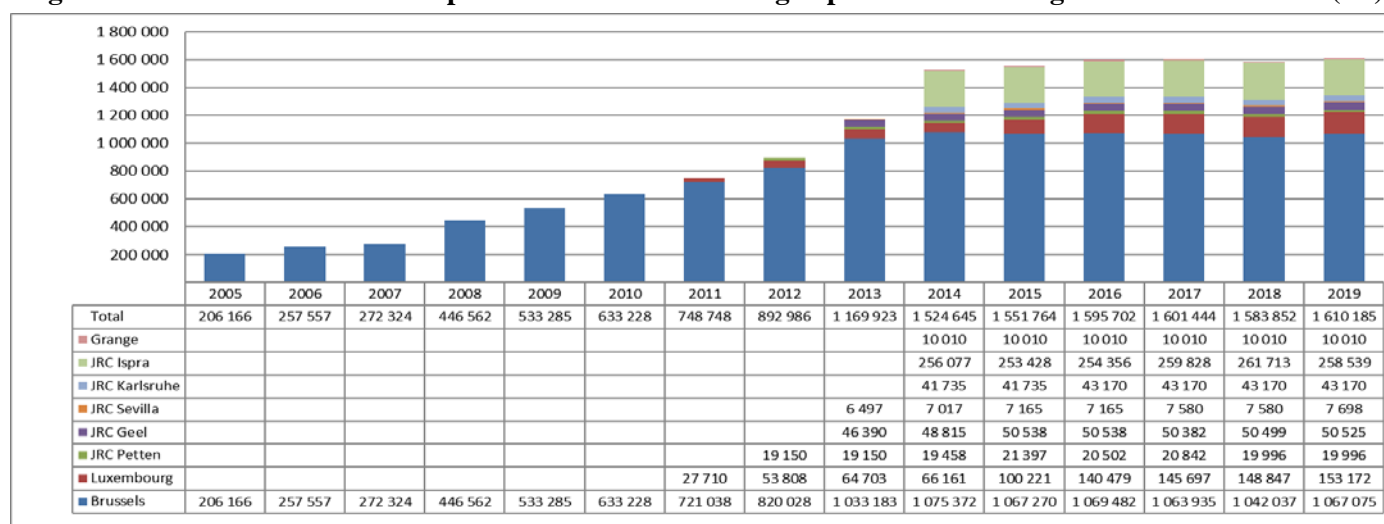
Since 2018, the EMAS Regulation requires that Registered Organisations take into account the EMAS Sector Reference Document (with Best Environmental Practices) for Public Administrations which came into force in late 2017.

1.6 The development of environmental management through EMAS at the Commission

Table 1.2 presents a chronology of the main developments in EMAS implementation at the Commission. Of particular significance was the introduction of the EMAS III Regulation⁶ in 2009, replacing the 2001 version and which made it easier to implement EMAS by making it possible to include sites in several different countries under one registration. This has greatly facilitated the expansion of the Commission's EMAS registration which, subject to ongoing administrative procedures by the Brussels EMAS authority, now covers eight sites in seven countries.

Historically and for operational reasons, the Commission separated the EMAS registration of its staff activities (departments) and buildings. While the system's communication aspects can be relatively quickly addressed enabling all staff across the Commission to be included, additional buildings must be inspected and certified by the national authorities. This is time consuming, and for this reason buildings at larger sites (Brussels and Luxembourg) have been added to EMAS each year according to resources available. Smaller sites, such as those of the JRC have been added whole. Figure 1.1 shows how the "useful" surface area within the EMAS scope has evolved and reflects progress in incorporating new buildings individually at Brussels and Luxembourg, and new sites.

Figure 1.1 The evolution of floor space in Commission managed premises⁷ to be registered under EMAS (m²)



⁵ Commission Regulation (EU) 2017/1505 of 28 August 2017 amending Annexes I, II and III to Regulation (EC) No 1221/2009. Registered organisations benefitted from transitional measures until 14 September 2018

⁶ Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC.

⁷ In Brussels this includes space occupied by three Executive Agencies. The premises of all Commission sites have been registered under EMAS other than Luxembourg where the 2019 registration will include 14 of 18 buildings, and Brussels 60 of 61 buildings:

Table 1.2 The Chronology of EMAS Implementation at the European Commission

Year	Action
2001	<ul style="list-style-type: none"> The EC launches a pilot exercise to apply EMAS (Regulation (EC) No 761/2001) to the activities and buildings of a number of its departments.
2005	<ul style="list-style-type: none"> The EC obtains the first EMAS registration for the activities of four Commission departments in Brussels, and covering eight buildings (based on data from 2002-4).
2005-9	<ul style="list-style-type: none"> More buildings were added to EMAS scope in Brussels, giving 32 in total for the verification exercise for 2009.
2009	<ul style="list-style-type: none"> EMAS III Regulation comes into force enabling the Commission to register sites in different Member States under one authority and with a single reference number.
2009	<ul style="list-style-type: none"> The EC decides to extend EMAS to all its departments in Brussels and Luxembourg with effect from 1 January 2010. New buildings are to be added annually in accordance with a schedule agreed in Brussels with the IBGE (Brussels Competent Body for EMAS).
2011	<ul style="list-style-type: none"> The registration was extended to include all EC departments in Brussels.
2012	<ul style="list-style-type: none"> The registration is further extended to include all its departments in Luxembourg and first two buildings (based on data reported for 2011).
2013	<ul style="list-style-type: none"> The EC decided to further extend the EMAS to the JRC sites in Europe and to SANTE Grange (Ireland). JRC Petten included in EMAS registration (based on data reported for 2012). Data is reported in this Environmental Statement for JRC sites at Geel and Seville in anticipation of their inclusion in the EMAS registration in 2014.
2014	<ul style="list-style-type: none"> JRC sites at Geel and Seville undergo successful verification and are included in the Commission's EMAS registration. JRC Karlsruhe's verification is postponed until 2015 for administrative reasons. EMAS begins to address the findings of the European Court of Auditor's (ECA) report 2014/14 into how the European Institutions address their Carbon Footprint. The Environmental Statement is upgraded by incorporating i) a new standardised approach for reporting at site level to ensure consistency among sites and a first step towards analysing the Commission's performance by aggregate site level data, ii) estimating greenhouse gas emissions associated with missions, and for Brussels also emissions associated with commuting; and iii) incorporating unit cost information to track management costs and key resource expenditure such as energy, water, waste disposal.
2015-6	<ul style="list-style-type: none"> Verification audits were successful at new sites JRC Karlsruhe, JRC Ispra, and SANTE Grange based on reporting for 2014. The Commission's EMAS registration includes eight sites in seven countries. Responding to the findings contained in the ECA's Carbon Footprint report, HR.D2 started to make the Commission's agencies aware of EMAS and to follow uptake among other European Institutions through the Inter-institutional Environmental Management Group (GIME). Longer term objectives for key environmental parameters were proposed to management targetting a 5% reduction over the period 2014 – 2020 in several parameters, and were adopted in early 2016, while automated workflows were became operational for the tracking of audit findings.
2017	<ul style="list-style-type: none"> Repeat verifications will again be sought at the eight Commission sites. Additional workflow solutions will be developed to track the status of environmental actions, and potentially to manage communications. The EC will continue to work closely with the other European Institutions and Agencies in relation to Carbon Footprint estimation and compensation specifically to respond to the European Court of Auditors Report on the subject, and by engaging in joint environmental awareness initiatives. The EC will continue to prepare for the EMAS Regulation coming into force in September 2018. This will include switching the timing of the internal and verification audits in 2018 so that the latter occurs in the first half of the year and the first in the second half.
2018	<ul style="list-style-type: none"> EMAS verification exercise undertaken in the first half of the year and demonstrates how the EC has addressed the new requirements of the EMAS Regulation including particularly expanded consideration of context and stakeholders' requirements. EMAS Sectorial Reference Document for Public Administrations published, and organisations must demonstrate how they have taken into account. Midterm review of performance for core parameters 2014-2020, resulting in raised targets for water, paper use, non hazardous waste generation, and vehicle fleet emissions.
2019	<ul style="list-style-type: none"> Expanded carbon footprint calculations implemented (and improved) for the second year, serving as baseline for DG CLIMA study investigating future Commission Greenhouse Gas reduction strategy Discussions with Executive Agencies to formally incorporate them into the Commission's system Exploratory discussions with European Parliament to incorporate (30+) Representations in Member States Incorporate EMAS actions into European Green deal Action Plan

In 2020 the EC will be seeking, re-registration of eight sites with 1,61 Million square metres of useful floor space, based on reporting for 2019. The number of staff working within the EMAS certified buildings⁸ has risen from just over 4 000 in 2005 to more than 35 000 in 2019.

1.6.1 The New EMAS Regulation requirements

The Commission published the sectoral reference document (SRD) for public administrations⁹ that entered into force in May 2019. An organisation must demonstrate that it has considered the document when, inter alia, defining indicators, establishing targets, reporting, and in particular identifying best practice and benchmarks for excellence.

During the two EMAS site coordinators workshops of 2019, the Commission evaluated its potential impact on the system. A table of compliance was constructed in 2020 to evaluate how the Commission behaves in relation to the SRD. The main outcomes of that evaluation were:

- The document formally applies to Brussels, Luxembourg, Seville and Grange sites (NACE code 84) and probably Ispra (NACE codes 36 and 37).
- The table demonstrates that the Commission implements the vast majority of the management actions and indicators proposed by the SRD.
- For NACE code 84, the Commission completely meets the requirements for five “benchmark of excellence”. It partially meets three others, but doesn’t meet a further three.

As a conclusion, the Commission is generally well aligned with the recommendations of the SRD and there is room for improvement to better meet the requirements of the benchmark of excellence. This will be developed in a cost effective way during the coming years.

1.7 Who implements EMAS in the Commission?

A College of Commissioners Decision¹⁰ ensures EMAS is implemented at a high level. DG.HR's Director General chairs the **EMAS Steering Committee**¹¹ (ESC) which meets twice yearly. It defines environmental policy, adopts the annual global action plan, sets environmental objectives and monitors progress. The ESC is where the Commission demonstrates EMAS leadership. In addition, and due to the Commission's decentralised organisation, management and line managers not directly involved in the ESC or without formally defined EMAS roles also participate in the system at different levels of responsibilities. A working group of the Commission's Management Board has recently been established to encourage closer links particularly between DG HR, SG and BUDG.

A team based in Brussels (**HR.D2**) within the Working Environment and Safety Unit of DG HR assumes day to day coordination. The **EMAS Management Representative** is responsible to Management for EMAS implementation, and is the contact point for external organisations such as IGBE (Brussels Environment) and other EU Institutions. It's two other full time staff members work predominantly on system coordination and on communication and training, and are assisted by a part time colleague.

⁸ In Brussels this also includes Executive Agency Staff (from three agencies) in the COVE building

⁹ Commission Decision (EU) 2019/61 of 19 December 2018 on sectoral reference document on the sectoral reference document on best environmental management practices, sector environmental performance indicators and benchmarks of excellence for the public administration sector under Regulation (EC) No 1221/2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

¹⁰ COMMISSION DECISION C(2013) 7708 of 18.11.2013 on the application by the Commission services of the Community eco-management and audit scheme (EMAS).

¹¹ The Steering Committee is made up of the following directorates-general and services: BUDG, CLIMA, DIGIT, ENER, ENV, HR, JRC, MOVE, SG, SANTE, MARE, RTD, SCIC, OIB and OIL (and several Executive Agencies are in the process of applying).

Owing to the Commission's size and geographic spread, HR.D2 works with a network of over 35 correspondents and eight site coordinators within the directorates general and departments and whose job descriptions include their EMAS responsibilities. The network includes:

1. **EMAS site coordinators:** at each of the eight sites who are HR.D2's main contact points and responsible for implementing EMAS at the site level. As such they report on performance at site level, contributing to the Environmental Statement and participate in preparing site level objectives and actions;
2. **EMAS correspondents** (only in Brussels) providing a link between their directorate-general/department and HR.D2, particularly for communication. The correspondents participate in formal meetings on average three times a year, usually before the start of information campaigns. They are nominated by their services;

EMAS site coordinators at OIB and OIL implement the system in Brussels and Luxembourg respectively as do those at the Joint Research Centre (JRC) and one located at DG SANTE at Grange. The JRC has EN ISO9001/14001 certifications, in addition to OHSAS 18001, which provides a useful base for introducing EMAS. HR.D2 communicates directly with the site coordinators. Other staff contribute to EMAS, for example when providing data for reporting on resource consumption or waste generation, or when participating in internal and verification audits. And all staff are exposed to communication campaigns, and can benefit from training designed to improve environmental behaviour. HR.D2 conducts an environmental survey every two years to gauge the evolution in staff attitudes.

1.8 Key components of the EMAS system

The main elements of the EMAS system are defined in the process diagram in Figure 1.2 which shows the steps required to achieve and maintain an EMAS registration.

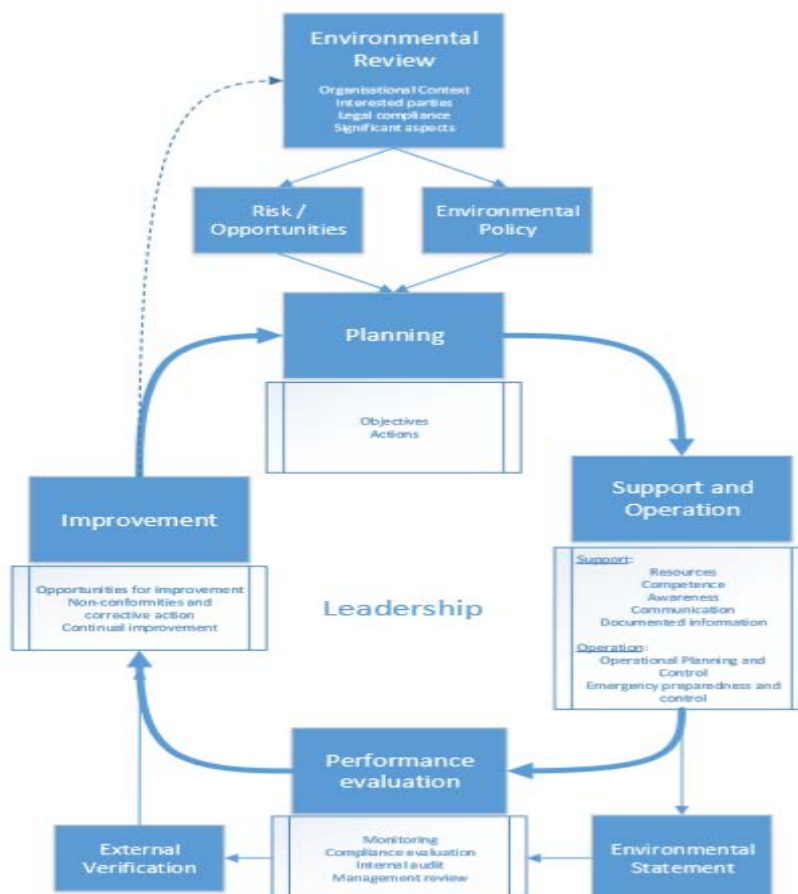



Figure 1.2 The EMAS Cycle

Further description of some of the elements are defined below. Most of the activities occur annually, but the whole cycle is completed in three years for practical purposes. The size and spread of the Commission's premises across Europe dictates that activities such as auditing are phased over the three year cycle.

1.8.1 The Commission's environmental policy

The environmental policy is one of the starting points of the environmental management system. It is signed by the Director General of DG HR, who chairs the EMAS Steering Committee and sets out the Commission's political objectives in concise terms. It is currently under review, and out to consultation with Steering Committee Members.



EMAS ENVIRONMENTAL POLICY

In 1997, the European Commission started a program of green housekeeping and, subsequently in 2001, decided to pilot the environmental management system EMAS¹ which allows organisations to participate voluntarily in a Community based eco-management and audit scheme (EMAS).

In 2009, the Commission decided to extend the environmental management system to all its activities and buildings in Brussels and Luxembourg.² In making this commitment the Commission recognised the positive contribution it can make to sustainable development in the long-term, through its policy and legislative processes, as well as through its day-to-day operations and decisions.

In 2013, the Commission decided to progressively extend the EMAS to all the research centers of the Joint Research Centre located in Petten (the Netherlands), Geel (Belgium), Karlsruhe (Germany), Seville (Spain) and Ispra (Italy), and to the Commission services located in Grange (Ireland).³ This extension includes all research activities.

Consequently, the Commission commits to minimising the environmental impact of its everyday work and to continuously improve its environmental performance by:

- (1) Taking measures to prevent pollution and to achieve more efficient use of natural resources (mainly energy, water and paper);
- (2) Taking measures to reduce overall CO₂ emissions (mainly from buildings and transport);
- (3) Encouraging waste prevention, maximising waste recycling and reuse, and optimising waste disposal;
- (4) Integrating environmental criteria into public procurement procedures and into the rules for organising events;
- (5) Complying with relevant environmental legislation and regulations;
- (6) Encouraging the sustainable behaviour of all staff and subcontractors through training, information and awareness-raising actions;
- (7) Progressively extending all the above to all its activities and buildings

And in relation to the Commission's core business by:

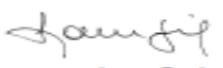
- (8) Systematically assessing the potential economic, social and environmental impacts of major new policy and legislative initiatives and promoting the systematic integration of environmental objectives into Community policies;
- (9) Ensuring the effectiveness of environmental legislation and funding in creating environmental benefits;
- (10) Promoting transparent communication and dialogue with all interested parties, both internally and externally.

By virtue of the powers conferred on the Appointing Authorities, the European Commission's EMAS Steering Committee hereby approves this Policy Statement, commits to adopt the Commission's EMAS objectives, targets and action plan, to supervise the system's implementation and to monitor the use of its allocated human and financial resources in order to ensure that the environmental management system runs efficiently.

The Commission's EMAS-registered buildings are noted at the latest EMAS Environmental Statement available at: http://ec.europa.eu/environment/emas/emas_ec/index_en.htm

This document shall take effect on the date of its signature,
Brussels, 24th April 2014

On Behalf of the EMAS Steering Committee,


Irene Souka
Chairman

1.8.2 Environmental review

According to the new EMAS regulation, the Commission defines its operational context, its legal obligations and determines which environmental aspects¹² related to its activities, products and services have (or may have) a significant impact on the environment and on the environmental management system (EMAS). It also considers the needs and expectations of interested parties, and decides which of these can become obligations in the management system.

All these elements are addressed at site level but the context and interested parties are also defined at corporate level. The above elements provide the basis to define appropriate actions taking into account both risks and opportunities. The Environmental Review provides a global overview of environmental considerations and a basis for defining strategy and objectives.

1.8.3 System documentation

HR.D2 maintains the system documentation of which the most important elements are the EMAS Handbook, which provides a system overview and defines roles and responsibilities. Sites must apply the three "central" procedures (or equivalent alternatives), and may develop their own standard operating procedures to cover local conditions.

The three central procedures are: i) EMAS environmental review; ii) Monitoring, reporting and planning and iii) Management of audits and verifications findings.

1.8.4 Monitoring of indicators and setting of objectives

EMAS requires organisations to continually improve their environmental performance, so they must identify indicators to measure and set objectives. While indicator and objective definition logically follows the environmental review conducted at each site and may therefore vary from site to site, Annex IV of the EMAS Regulation nevertheless defines "core" indicators for which data is expected to be collected, including energy efficiency, material efficiency, water consumption, waste generation, biodiversity and emissions.

According to the Regulation, and as an administrative organisation, the Commission expresses the core indicators first as output per person. The total number of employees within the EMAS area, is therefore a common denominator of most indicator measurements. In addition, in facilities managers use indicators, such as energy consumption and gas emissions that are commonly expressed per square metre.

Every year the Commission updates its Global Annual Action Plan. This comprises two elements:

- a review of the evolution of indicators against targets, and the setting or future targets; and
- an update in the status of existing actions and the identification of new actions to improve environmental performance and meet targets.

The EMAS Steering Committee approves the Global Action Plan annually. After consultation with the sites the ESC adopted medium term objectives for the period 2014-2020 for several indicators.

¹² Aspects evaluation undertaken according to Annex 4 of EMAS PRO 001 and considers for each aspect considering frequency, severity, breach of law, magnitude, applicable legislation, stakeholders concern, previous incidents and the possibility of taking action

Indicators are defined in the data tables contained in the individual reports for each site in Annexes A to H. These are grouped under eight main headings that encompass the political objectives set out in the Environmental Policy and as shown in Table 1.3. Not all sites report on all parameters:

Table 1.3 Summary of main policy objectives and associated indicators

No	Environmental Policy Objective	Indicators
Physically based parameters¹³		
I	More efficient use of natural resources	a) Total energy consumption (buildings), b) total energy consumption (site vehicles), c) renewable energy use, d) water consumption, e) office paper consumption and f) offset (professional printing) paper consumption.
II	Reducing CO ₂ emissions, (including CO ₂ equivalent of other gases) and other air pollutants	a) CO ₂ emissions from buildings energy consumption, b), other greenhouse gas emissions (as CO ₂ equivalent from buildings (ie refrigerants), c) vehicle CO ₂ emissions (manufacturer) d) vehicle CO ₂ emissions (actual) and e) actual total air emissions including SO ₂ , NO _x , PM. Also evaluated are emissions from other business travel, and for six sites, commuting, and for additional criteria adopted in 2018 and 2019 (fixed assets for buildings, IT, Commission vehicle fleet service contracts, and waste disposal).
III	Improving waste management and sorting	a) Total waste, b) controlled waste and c) separated waste (as % of total).
IV	Protecting biodiversity	a) Total use of land, b) sealed area, c) nature oriented area on/off site
Communication/training "soft" parameters¹⁴		
V	Promoting "greener" procurement	a) Percentage of contracts over 60.000 EUR incorporating additional "green" criteria and, b) degree of greening achieved in contracts according to criteria adopted ¹⁵ c) percentage, fraction and value of "green" products in the office supply catalogue,
VI	Ensuring legal compliance and emergency preparedness	a) Risk prevention and management, b) progress in registering for EMAS, c) non-compliance in external EMAS audits and d) emergency preparedness.
VII	Improving communication (sustainable behaviour of staff; suppliers, and training)	a) Centralised formalised EMAS campaigns, b) environmental training for new colleagues, c) take up of e-learning, d) staff awareness (through two yearly external survey), e) register of training needs and f) response to internal questions.
VIII	Enjoying transparent relations with external partners	a) Response to external questions, b) register of information sessions for main subcontractors and suppliers, c) register of local and regional stakeholders and d) dialogue with external partners.

¹³ Usually requiring invoices and/or measurements for their definition. For several resource consumption parameters, technical staff may also report results per square metre. This applies to "useful surface" areas which are often defined in lease or service contracts'

¹⁴ Results obtained in these areas will ultimately be seen through improvements in the areas of policy objectives I to IV, and most parameters measured input based.

¹⁵ As per recommendations of the ECA Special Report of 2014 on how the European Institutions measure and mitigate their Carbon Footprints.

This document summarises results for each site along with a Commission wide summary presented in the order in the above table and consistent with the Global Annual Action Plan.

1.8.5 Legal compliance

The Commission maintains European, National and, where relevant, Regional registers of applicable legislation for its sites. It applies host country legislation, and requires its contractors to do so, with a particular focus on maintenance and inspection contracts. Expectations and needs of interested parties can become an obligation for the Commission if accepted.

In addition to complying with general legislation applicable to its facilities, the Commission must fulfil the requirements of environmental permits, where these are granted by the authorities. In Brussels and Luxembourg individual buildings each have their own environmental permit. However the Commission seeks, when it is not the permit holder for example when renting premises, to ensure that the permit holder is compliant.

Each site is responsible for its own legal compliance which is checked through sampling each year as part of the activity of two audit campaigns organised and coordinated by HR.D2. In 2018 the timing of these was switched:

- "verification" audits that are required to maintain the EMAS registration and which will take place in the spring; and
- "internal" EMAS audits in the autumn.

HR.D2 also monitors the follow-up of these audit findings on a corporate register and reports on progress twice yearly to EMAS Steering Committee. Furthermore, each site undertakes routine operational checks and puts in place corrective actions under the normal working conditions (usually infrastructure services and/or health and safety units).

Sampling method for buildings audits:

The Commission is a multi-site organisation EMAS buildings/facilities in eight sites across seven countries. Buildings/facilities are verified each year in all these sites.

Buildings/facilities in Geel (Belgium), Petten (The Netherlands), Seville (Spain), Karlsruhe (Germany), Ispra (Italy) and DG SANTE at Grange (Ireland) are verified each year.

The administrative buildings of the Commission headquarters Brussels and Luxembourg are verified on a sampling method based on the EMAS users guide¹⁶. Any new buildings entering into the scope are verified the year they enter the scope and, in addition, some previously registered buildings are also verified. On average 12 buildings have been visited each year during the past years¹⁷.

¹⁶ Commission Decision (EU) 2017/2285 of 6 December 2017 Amending the user's guide setting out the steps needed to participate in EMAS, under Regulation (EC) n° 1221/2009 of the European Parliament and of the Council on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS).

¹⁷ The guide requests verification of the square root of the number of buildings multiplied by 2 for a registration renewal. That means for Brussels and Luxembourg a minimum of 17 buildings in the three years period before the registration renewal (based on 2019 figures).

2 THE COMMISSION'S ENVIRONMENTAL PERFORMANCE UP TO 2019

This section presents an overview of the individual results for the eight sites participating in EMAS, each of which has a separate report in Annexes A to H and where possible aggregated data representing the Commission. The Executive Summary includes a performance summary table including more parameters with aggregated Commission data only.

2.1 The Commission's progress towards targets for selected parameters for 2014-20:

Table 2.1 summarises the individual sites' and Commission performance trends in recent years and progress towards 2014-20 targets for selected (and often communicated) core parameters.

Performance has improved at most sites and for most parameters as indicated by a majority of figures showing improvement (**green**) in the right hand side of the table. Indeed some cases of apparently poor performance (**red**) can arise from particularly unusual circumstances, and could therefore be considered "artificial".

Table 2.1 Summary of performance for selected parameters at EMAS sites

Physical indicators (Number, description , unit)	Historic data values					Performance trend (%) since:				Target	
	First EMAS data ⁽¹⁾	2014	2017	2018	2019	First EMAS data ⁽¹⁾	2014	2017	2018	2020 ^(2,3,4)	Value
1a) Energy bldgs (MWh/p)											
Brussels	19,06	6,95	7,20	7,16	6,59	-65,4	-5,1	-8,4	-7,9	-5,0	6,600
Luxembourg	8,35	17,42	14,88	11,75	11,50	37,8	-34,0	-22,7	-2,1	-5,0	16,5
JRC Petten	37,46	23,99	23,95	26,41	24,24	-35,3	1,0	1,2	-8,2	-5,0	22,79
JRC Geel	60,62	51,21	55,76	53,09	49,81	-17,8	-2,7	-10,7	-6,2	-5,0	48,65
JRC Sevilla	11,17	9,13	8,11	6,87	6,29	-43,7	-31,1	-22,4	-8,5	-8,0	8,402
JRC Karlsruhe	78,64	64,03	68,64	73,06	76,90	-2,2	20,1	12,0	5,3	-5,0	60,83
JRC Ispra	53,22	44,32	42,86	43,39	41,92	-21,2	-5,4	-2,2	-3,4	-5,6	41,84
Grange	10,21	12,69	11,58	10,75	11,27	10,4	-11,2	-2,7	4,8	-5,0	12,06
Commission		11,57	11,77	11,35	10,62		-8,2	-9,7	-6,4	-5,2	10,97
1d) Water use (m³/person)											
Brussels	28,44	12,57	11,98	11,91	12,00	-57,8	-4,5	0,2	0,7	-8,0	11,56
Luxembourg	12,26	14,48	15,18	13,63	12,42	1,3	-14,2	-18,2	-8,9	0,0	14,5
JRC Petten	11,50	11,14	11,22	8,00	9,83	-14,5	-11,7	-12,3	22,9	-5,0	10,58
JRC Geel	79,57	34,75	26,95	28,97	28,61	-64,0	-17,7	6,1	-1,3	-5,0	33,01
JRC Sevilla	42,81	21,73	20,11	14,66	13,00	-69,6	-40,2	-35,3	-11,3	-5,0	20,65
JRC Karlsruhe	16,51	21,03	18,65	19,11	15,22	-7,8	-27,6	-18,4	-20,3	-5,0	19,98
JRC Ispra	1 517	734,9	776,9	799,8	615,0	-59,5	-16,3	-20,8	-23,1	-5,0	698
Grange	30,66	27,69	17,12	18,11	16,31	-46,8	-41,1	-4,8	-9,9	-5,0	26,30
Commission		67,75	63,66	64,82	50,98		-24,8	-19,9	-21,4	-5,4	64,09
1e) Office paper (sheets/p/day)											
Brussels	77,4	33,1	24,0	24,0	22,1	-71,4	-33,1	-7,7	-8,0	-35,0	21,49
Luxembourg	32,1	24,1	12,3	10,9	9,5	-70,3	-60,4	-22,5	-12,5	-40,0	14,4
JRC Petten	40,0	15,9	11,7	9,6	19,4	-51,6	22,1	65,9	101,7	-9,0	14,43
JRC Geel		20,4	11,3	11,3	12,4	0,0	-39,4	9,6	9,4	-5,0	19,41
JRC Sevilla	30,6	12,6	11,7	12,8	9,7	-68,4	-22,9	-17,6	-24,3	-5,0	11,92
JRC Karlsruhe		17,8	10,6	10,8	7,2	0,0	-59,4	-32,0	-33,0	-20,0	14,25
JRC Ispra	22,4	16,5	13,6	12,2	11,0	-50,8	-33,4	-18,7	-9,8	-20,0	15,06
Grange	0,0	9,9	20,2	18,7	16,5	0,0	66	-18,0	-11,5	-5,0	9,432
Commission		30,2	21,2	20,8	19,1		-36,9	-9,8	-8,1	-34	20,0
2a) CO₂ emissions from buildings (tonnes/person)											
Brussels	4,77	0,71	0,70	0,69	0,64	-86,5	-8,9	-8,6	-6,4	-5,0	0,671
Luxembourg	0,18	1,61	1,59	1,33	1,26	602,7	-21,5	-20,6	-5,1	-5,0	1,5
JRC Petten	14,85	10,00	8,99	3,04	2,79	-81,2	-72,1	-69,0	-8,3	-7,0	9,296
JRC Geel	17,57	14,83	16,15	4,34	3,56	-79,7	-76,0	-77,9	-18,0	-5,0	14,09
JRC Sevilla	4,54	3,09	2,79	2,31	1,79	-60,5	-41,8	-35,7	-22,2	-5,0	2,931
JRC Karlsruhe	19,37	18,34	20,51	20,46	19,45	0,4	6,1	-5,2	-5,0	-5,0	17,42
JRC Ispra	12,39	10,27	9,90	9,65	9,33	-24,7	-9,2	-5,8	-3,4	-5,6	9,695
Grange	4,18	4,91	4,09	3,69	3,85	-7,9	-21,5	-5,8	4,3	-5,0	4,663
Commission		1,94	1,85	1,64	1,52		-22,1	-18,0	-7,4	-5,1	1,85
3a) Non hazardous waste (tonnes/person)											
Brussels	0,300	0,222	0,208	0,188	0,186	-38,0	-16,2	-10,6	-1,1	-10,0	0,200
Luxembourg	0,25	0,103	0,18	0,13	0,13	-47,1	26,6	-27,4	-3,8	0,0	0,1
JRC Petten	0,08	0,105	0,14	0,11	0,10	25,2	-7,4	-28,9	-15,3	-5,0	0,100
JRC Geel	0,267	0,479	0,358	0,292	0,249	-6,8	-48,1	-30,6	-14,9	-5,0	0,455
JRC Sevilla	0,000	0,022	0,035	0,031	0,044	0,0	96,7	24,6	39,8	-5,0	0,021
JRC Karlsruhe	0,000	0,333	0,248	0,269	0,246	0,0	-26,0	-0,6	-8,4	-20,0	0,266
JRC Ispra	0,474	0,491	0,507	0,546	0,508	7,1	3,4	0,1	-6,9	NA	NA
Grange	0,000	0,251	0,206	0,253	0,230	0,0	-8,6	11,7	-9,1	-5,0	0,239
Commission		0,237	0,223	0,203	0,198		-16,6	-11,2	-2,7	-9,7	0,214

Note: NA - not applicable, (1) Earliest reported data: 2005 -Brussels, Grange; 2008 - Karlsruhe; 2010 - Petten, Seville; 2011 - Geel, Ispra, Luxembourg; (2) Compared to 2014; (3) EMAS Annual Action Plan 2020

In Luxembourg, in order to give more representative overall results, reporting¹⁸ for most parameters since 2015 has been for the entire site. Some parameters such as paper supply may be irregular and in large volume particularly in small sites (eg SANTE at Grange), making trends in usage difficult to follow. Similarly some hazardous waste removals may also be irregular. Sites experienced improved performance for many parameters, and Luxembourg and JRC Ispra achieved improvements for all the above parameters.

In relation to **per capita buildings' energy consumption**¹⁹:

1. Brussels, Petten, Geel, Sevilla and Grange have all achieved 5 to 10% reductions in 2019 (over 2018);
2. The most populous sites, Brussels, Luxembourg and Ispra have experienced reductions from 2014 to 2019 (of 5, 34 and 5% respectively), so the Commission's overall reduction target of 5.2% for 2014-20 was exceeded (8.2%). Luxembourg's improved figures are largely due to occupying more modern buildings after vacating the JMO building.
3. As an active nuclear site with legally imposed ventilation requirement, Karlsruhe has less control over their energy consumption.

In relation to **per capita water use**:

1. JRCs Karlsruhe and Ispra achieved more than 20% reductions since 2018, while Luxembourg, Sevilla and Grange reduced consumption by around 10%. Consumption in Brussels was little changed over 2018, while a larger consumption was recorded at JRC Petten;
2. All sites have achieved reductions from 2014 to 2019; Grange and Seville by 40%, Karlsruhe by 28% while Luxembourg, Petten, Geel and Ispra reduced consumption by more than 10%. Consequently the Commission achieved a 25% reduction, exceeding the Commission's target of 5.4 % for 2014-20.

In relation to **per capita office paper consumption**:

1. Six of eight sites have reduced consumption in the last year, Karlsruhe by 33%.
2. All sites have achieved between 20% and 60% reduction from 2014 to 2019 with a Commission value of 37% already exceeding the revised 2014-20 target of 34%.

In relation to **per capita CO₂ emissions from buildings energy consumption** (which normally correlates with energy consumption):

1. Geel and Seville reduced emissions by around 20% since 2018 and most other sites also recorded reductions in the last year.
2. Seven of eight sites have reduced emissions since 2014, Petten and Geel by the greatest amount owing to the introduction of contracts for electricity from renewable sources. Overall Commission reduced emissions by 22% compared to a target of 5%.

In relation to **non-hazardous waste** generation:

1. Seven sites reduced generation since 2018, Petten and Geel by around 15%. JRC has recorded an increase, but from a very low figure.
2. The Commission reduction of 17% already exceeds the 2014 to 2020 target of 9.7% reduction. The largest reductions were at Brussels (16%), Karlsruhe (26%) and Geel (48%). The 2014 data baseline data for Luxembourg didn't take into account the JMO whose closure in the following years resulted in a significant increase in waste generation in 2015.

¹⁸ For verification purposes data for EMAS registered buildings only is also available. Reporting only on EMAS registered buildings made it more difficult to discern trends from year to year - particularly when newly registered buildings were very different to existing ones

¹⁹ Measured as final energy (ie through meter readings)

2.2 Description of activities

Brussels is the main site, the Commission's administrative centre, with a range of buildings dominated by offices but including conference centres, catering facilities, storage depots, print shops, childcare facilities, and sports facilities. The Luxembourg site is of a similar nature, though smaller but also includes a small nuclear laboratory operated by DG ENER.

The five JRC sites are all incorporated under EMAS and include:

- JRC's main site at Ispra (Italy): a large campus with offices and research facilities, encompassing in addition many of the activities of a small town with its own power plant, fire station and water treatment works, and over 400 buildings in total. Most of its nuclear activities (including reactors), are no longer operational. Nuclear plants and storage facilities are under a decommissioning programme which aims to restore "green field" status by 2038.
- JRC Karlsruhe (Germany) a relatively modern self-contained site located in a research campus on the outskirts edge of Karlsruhe, with ongoing nuclear activities.
- JRC Petten (Netherlands) accommodates experimental equipment notably conducting research on fuel cells.
- JRC Geel (Belgium) contains Van de Graaff and Gelina Nuclear Accelerators, large power hungry installations, and an array of laboratories.
- JRC Seville (Spain) has advanced computing infrastructure, but lacks experimental laboratories. From an EMAS perspective, it is more similar in nature to the administrative centres of Brussels and Luxembourg, than to the other JRC sites, with the added complexity of being in wholly rented accommodation.

DG SANTE's site at Grange Ireland is a purpose built low level wooden clad structure dating from 2002 and set in countryside 45km north west of Dublin. It accommodates Directorate F, Health and Food Audits and Analysis but was formerly known as the Food and Veterinary Office (FVO). Many staff members are inspectors or auditors and travel frequently, and typically up to half may be away from the office at any one time.

Table 2.2 presents the NACE²⁰ codes for the Commission's eight EMAS sites.

²⁰ Statistical classification of economic activities in the EU

Table 2.2 NACE codes and descriptions of activities at the sites

Code	Description	Brussels	Luxembourg	JRC Petten	JRC Geel	JRC Seville	JRC Karlsruhe	JRC Ispra	SANTE Grange
99	Activities of extraterritorial organisations and bodies	✓	✓	✓	✓	✓	✓	✓	✓
84.1	Administration of the State and the economic and social policy of the community	✓	✓						✓
71.2	Testing and technical analysis		✓	✓	✓		✓	✓	
72.1	Research and experimental development in natural sciences and engineering			✓	✓		✓	✓	
72.2	Research and experimental development on social science and humanities					✓			
35.11	Production of electricity							✓	
35.30	Steam and air conditioning supply							✓	
36.00	Water collection, treatment and supply							✓	
37.00	Sewerage							✓	

Characteristics of the sites in terms of staff and infrastructure are shown below:

Table 2.3 Basic characteristics of the Commission EMAS sites 2019

Site	Staff		Buildings for registration		Useful surface (m ²)	
	EMAS	Total	EMAS	Total	EMAS	Total
Brussels (all EMAS buildings)	27 440	27 866	60	61	1 067 075	1 069 020
Luxembourg	4 355	5 138	14	18	153 172	181 623
JRC Petten	249	249	12	14	19 996	19 996
JRC Geel	262	262	16	16	50 525	50 525
JRC Karlsruhe	315	315	4	4	43 170	43 170
JRC Seville	368	368	1	1	7 698	7 698
JRC Ispra	2 332	2 332	384	384	258 539	258 539
Grange	176	176	3	3	10 010	10 010
Total	35 497	36 706	494	501	1 610 185	1 640 581

The Brussels site clearly dominates staff numbers with approximately three times more total staff than the other sites combined. Both Brussels and Luxembourg have buildings and facilities spread out throughout their respective cities and have implemented EMAS gradually. Brussels includes all its occupied buildings²¹ within EMAS reporting effectively completing a phased implementation that started with its first EMAS registration in 2005 which included eight buildings. The MERO and MO15 buildings in Brussels were incorporated into the EMAS registration in 2019. Luxembourg signed the lease for a new more efficient building for the office of publication in 2019.

Luxembourg started EMAS registration for its buildings in 2011 and by 2019 EMAS registered buildings accounted for 84% of floor space and accommodating 85% of staff. It will incorporate the remaining buildings by 2021²². As self-contained sites²³, each of the JRC sites and SANTE Grange are incorporated "whole" into EMAS.

²¹ Buildings managed by OIB, Executive Agencies in COVE buildings, PALM building excluded.

²² FISCHER building in 2021 – remaining buildings CPE1 & 2 and Maison d'Europe may be replaced

²³ JRC Seville occupies part of a commercial building.

2.3 Corporate Organisational context and interested parties

The evaluation of the context and interested parties has been undertaken for each site individually and is described in the corresponding annexes to this report.

At corporate level the most important contextual issue identified was the high level of expectations for the system and the relatively limited resources available for implementation. These arise from the political, social and technological context but also the culture of excellence and staff expectations that are quite demanding. The limited financial resources requires constant improvements in efficiency and more prioritising between EMAS actions. The associated risk is summarised as a high level of stress and delivery constraints, but this offer the opportunity to promote the EMAS and its achievements at the Commission.

HR.D2 has identified needs and expectation of 14 interested parties in relation to the EMAS system at corporate level, with reputational risk being the most common. This is mainly due to their expectations of information, support, coordination which exceed the available means. Internal interested parties are more concerned by operation support and cooperation. The major target to respond to their expectations is to maintain a high level of quality in the EMAS deliveries and coordination.

As a more targeted part of the exercise to identify stakeholders needs and expectations at corporate level, the services represented on the Steering Committee have expressed their views. Follow up operational meetings have been held to determine possible follow up actions. DG CLIMA proposed a study to determine what intermediate and long term targets could apply for carbon reduction, including carbon neutrality, and how these could be achieved.

The Commission's Green Deal puts additional demands on the EMAS Coordination team. The requirement for high level briefings, and requests from internal stakeholders for further assistance of guidance in light of the Green Deal has stretched resources further.

2.4 Environmental impact of Commission activities, indicators and targets

Each site reviews its environmental impact in order to identify those that are significant and determine how they should be managed. Details are presented in the annexes to this report, and summarised in Table 2.4. There is no separate review for the Commission as a whole.

Table 2.4 also includes objectives for Commission wide indicators associated with the target for 2014 - 2020 performance. The table indicates that resource consumption, particularly in relation to energy, CO₂ emissions and other air emissions along with managing waste generation are particularly significant at most sites.

Table 2.4 Significant environmental aspects at EMAS sites 2019, associated indicators and Commission level targets for 2014-2020

A/ Significance of aspects at site level									B/ Indicator and Commission level target for 2014-20 (where stated)			
Political objective group and significant aspect	BX	LX	PE	GE	SE	KA	IS	GR	Indicator	Units	Target % ⁽¹⁾	Target
1) Efficient resource use												
Buildings energy consumption	✓	✓	✓	✓	✓	✓	✓	✓	1a Total energy consumption (bldgs.)	MWh/p kW/m ²	-5.2 -5.2	11,0 222
	✓						✓		1c Non-renewable energy use	EUR/p %	-4.6 -3.3	749 60,8
Vehicle energy consumption	✓						✓		1b vehicle energy consumption	MWh/p kW/m ²		
Water consumption	✓	✓	✓	✓			✓		1d Water consumption	M ³ /p L/m ²	-5.4 -4.8	64.1 1 308
										EUR/p	-1.3	55.0
	✓		✓	✓			✓			T/p Sheet/p/d	-34 -34	0,0198 20.0
Paper consumption	✓								1e Office paper consumption			
2) Reducing emissions to air												
CO ₂ emissions (from buildings energy consumption)	✓	✓	✓	✓		✓	✓		2a CO ₂ emissions (buildings)	TCO ₂ /p kgCO ₂ /m ²	-5.1 -5.2	1,86 37,6
Equivalent CO ₂ emissions refrigerants (from buildings)	✓			✓	✓	✓	✓	✓	2b Refrigerant losses	TCO ₂ /p kgCO ₂ /m ²		
Emissions from transport, including all missions and commuting (indicators only applies to Commission vehicle fleet)	✓						✓		2c CO ₂ emissions (vehicle fleet) manufacturer actual	gCO ₂ /km gCO ₂ /km	-14 -4.9	144 260
Emissions of particles, dust, noise etc	✓		✓				✓	✓	2d Bldgs emissions(NOx,SO ₂ ,	Tonnes/p		
Nuclear emissions		✓	✓	✓		✓	✓					
3) Improving waste management												
Non hazardous waste	✓	✓	✓	✓			✓	✓	3a Non-hazardous waste	T/p	-9.7	0,214
Hazardous waste	✓	✓	✓	✓			✓	✓	3b Hazardous waste	T/p		
									3c Separated waste	%	+6.0	66,7
Wastewater/liquid waste	✓	✓	✓	✓			✓	✓	3d Non dom. wastewater discharge	m ³ /p		
Nuclear waste						✓	✓					
4) Protecting biodiversity												
Protecting biodiversity	✓						✓		4a Use of land, sealed area,	m ² /p,		
5) Promoting green procurement												
Contractor behaviour	✓						✓		5a Contracts with "eco" criteria Degree of greening criteria	%		
6) Legal compliance and emergency preparedness												
Ensuring emergency compliance and preparedness	✓		✓	✓								

2.4.1 The Annual Action Plan

The EMAS Steering Committee adopted the 2019 EMAS Global Annual Action Plan, prepared in the manner introduced in 2018, and with progress towards the objectives for each site, grouping actions by category.

2.4.2 Targets

These were formulated through consultation with the sites and cover most of the significant aspects that were identified by a majority of sites. The Commission level target is a weighted average of sites' individual targets. Following a mid-term review of performance from 2014-17, the EMAS Steering Committee revised some **Commission level targets** for 2014-2020 (Table 2.4) for core parameters, making them more ambitious (water use, paper consumption, vehicle fleet emissions, non-hazardous waste).

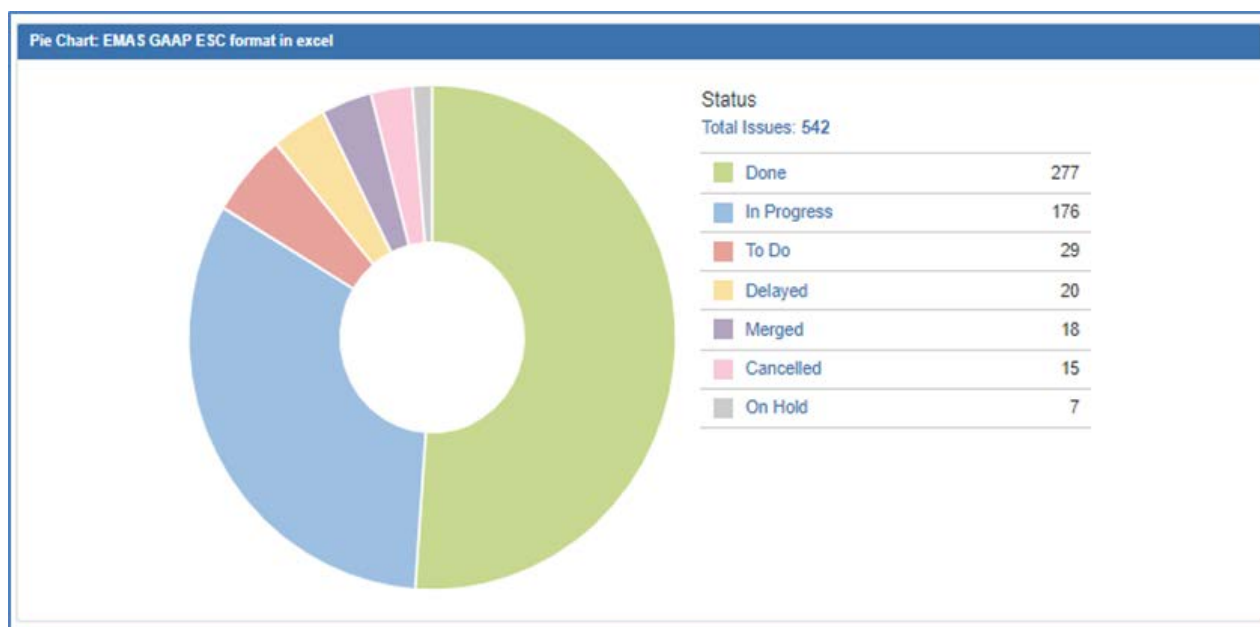
Sites may also develop individual targets or objectives for indicators for which no Commission level target has been set. This may be the case for example in the sites with nuclear activity or communication or training activities.

2.5 Actions for mitigation

2.5.1 Number and status of actions

The EMAS Global Annual Action Plan has at its core a database of nearly 500 actions, past and present, across all the sites that seek to improve the Commission's environmental performance. Every January the EMAS Steering Committee formally adopts a new plan, and the January 2020 plan included the actions described in Figure 2.1.

Figure 2.1 Status of actions in the EMAS Global Annual Action Plan 2020²⁴



²⁴ ARES(2020)1660180

Although roughly half of the actions have been completed, they are retained on the database for reference.

2.5.2 Breakdown of actions by main objective

The actions are distributed across the Commission's main environmental objectives according to Table 2.5 which shows that the Commission continues to add new actions to respond to most environmental objectives.

Table 2.5 Evolution of actions by main objective in the GAAP, 2018-20

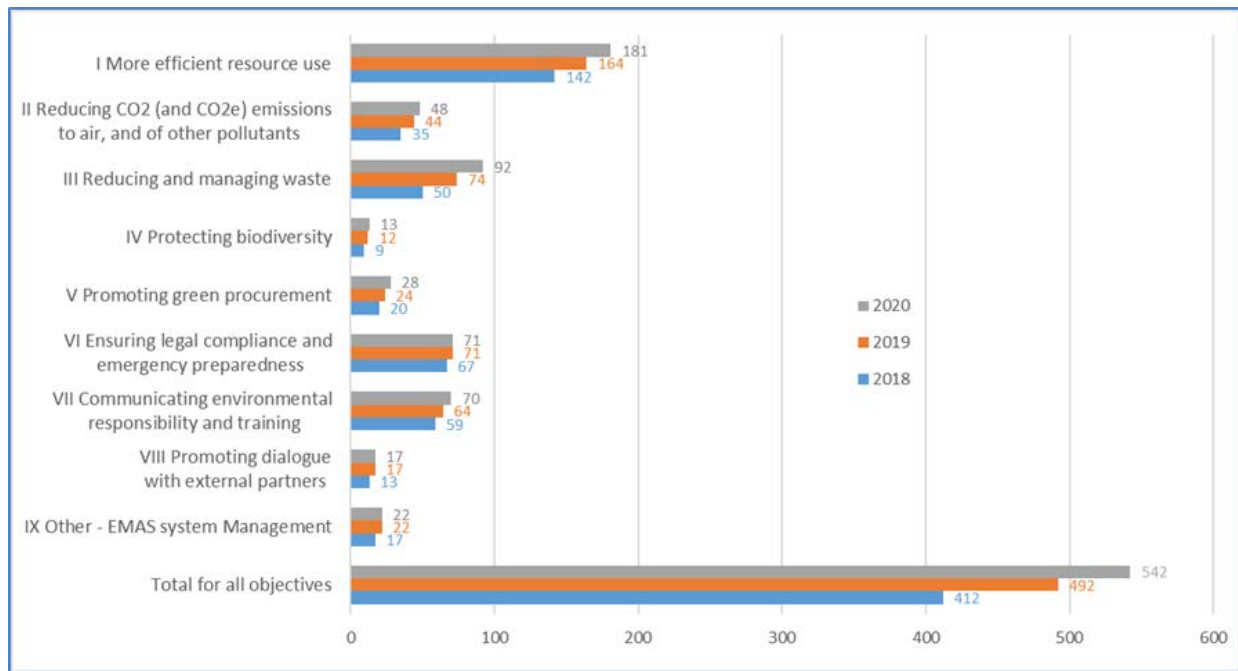


Figure 2.5 shows that most main objectives recorded an increase in the number of actions particularly **I – More efficient energy use**, and **III Reducing and managing waste**. The rise for the latter category was in large part due, to the proliferation of actions under DGs ENV and MARE initiative to reduce single use plastics in line with Commission pledges for the Our Ocean Conference in Malta in 2017, and ongoing work in that area.

The objective **I – More efficient resource use** includes energy, water and paper consumption, and are broken down as in the 2020 Global Annual Action Plan according to the following indicators which have objectives described in Table 2.4.

Table 2.6: Objective I More efficient resources use, actions by indicator

Indicator	Description	Actions (No)	Actions (% of total)
1a	Reducing buildings' energy consumption	119	22
1d	Reducing water consumption	23	4
1e	Reducing office paper consumption	22	4
1c	Reducing use of non-renewable energy	8	2
1b	Reducing fleet vehicle energy consumption	2	0,4
1	General awareness	5	0,9

Reducing buildings' energy consumption is the overwhelming priority, the number of actions representing nearly one quarter of all the actions in the database.

2.5.3 Breakdown of actions by main objective and site

Table 2.7 presents the distribution of actions with “active” status, ie those not “cancelled” or “done”.

Table 2.7 Distribution of ‘active’¹ actions by site for main objectives

Two Dimensional Filter Statistics: EMAS GAAP (all active - IP,TD,OH, DE)									
Main objective	Brussels	Grange	JRC Geel	JRC Ispra	JRC Karlsruhe	JRC Petten	JRC Sevilla	Luxembourg	T:
I More efficient resource use	26	5	7	19	3	2	3	16	81
II Reducing CO2 (and CO2e) emissions to air, and of other pollutants	4	0	1	6	0	0	3	4	18
III Reducing and managing waste	11	3	3	9	0	0	4	8	38
IV Protecting biodiversity	0	2	3	4	0	1	0	0	10
V Promoting “green” procurement	5	0	0	3	0	1	2	2	13
VI Ensuring legal compliance and emergency preparedness	8	0	2	1	2	0	2	1	16
VII Communicating environmental responsibility and training	19	1	2	1	0	0	3	3	29
VIII Promoting dialogue with external partners	6	1	0	2	0	0	3	1	13
IX Other - EMAS System Management	10	0	0	0	0	0	3	1	14
Total Unique Issues:	89	12	18	45	5	4	23	36	232
Grouped by: Site resp. Showing 9 of 9 statistics.									

The largest sites, Brussels, Luxembourg and JRC Ispra have the greatest number of total actions.

Given the relative importance and high number of energy reduction actions (within more efficient resource use), the number of actions that seek to reduce emissions appears relatively low. However this is because most actions that reduce energy consumption also reduce emissions, and these are not counted separately in this this analysis. The data also shows:

- Resource consumption dominated the actions at most sites, Luxembourg and JRC Seville being exceptions perhaps owing to a larger proportion of rented accommodation.
- There were also many actions relating to communication and legal compliance. Legal compliance actions were a significant proportion of the total at Brussels and Luxembourg because individual buildings in both cities require environmental permits. And JRC Karlsruhe operates under extensive legal operating requirements and is very closely monitored by the German authorities owing to its nuclear activities. The JRC sites and DG Grange at SANTE don’t require registration of individual buildings because their special legal status permits them to be incorporated into EMAS as a whole.

The relatively large number of actions for more efficient resource use, and waste is in line with important international policy developments. To slow global warming by limiting greenhouse gas emissions, at the United Nations Climate Change Conference in Paris 2015 (COP 21) all 195 countries adopted the first universal climate change agreement aiming to limit temperature rise to well under 2 degrees Celsius by the end of the century. Under the agreement the EU will seek to reduce CO₂ emissions by 40% in 2030, although the Commission is planning to increase this to 55%. The Commission has also called for a climate neutral Europe by 2050, and the Commission has itself declared an ambition to become greenhouse gas neutral for 2030 under the **Green Deal**.

The EU recently adopted the circular economy package to reduce waste generation and under which by 2030 the EU should achieve common municipal waste recycling target of 65%, 75% target for recycling packaging waste, and an EU wide landfill reduction target of 10%.

2.5.4 EMAS objectives and the UN Sustainable Development Goals (SDGs)

The 17 SDGs are part of the 2030 Agenda for Sustainable Development, which includes a Political Declaration and a High Level Political Forum for follow up. They apply to all countries, incorporating economy, environmental and social pillars of sustainability, and underpinned by the '5Ps' (people, planet, prosperity, peace and partnership). Countries report on progress in voluntary annual reports.

They have been referred to as the 'closest thing' the world has to an overall plan. The 17 high level objectives were developed by working groups of the UN Member States and other organisations, and include a total of 169 targets under the 17 headings. They follow on from the Millenium Development Goals that applied only to developing countries. The 17 SDGs can be grouped as follows:

- 1 to 5 - parameters carried over from the Millenium Development Goals
- 6 to 11 - new areas
- 12 to 15 - the 'green' agenda
- 16 - peace
- 17 - means of implementation and partnership

Table 2.8 shows the coherence of the Commissions main EMAS objectives and core indicators with certain SDGs. There is considerable overlap in the definition.

Table 2.8 EMAS core indicators of global objectives and selected SDGs

EMAS global objectives and associated core indicators	Selected Sustainable Development Goals											
	3, Global health and wellbeing	4, Quality education	6, Clean water and sanitation	7, Affordable and clean energy	9, Industry innovation and infrastructure	11, Sustainable cities and communities	12, Responsible consumption and production	13, Climate action	14, Life below water	15, Life on land	16, Peace, justice and strong institutions	17, Partnerships for the goals
	1) Efficient resource use											
	1a Total energy consumption (buildings)											
	1c Non-renewable energy use											
	1b vehicle energy consumption											
	1d Water consumption											
	1e Office paper consumption											
	2) Reducing emissions to air											
	2a CO ₂ emissions (buildings)											
2b Refrigerant losses												

EMAS global objectives and associated core indicators	Selected Sustainable Development Goals											
	3, Global health and wellbeing	4, Quality education	6, Clean water and sanitation	7, Affordable and clean energy	9, Industry innovation and infrastructure	11, Sustainable cities and communities	12, Responsible consumption and production	13, Climate action	14, Life below water	15, Life on land	16, Peace, justice and strong institutions	17, Partnerships for the goals
2c CO ₂ emissions (vehicle fleet) manufacturer, actual												
2d Buildings emissions (NO _x ,SO ₂ , PM ₁₀)												
Nuclear emissions												
3) Improving waste management												
3a Non-hazardous waste												
3b Hazardous waste												
3c Separated waste												
3d Non domestic wastewater discharge												
Nuclear waste												
4) Protecting biodiversity												
4a Use of land, sealed area, natural areas												
5) Promoting green procurement												
5a Contracts with "eco" criteria												
6) Legal compliance and emergency preparedness												
7) Communicating environmental responsibility and training												
8) Promoting dialogue with external partners												

The breakdown of actions by site in the 2020 action plan included the actions in Table 2.9:

Table 2.9: Distribution of actions according to Sustainable Development Goals

SDG1	Brussels	Grange	JRC Ispra	JRC Sevilla	Luxembourg	T:
4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	0	0	1	0	0	1
6 Ensure availability and sustainable management of water and sanitation for all	1	1	6	0	1	9
7 Ensure access to affordable, reliable, sustainable and modern energy for all	26	0	13	0	10	49
9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	0	0	3	0	1	4
11 Make cities and human settlements inclusive, safe, resilient and sustainable	10	0	5	0	4	19
12 Ensure sustainable consumption and production patterns	31	6	18	1	14	70
13 Take urgent action to combat climate change and its impacts	18	0	0	0	4	22
15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	3	1	4	0	0	8
17 Strengthen the means of implementation and revitalize the global partnership for sustainable development	16	0	2	0	3	21

Further work is required to cross-reference older actions with SDGs

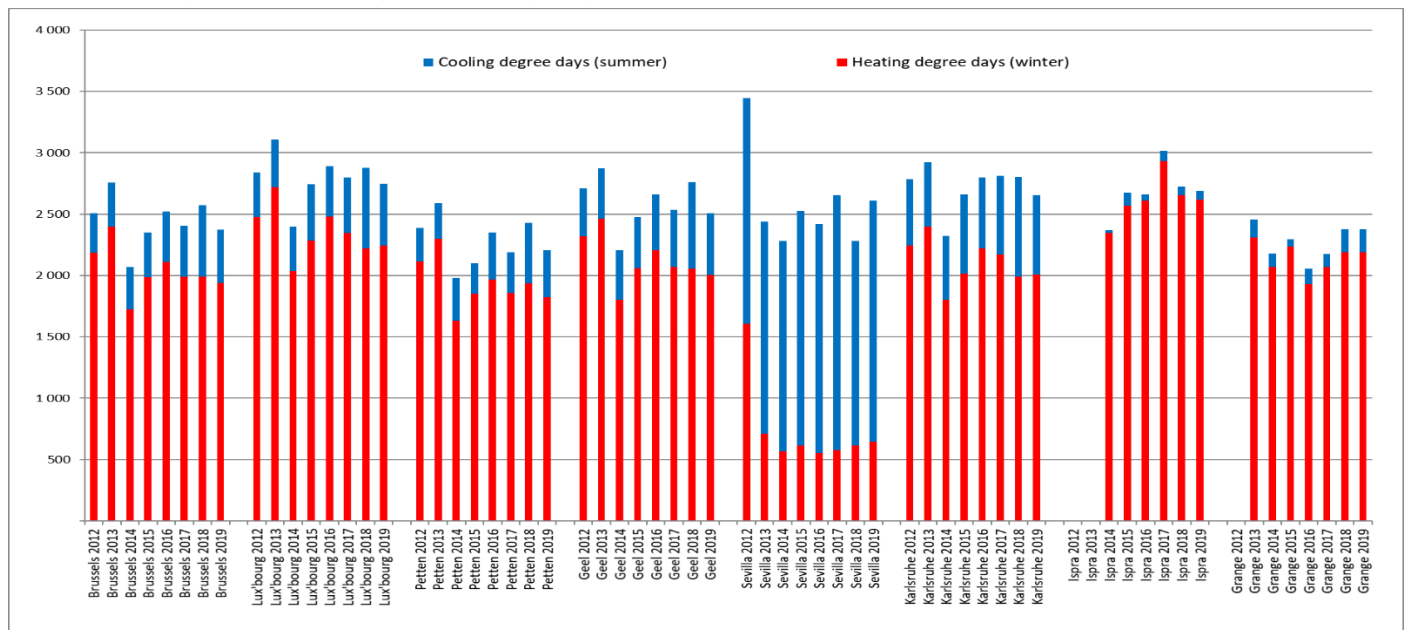
3 MAKING MORE EFFICIENT USE OF NATURAL RESOURCES

3.1 Energy consumption

3.1.1 Climate influence

Climate influences buildings' energy consumption. One simple means of describing the annual variability in climate is temperature, and Figure 3.1 shows the annual number of heating degree-days and cooling degree-days for meteorological stations near the Commission EMAS sites since 2012.

Figure 3.1 Heating and cooling degree-days for weather stations close to the EMAS sites



Comparing the total number of degree-days from year to year at a site will suggest whether in a given year, and all other factors being equal, more or less energy consumption could be expected. In Figure 3.1, it is noteworthy that:

- the more northern continental sites (Brussels, Luxembourg, Petten, Geel and Karlsruhe) all experienced fewer degree days in 2019 than 2018 (a reverse of the previous year's trend) and would, other factors being equal, need more energy ²⁵ than in 2017.
- Grange and Ispra were little changed over 2018 but Sevilla recorded a rise in degree days, particularly during the summer, indicating that more cooling would have been expected in 2019.

Figure 3.1 also shows that the 2014-20 target for reducing energy consumption (based on final energy) will be challenging because the baseline year 2014 was relatively mild in comparison to later years.

²⁵ But factors such as humidity and windspeed are also important.

3.1.2 Energy use in buildings, breakdown by site

Figure 3.2 Buildings' energy consumption at EMAS sites in 2019 (MWh)

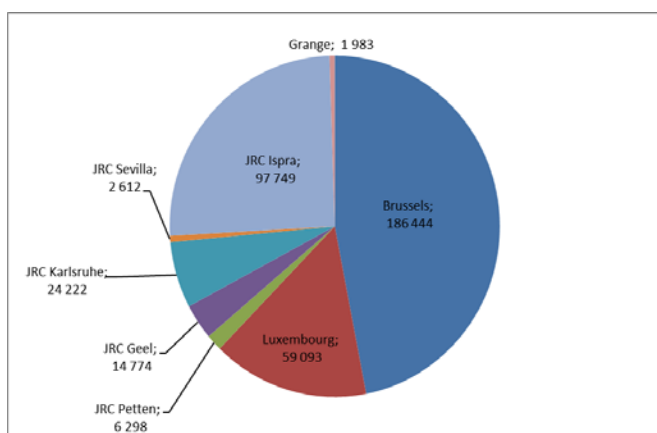


Figure 3.2 shows that Brussels and JRC Ispra²⁶ account for nearly three quarters of energy consumption at the Commission sites, reflecting that they have the largest amount of infrastructure.

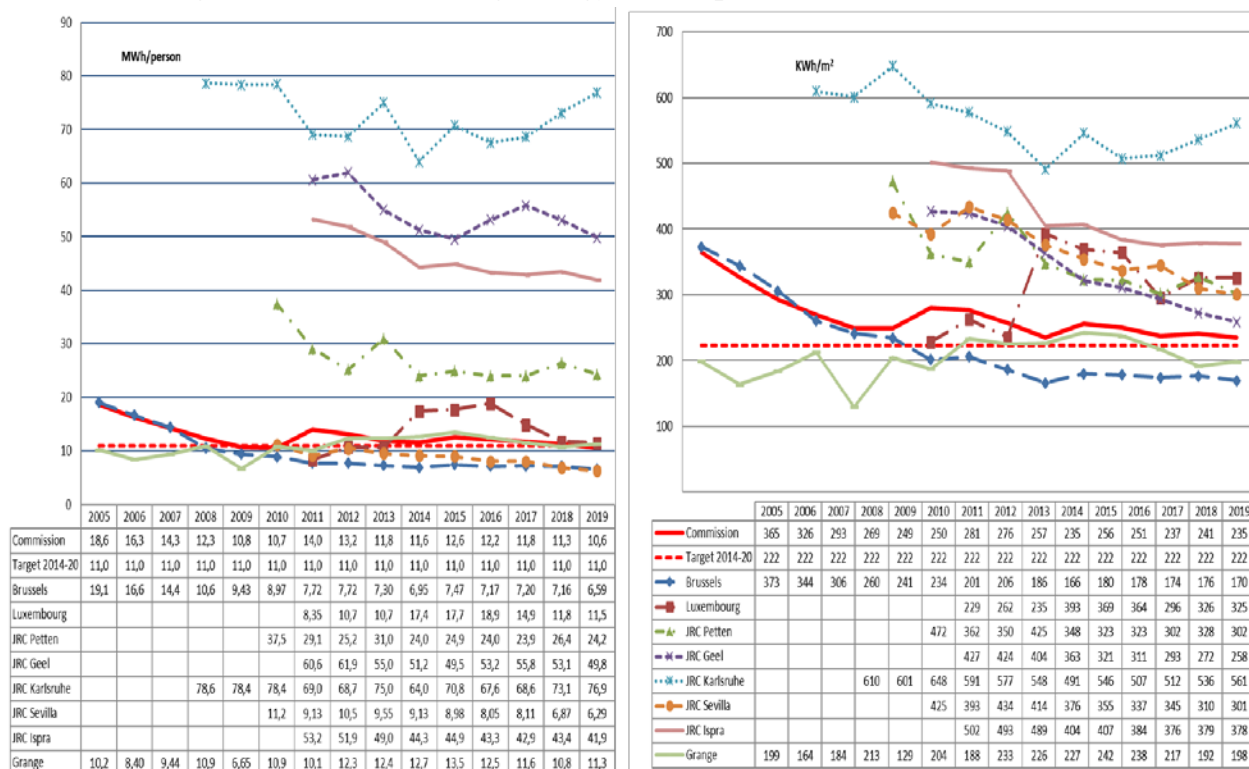
Luxembourg is the third highest overall consumer of energy, with over double the consumption of Karlsruhe which is a much smaller site both in terms of staff and total square meters.

Figure 3.3 shows the evolution in per capita and per square meter buildings energy consumption for the EMAS sites, together with the Commission value obtained by aggregating and the values for individual sites and the target for the period 2014-2020.

individual sites and the target for the period 2014-2020.

Although degree-day data suggest mixed climatic conditions in 2019 overall Commission consumption continued the decreasing trend since 2015.

Figure 3.3 Annual buildings energy consumption at Commission sites to 2019²⁷



²⁶ JRC Ispra has its own power plant to produce electricity based on gas (methane).

²⁷ Where energy produced in kWh is derived from fuel consumption in litres, following values apply - Petrol 9,42; diesel 10,62; gasoil 11,4; fuel oil 12,2 (source harmonised values for Europe, based on Carbon Trust 2016 study www.carbontrust.com)

Most sites have decreased energy consumption, either over time or in recent years. The marked increase in Luxembourg in 2014 is due to the inclusion of two data centres in EMAS reporting in 2014. Karlsruhe has the highest consumption figures, and this is due to the legal requirement to continue full time circulation of air through the nuclear facilities (a permanent flow of around 300 000 m³). Brussels reduced energy consumption as a result of many different initiatives, while at JRC Geel the replacement of street lighting and renewal of some electric transformers played an important role in reducing their consumption.

The JRC sites with laboratory or heavy experimental apparatus (Karlsruhe, Geel, Ispra and Petten) have the highest per capita energy consumption from 20 to 80 MWh per annum. The predominantly office dominated sites of Brussels, Luxembourg, Grange and JRC Seville consumed between 6 and 12 MWh per capita. JRC Seville continued its trend of reducing both energy consumption by both measures since 2017 largely due to works undertaken on the building, likely due in part to a long term campaign to encourage the landlord to develop more sustainable infrastructure. JRC Geel achieved improvements in its district heating system using its Building Management System.

Brussels heavily influences Commission performance that trended upwards in 2011 when the JRC sites were included. Six sites reduced per capita consumption in 2019 enabling the Commission to meet the 2014-20 reduction target. Five sites reduced consumption per square metre enabling the Commission value (232 MWh/sq.m) to approach the 2014-20 target of 222 MWh/sq.m).

Table 3.1 shows the types of action that target reduction in total energy consumption of buildings at the EMAS sites. Details of individual actions are available in the Global Annual Action Plan (GAAP) actions database.

Table 3.1: Actions in the EMAS Global Annual Action Plan to reduce buildings' energy consumption

	Description	BX	L X	P E	G E	K A	SE	IS	GR
STUDIES AND AWARENESS	Awareness/communi-cations campaigns	•					Δ Δ		
	Energy action plan or audits, studies	•• •• •Δ ΔΔ Δ	• • •	•	• Δ	•		Δ Δ	Δ
	Management review, trends analysis	•Δ	Δ	•				Δ Δ	
LIGHTING; MOVEMENT	Lighting	•• •	• • • •		• • Δ Δ Δ	Δ Δ		•	Δ
	Movement sensors	•	•		Δ			Δ	
IT	PC turnoff (auto)	•					Δ		Δ
	IT cloud strategy	•							
	IT server room consol. strategy	•						Δ	
	IT-add cold corridors in server rooms		•						

	Description	BX	L X	P E	G E	K A	SE	IS	GR
			•						
OPERATIONAL OPTIMISATION	Metering and measurement, BMS EMS	Δ				Δ		ΔΔ Δ	•
	Use emergency generator. less				Δ				
	Comfort hours optimisation	•Δ ΔΔ Δ	•						
	End of year buildings closure	•							
	Block/ replace thermostatic valves		••						Δ
	Air flow optimisation	•							
	Space optimisation							•	
	Optimise heating set point temperatures	Δ							
BUILDING STANDARDS	Insulation (roof, pipe or unspecified)	•Δ	••• •	Δ	Δ	•		•Δ	Δ
	New building and standards, or refurbishment, disuse/ demolition of old buildings				•			•ΔΔΔΔ	
LARGE INVESTMENT	Replace cooling towers with free air or other cooling improvements		••• •		•				
	Geothermal energy or heatpumps				•			Δ	
	HVAC upgrade				Δ	ΔΔ		ΔΔΔΔΔ	
	Heat transfer system (new)					Δ			
OTHER	Introduce SPS sintering					Δ			
	Replace white goods				•				

Note: Δ denotes actions for which reduction of CO₂ emissions (Indicator 2a) were considered a secondary important impact of the action; significance of aspects as defined in Table 2.4

Sites generally have a have a large number of prioritised actions (too many to list here) and are required to undertake measures with a payback period of less than 5 years. Table 3.1 shows that:

- There are a wide variety of actions at most sites, which reflects the significance of the indicator and that many of the actions to reduce buildings energy consumption also reduce CO₂ emissions;
- Studies and audits have been conducted at most sites and actions involving relatively "quick wins" such as relating to lighting and insulation have been widespread;
- Luxembourg and JRCs Geel, Karlsruhe and Ispra list several actions with larger "investment" projects. (The JRC sites generally have site development plans for 2030).

3.1.3 Buildings energy from renewable sources

Figure 3.4 Percentage of Commission buildings' energy generated from non-renewable sources

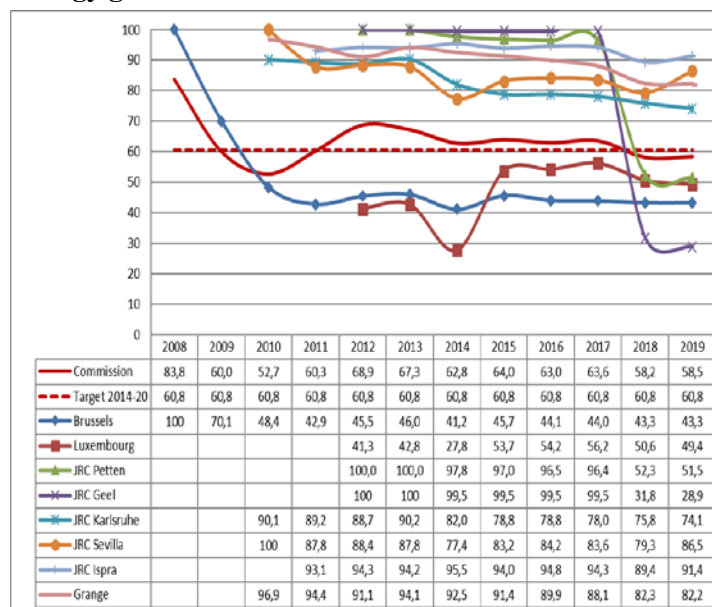


Figure 3.4 shows that the percentage of buildings metered energy consumption generated from non-renewable sources has been decreasing in recent years, in 2019 achieving a similar value to 2018 and again meeting the 2020 target.

Both Brussels and Luxembourg have been purchasing almost all of their electricity from renewable sources, the former introducing its renewable energy contract in August 2009, and in the last couple of years both JRC Geel and Petten have followed.

Several sites have developed photovoltaics to generate energy on site, and both JRCs Ispra (starting in 2015) and Petten use ground source heat pumps.

A wood chip boiler, served by sustainable forests in the immediate region, generates part of Luxembourg's heating supply.

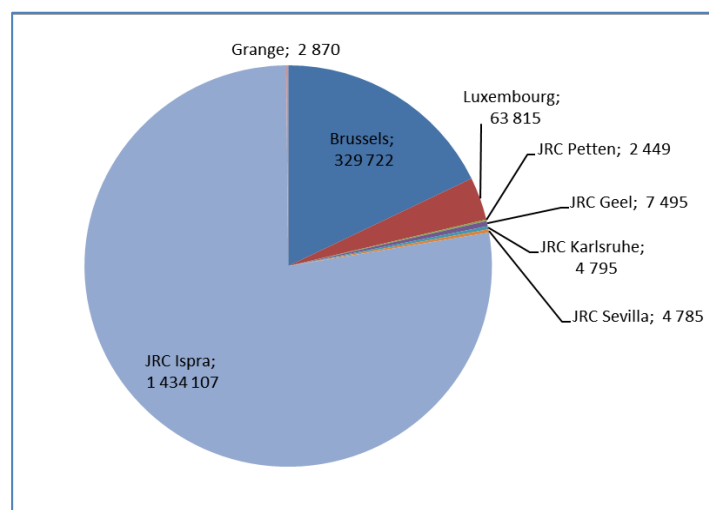
JRC Geel's reduction is due to a new electricity contract from renewable sources. JRC Geel is supporting the development of a local energy supply from superheated groundwater at 3km depth that is under development by its supplier VITO. Although the high pressures involved in the reinjection process have triggered small tremors that have required further site investigation prior to authority approval.

Lake water abstraction reduces JRC Ispra's requirement for cooling energy, although rising temperatures in Lake Maggiore have been a challenge in recent years.

Examples of actions to increase the proportion of renewable energy (and GAAP number) include:

- Studies - JRC Petten (15), and campaigns JRC Ispra (414)
- Monitoring system for photovoltaic panels – JRC Ispra (97)
- Using geothermal energy (heat pumps), - JRC Geel (18), JRC Ispra (407) and in Brussels building MO15.
- Installation of photovoltaic panels JRC Petten (12, 35), JRC Ispra (48, 49, 92)

In addition Brussels and Luxembourg have had electricity from renewable sources for several years, JRC Petten and Geel since 2018. JRC Geel is looking to long-term provision of geothermal energy from a regional source.



3.2 Water use

Figure 3.5 Water use at Commission sites in 2019 (m³)

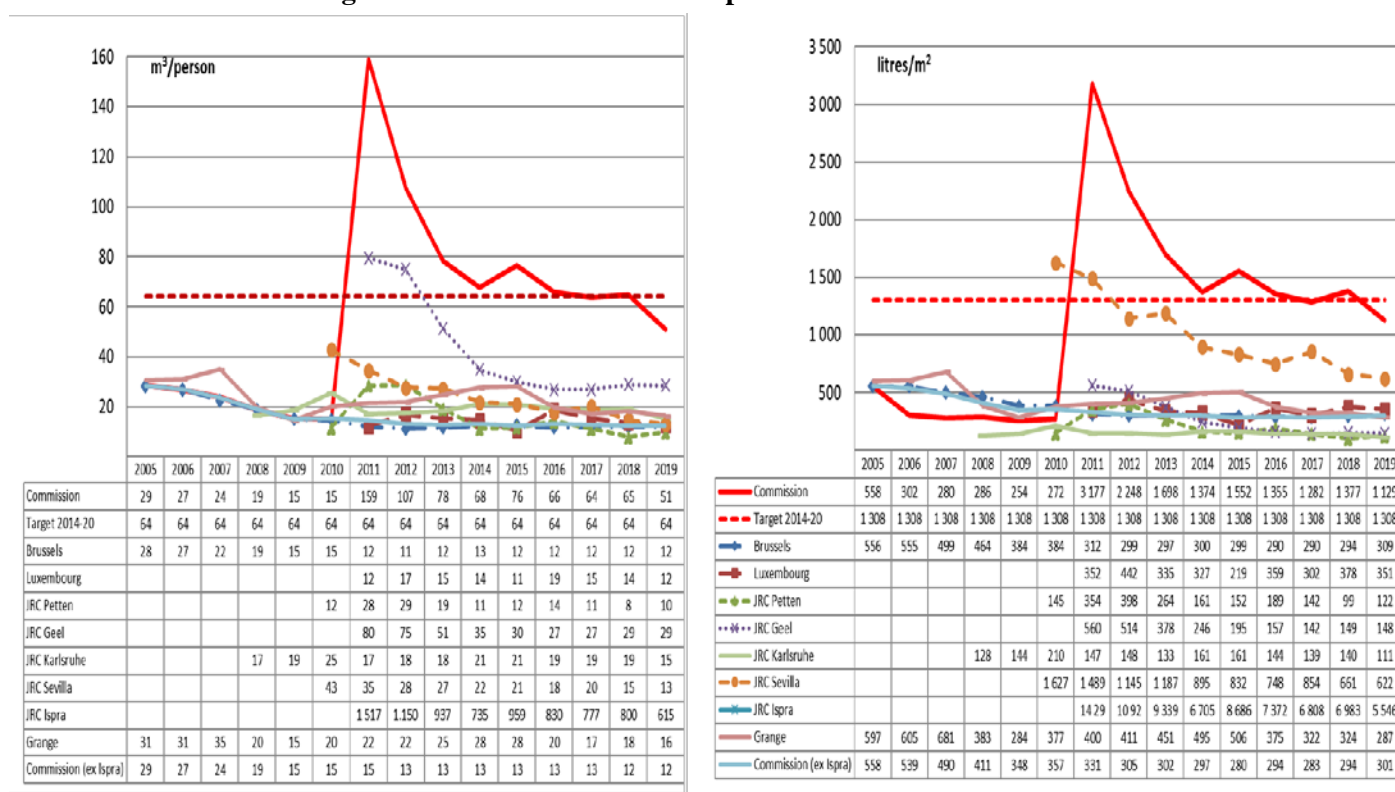
Figure 3.5 shows the JRC Ispra is by far the greatest user of water, and along with Brussels accounts for 98% of water consumed.

Unlike other sites, JRC Ispra was designed to use its own intake from nearby Lake Maggiore. Indeed, this low cost and readily available water supply was one reason to select the site to host EURATOM facilities. The resulting widespread water use in the buildings and underground for cooling are therefore a consequence of site design.

The site also contains fire services, a water treatment works and extensive water-cooling circuits (for buildings, laboratories, nuclear plants and installations, etc.), sports centres and supplies residential properties for Commission staff; its water use is inevitably higher than that of other sites.

Figure 3.6 shows water consumption measured on a per capita and per square metre basis for the sites. As with energy, consumption has fallen at most sites in recent years. Figure 3.6 also includes a value for the Commission excluding JRC Ispra, which is quite similar to the trend for Brussels.

Figure 3.6 Annual water consumption in the EMAS area to 2019



Per capita water consumption in Brussels has more than halved since 2005. The JRCs at Seville, Geel and Ispra have recorded the largest reductions in consumption over the last three to four years, with Ispra introducing through several infrastructure related initiatives. Improving the network and reducing leaks enabled Ispra to follow a 9% rise in consumption in 2018 with a decrease of 16% in 2019.

JRC Petten suffered a major leak in 2011/2 owing to a faulty valve control in the water treatment plant of the fuel cell laboratory building resulting in a spike in water consumption.

Ispra's consumption heavily influences the weighted Commission value as indicated by the sudden increase in 2011 when it started reporting. The increase in water consumption in 2015 at Ispra was due to i) extraordinary maintenance interventions lasting eight months and resulting in the newly installed water pumping regulation system being unavailable and ii) to a particularly hot summer requiring more cooling water than normal.

Ispra is currently investigating the feasibility of separating water used predominantly for cooling purposes from consumption. Overall, both the Commission's per capita and per square metre emissions have reduced significantly in 2019, both achieving the 2014-20 targets.

Replacing air conditioning systems that use water with free air based cooling is one reason for reduction at several sites. Table 3.2 summarises some of the site based actions to reduce water consumption:

Table 3.2: Sample site based actions to reduce water consumption

	Description	BX	LX	PE	GE	KA	SE	IS	GR
	Studies, improve plans, drawings				•		•		
OPERATIONAL OPTIMISATION	Improved monitoring system	Δ		Δ	••			••••	Δ
	Water saving devices on taps or water dispensers	•	•				•		
	Remove hot water to sanitary rooms		•						
	Reduce water pressure		•						
LARGE INVESTMENT	Connect cooling network to buildings							•	
	Rainwater recycling, introduce or improve				••				
	Modify, remove or replace cooling towers		••ΔΔΔ		••				
	Infrastructure (HVAC) upgrade and optimization							•	
	Install cascade of pumps and variators		•					•	

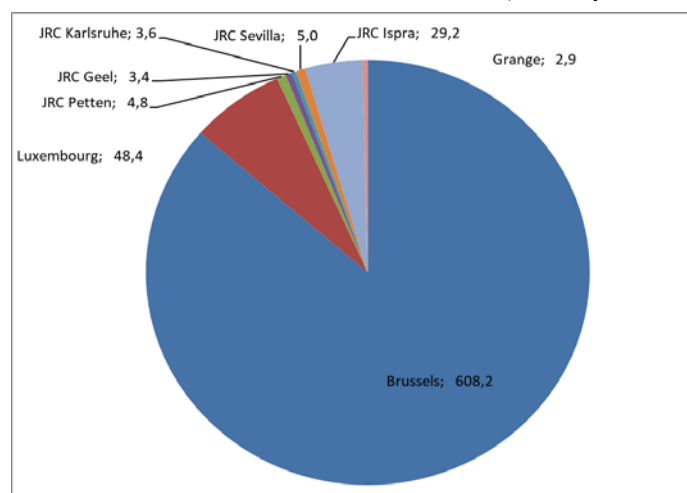
Note: Δ denotes actions for which reducing water consumption was considered a secondary important impact of the action

Several actions at Luxembourg involve reducing the number of cooling towers. All sites for which water consumption is a significant aspect have actions to improve performance. Six of the actions primarily target another indicator (usually 1a, reducing energy consumption of buildings).

3.3 Paper consumption

Figure 3.7 shows annual total paper consumption at the Commission, which in both Brussels and Luxembourg applies to the whole Commission site.

Figure 3.7 Total paper consumption at the Commission EMAS sites in 2019 (tonnes)



Total paper consumption comprises:

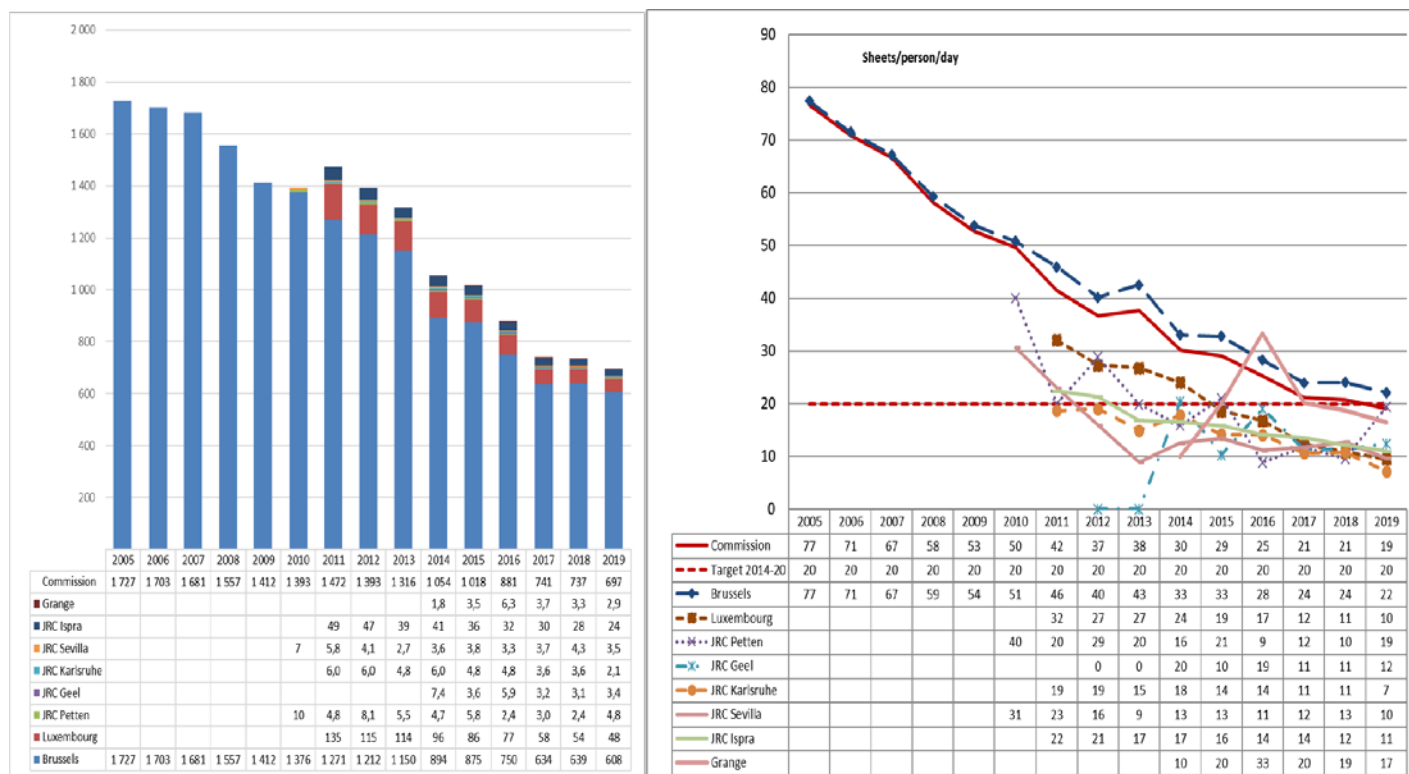
- Office paper - A3 or A4 typically used for printing in offices and representing about 80% of total paper consumption, and
- Print shop paper - used in high quality or large format printing usually for publications and used at fewer sites.

Brussels, as expected, was by far the largest consumer of paper in 2019, followed by

Luxembourg and Ispra with these three sites responsible for more than 95% of the total.

3.3.1 Office paper

Figure 3.8 Office paper consumption at Commission EMAS sites to 2019, (tonnes, and sheets/person/day)²⁸



The reduction in office paper consumption shown in Figure 3.8 continues with more than a 5% improvement for the Commission in 2019 compared to 2018 and which meets the revised target for 2014-20. While continual promotion of electronic circuits and communication explains the decrease, OIB also introduced 75g/m² office paper in 2013 (replacing 80g/m² paper in Brussels) with most other sites adopting this approach since then. Some Commission services are investigating the feasibility of using even lighter office paper. New printing habits, in part encouraged by a newly installed badge operated network printer system that replaced many individual printers, also resulted in improved performance in Brussels.

Luxembourg and the JRC sites have lower consumption than Brussels. Peak trends at the smaller sites can be due to bulk orders, and the reported figures reflect purchase rather than consumption. Office paper consumption in Brussels is about one-third the value in 2005. JRCs Sevilla and Karlsruhe continued to achieve significant reductions in paper use (3 and 4 sheets/person/per day respectively) despite already low levels recorded in 2018. JRC Ispra is well ahead of its target for 2020 reduction in paper consumption.

²⁸ Working days in a year – 211: Supplied by DG.HR.A3 and used since 2014 in calculations including emissions from staff commuting and paper consumption (sheets/person/day) – Email El Bourrai –Rourke on 13/03/2014

Table 3.3 shows examples of actions at site level to reduce paper consumption.

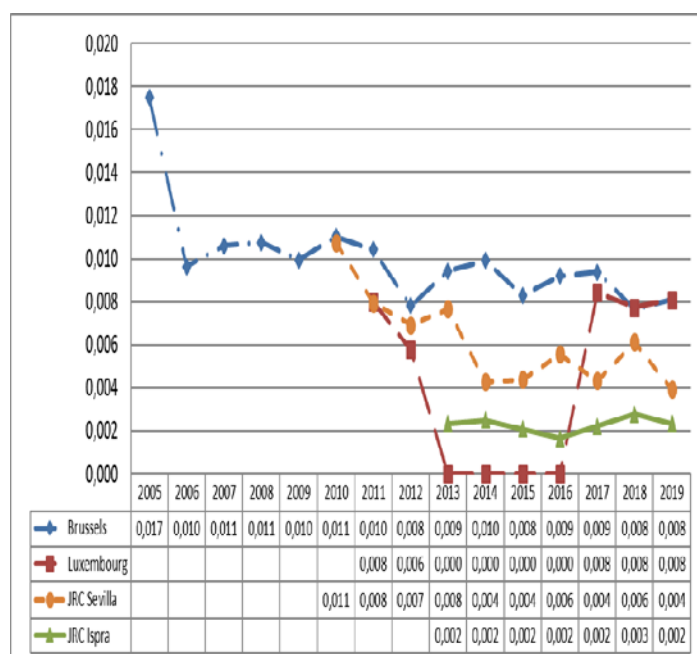
Table 3.3: Actions in the Global Annual Action Plan to reduce paper consumption

	Description	B X	L X	P E	G E	K A	S E	IS	G R
	Raising awareness with communication	• • △ △ △			•		• △		
	Staff training on multifunctional device						•		
	Better inventory measurement			•					•
	Data monitoring analysis				•		•		
	Use lighter paper (reduce from 80gm!)				• •				
	"Paperless working, various"	• • • •	• • • •		•			• •	
	Use paper supply with higher recycled content	•							

△ denotes actions for which reducing paper consumption was considered a secondary important impact of the action

3.3.2 Print shop paper consumption

Figure 3.9 Evolution of print shop paper



consumption to 2019 (tonnes/person)

JRCs Petten, Geel, Karlsruhe and Grange have no print shop and/or undertake a negligible amount of printing, and are therefore not included in Figure 3.9.

Luxembourg switched from conventional offset printing to using digital presses in 2013. JRC Seville contracts a large amount of offset printing per capita compared to other sites. JRC Ispra prints for other JRC sites.

Brussels has been using a new parameter for measuring waste paper in the print shop for several years.

4 REDUCING THE CARBON FOOTPRINT, OTHER GREENHOUSE GASES AND AIR POLLUTANTS

4.1 Overview

Table 4.1 – Main components of the Commission’s carbon footprint, tonnes CO₂e²⁹ (2018, 2019)

Main contributors	2018	% of total	2019	% of total
Buildings energy and refrigerant losses	57 592	29	56 379	28
Buildings fixed assets	36 700	18	37 049	19
Missions	53 758	27	60 803	30
Staff commuting	13 611	7	13 699	7
IT fixed assets	19 298	10	10 497	5
Other (waste, goods/services, vehicle fleet)	9 413	5	10 693	5
Sub-total	190 371		189 120	
Non reported emissions, mixed categories (estimated*)	10 098	5	10 991	5
Sum	200 469	100	200 110	100

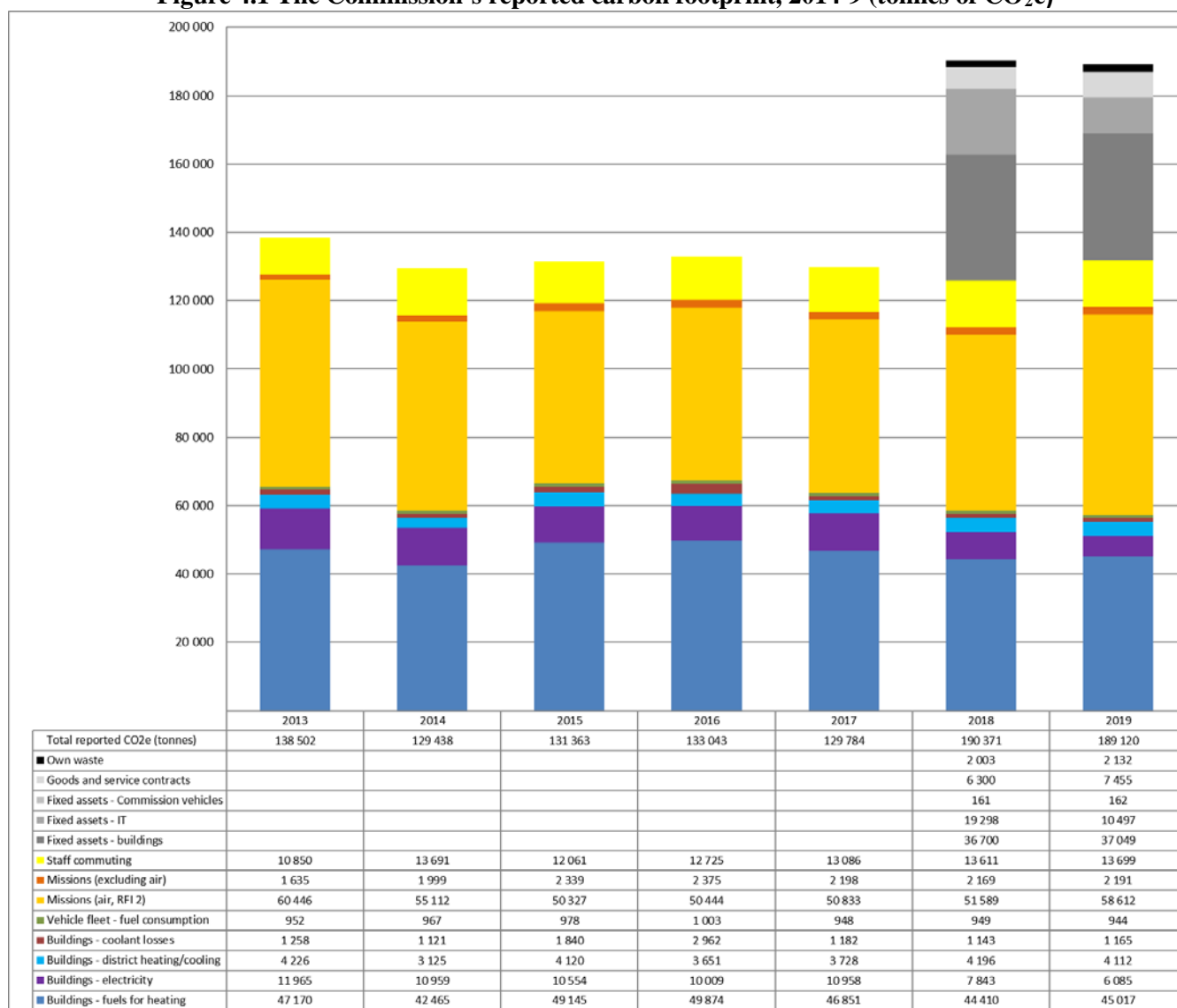
*Not all sites report for commuting, fixed assets, goods and services contracts, own waste. These are estimated using pro-rata extrapolation of the total from other sites based on surface area or population.

Table 4.1 summarises the main contributions to the Commission’s carbon footprint in 2018 and 2019. Buildings, through the energy used in their construction and consumed through their operation, account for around 47% of total emissions, while staff missions represent around 30%. Commuting, the next largest contributor in 2019 accounts for around 7%. IT fixed assets represented a smaller proportion in 2019 as several coefficients used in the calculation have been revised downwards, and the rollout of laptops has continued.

Figure 4.1 shows the evolution of emissions generated under the categories comprising the main contributors above, but excluding the non-reported emissions that are estimated only for 2018, 2019.

²⁹ All carbon emissions in this chapter are expressed as CO₂e (carbon dioxide equivalent, which allows for warming effects related to combustion and release of refrigerants to be included, as well as other warming gases).

Figure 4.1 The Commission's reported carbon footprint, 2014-9 (tonnes of CO₂e)



The slight downward trend in total emissions (excluding the new categories included in 2018/9) is due in large measure to reduced emissions from electricity, as sites move to sources from renewable contracts, as well as a reduction, since 2015, of gas used for heating the buildings.

The Commission significantly expanded its reporting in 2018, to include fixed assets (buildings and IT), purchased goods and services, and waste and upstream emissions due to energy consumption. Further additions in 2019 included fixed assets (embodied energy of Commission vehicles and of infrastructure for renewable energy) following experts' recommendations.

4.2 Definition of scopes and the Commission's approach to reporting

4.2.1 *Scopes defined*

For the purposes of Greenhouse Gas (GHG) reporting, emissions fall under different "scopes"³⁰:

- Scope 1: "Direct" emissions typically arising from own fuels combustion (e.g. boilers, furnaces), owned transport (Commission owned or operated vehicles), process emissions and fugitive emissions (refrigeration and air conditioning leaks);
- Scope 2: "Indirect" emissions from energy consumed but produced by others (purchased electricity, heat, and steam cooling); and
- Scope 3³¹: Other "indirect" emissions including, transport related activities (commuting and business travel, distribution), fixed assets, purchased goods and services, waste disposal (waste, recycling), purchased materials and fuels (e.g. extraction, processing and production), fixed assets.

More than one scope may be associated with a particular type of energy use. When the Commission consumes gas for heating, or either petrol or diesel for its vehicle fleet, the reported emissions result from not only combusting the fuel (scope 1) but also from the extraction and supply (scope 3).

The additional parameters added for reporting in 2018/9 permit the embodied emissions of renewable energy supply infrastructure to be considered, as well as the emissions used to produce Commission fleet vehicles – although in both cases, the contribution to the carbon footprint is relatively small.

4.2.2 *Uncertainty*

As shown in the following section, compiling a carbon footprint is very data intensive, and relies on a large number of conversion factors. Both the data and factors have associated degrees of uncertainty, and these increase with scope, especially for factors. Energy invoices provide consumption data with a high level of precision (considered +/-5% accuracy), as they are based on calibrated meter readings. The factors used to convert the consumption to emissions are based on physical/chemical properties that are well known, and similarly have low uncertainty.

While input data is from invoices, or databases (eg IT equipment), the uncertainty remains low. But estimating the Global Warming Potential of refrigerants over 100 years, which may be composed of two or more substances leads to factors considered to have around 30% uncertainty. The factors used to estimate emissions from the construction of buildings, IT equipment, and food which all have very complex supply chains are subject to research that is frequently updated and uncertainties of 50% are attached.

³⁰ <http://www.ghgprotocol.org/calculation-tools/faq>

³¹ Although strictly belonging to scope 3, for operational purposes, the Commission includes emissions from leased buildings and vehicles under Scope 1 as they are under direct the Commission's direct management control.

Therefore adding additional elements, beyond scope 1 and 2 necessarily involves considerable additional resources while providing answers that are more uncertain. It is important therefore to use a consistent approach year to year.

4.2.3 Commission approach

The Commission chairs the Inter-institutional environment group (GIME) and in November 2017 adopted a common methodology for calculating carbon emissions in response to the European Court of Auditor (ECA) 2014 special report on the subject.

The following table summarises the different components, and conversion factors used when calculating the Commission's footprint for 2019. For coherence (and simplicity), the central coordination team recommends that EMAS sites use these values, but the sites can (exceptionally) choose different values, for example at the request or under guidance of national authorities.

Table 4.2 Summary of components, and recommended conversion factors used in the carbon footprint

No	Description	Scope 1	Scope 2	Scope 3	
1	Mains gas for buildings PCI	Combustion 0,205 kgCO ₂ e/kWh		Upstream supply 0,039 kgCO ₂ e/kWh	
2	Tanked gas for buildings ⁽¹⁾	Combustion 0,230 kgCO ₂ e/kWh			
3	Gas oil for buildings ⁽¹⁾	Combustion 0,266 kgCO ₂ e/kWh		Upstream supply 0,058 kgCO ₂ e/kWh	
4	Commission vehicle fleet (petrol) ⁽²⁾	Combustion 2,28 kgCO ₂ e/L		Upstream supply: 0,528 kgCO ₂ e/L	Fixed asset 0,04 kgCO ₂ e/km
5	Commission vehicle fleet (diesel) ⁽²⁾	Combustion 2,5 kgCO ₂ e/L		Upstream supply: 0,658 kgCO ₂ e/L	Fixed asset 0,04 kgCO ₂ e/km
6	Refrigerant losses: (100 Year GWP, as kgCO ₂ e/kg for Kyoto protocol gases) ⁽³⁾	R410A (1 920), R134A (1 300) R404A (3 940), R407C (1 620) R407D (1 627), R507A (2 240) R422D (2 470), R23 (12 400) R32 (675), R427A (2 020) R508B (13 396), SF6 (23 500) R227A (2640), ISCEON89 (3805)			
7	Refrigerant losses: (100 yr GWP kgCO ₂ e/kg commercial sources or calculated)	R22 (1760), NAF SIII (1447)			
8	Electricity supply: (kgCO ₂ e/kWh)		Contract factor	Supplier line losses: 10% of emissions	Upstream losses: 9% of emissions
9	District heating: (kgCO ₂ e/kWh)		Contract factor		
10	Renewables for bldgs. energy (3 categories). ⁽¹⁾			Upstream supply (as kgCO ₂ e/kWh) i) photovoltaic (0,055) ii) biomass (0,014); iii) geothermal pumps (0,045)	
11	Business travel: (5 categories)			Air, rail, hire car emissions supplied by third party as calculated for missions booked through the Commission travel Agency via MIPS. Air taxi for Brussels only separate	

No	Description	Scope 1	Scope 2	Scope 3
				data from third party. Private car emissions established by ratio
12	Fixed assets – buildings (7 categories) Factors in kgCO ₂ e/m ² for the following construction types: ⁽¹⁾			i) Not specified – offices (650) , ii) Steel - industrial building (275), iii) Steel - parking underground (220), iv) Steel - restaurants (183), v) Concrete - industrial buildings (825), vi) Concrete - parking underground (656), vii) Construction type concrete - restaurants (550) Initial recommended design life 25 years (c)
13	Fixed assets – IT equipment (16 categories) Factors in kgCO ₂ e/unit for the following items: (* denotes factor reduced since previous year) ⁽¹⁾			i) PC desktop (513); ii) Docking station (80); iii) Flat screen (767); iv) Laptop (156*); v) Individual printers (110); vi) Network printers & copiers (2940), vii) Fax machines (1470); viii) Scanners (1470); ix) Telephones (simple) (20); x) Telephones (smartphone and Iphones) (29*); xi) Telephones (fixe) (17); xii), Servers, (600*) ; xiii) Projectors (94) ; xiv) Videoconference installations (500*); xv) Televisions (500*); xvi) Other small IT devices (firewall router switches) (81) Initial recommended design life 4 years (c)
14	Goods and services contracts (non catering – 6 categories) Factors in kgCO ₂ e per named unit ⁽¹⁾			i) Security contract (FTE) (561); ii) Cleaning contract (FTE) (1180); iii) Other service contracts - consultants (kEUR) (110); iv) Other service contracts - translators (kEUR) (110); v) Other service contracts - (kEUR) (110); vi) Purchased paper, used or new (tonnes) (919);
15	Goods and services contracts (catering – 7 categories) Factors in kgCO ₂ e per tonne			i) beef (12800); ii) pork (2420); iii) fish (2870); iv) chicken (2140); v) milk (937); xii) Other dairy products (average yoghurt and butter) (6185); xiii) coffee (3140)
16	Waste disposal (11 categories) Factors in kgCO ₂ e per tonne ⁽¹⁾			i) Incinerated waste – domestic waste (362); ii) incinerated waste – food (47); iii) methanisation – food (87); iv) Recycled/reused – paper (33); v) Recycled/reused – cardboard (33); vi) Recycled/reused – wood (33); vii) Recycled/reused – glass (33); viii) Recycled/reused - plastic PMC (880); ix) Recycled/reused – others (357); x) Hazardous waste - all types (706); xi) Landfill (probably mostly projects) (33)

Notes (1) Europe average from ADEME, Base Carbone 2018; (2) France value from ADEME, Base Carbone 2018; (3) IPCC 5th Assessment Report (2014, from p 731) https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf, As referenced by ADEME, Base Carbon 2018 (100 year GWP values) All factors supplied and revised by Commission's internal EMAS auditor

The factors for energy consumption include both scope 1(combustion) and scope 3 (upstream) components, the latter being typically 20 to 30% of the former. Scope 2 emissions are restricted to purchased electricity from the grid, which is applicable to all sites, and also to district heating which is available at a minority of sites for example Luxembourg, Karlsruhe.

Scope 3 comprises emissions from a wide range of sources. The categories added in 2018/19 (items 13 to 16 in Table 4.2), include 48 subcategories with potential data requirements at each site.

The conversion factors used each year are relatively stable when based on physical or chemical properties of fuels, or refrigerants. They can be updated more frequently when considering for example the embodied energy of IT equipment that depend on complex supply chains. Of the 16 factors used for estimating embodied energy for IT equipment, five reduced in 2019, some of these, for example relating to servers, or laptops by quite a large margin. This reflects updated and improved methods of estimating the emissions and more efficient production processes.

Evaluating emissions for buildings and IT equipment is based on amortisation: the emissions are spread evenly across the assumed lifetime of the assets. The sites have used values they consider “appropriate” to their premises for buildings emissions. DG DIGIT provides information for calculating emissions from IT equipment for Brussels, Luxembourg and Grange, but not for the JRC. DG DIGIT has used an accounting lifetime of 4 years to determining how many units in each category of equipment have been amortised.

4.3 Detailed breakdown of per capita emissions by site in 2019

Table 4.3 contains the components of the carbon footprint for each site based on site and centralised data for 2019 where data was reported.

Table 4.3 Per capita CO₂ equivalent (CO₂e) emissions by scope and site 2019 (tonnes)

	Brussels	Luxembourg	JRC Petten	JRC Geel	JRC Sevilla	JRC Karlsruhe	JRC Ispra	Grange
Scope 1: Own fuel use and direct losses	0,56	0,79	2,51	2,43	0,19	0,06	7,92	1,78
Fuel for bldgs: mains gas	0,518	0,724	2,304	1,288	0,185		7,802	
Fuel for bldgs: tanked gas (1)								0,067
Fuel for bldgs: diesel	Ne	Ne	Ne	0,034	Ne	0,009	0,013	1,709
Commission vehicle fleet	0,019	0,032	0,034	0,018	0,002	0,055	0,019	0,000
Refrigerant leaks	0,019	0,038	0,170	1,086	0,000	0,000	0,089	0,000
Scope 2: Purchased energy	0,01	0,38	0,00	1,95	1,43	18,40	0,00	1,55
External electricity supply	0,015	0,167	0,000	0,000	1,426	10,348	0,000	1,547
District heating (4)		0,211		1,950		8,055	0,000	
Scope 3: Other indirect sources	3,90	2,79	3,51	5,51	2,07	3,15	6,10	8,85
Upstream emissions, Fuel for bldgs: mains gas	0,109	0,161	0,486	0,272	0,041		1,511	
Upstream emissions, Fuel for bldgs: tanked gas (1)								0,000
Upstream emissions, Fuel for bldgs: diesel	Ne	Ne	Ne	0,007	Ne	0,002	0,003	0,373
Upstream emissions, External electricity supply	0,001	0,014	0,000	0,000	0,143	1,035	0,000	0,155
Upstream losses, for electricity from fossil fuel	0,001	0,015	0,000	0,000	0,128	0,000	0,000	0,139
Upstream emissions, renewable energy sources		0,001	0,045	0,013			0,017	
District heating		0,051		NR		NR		
Commission vehicle fleet	0,005	0,008	0,009	0,004	0,000	0,014	0,005	
Business travel: air	1,821	0,374	1,080	1,858	1,517	0,986	1,483	5,881
Business travel: rail	0,006	0,001	0,004	0,004	0,000	0,013	0,005	0,002
Business travel: hire car	0,005	0,078	0,000	0,015	0,004	0,180	0,005	0,040
Business travel: private car	0,018	0,031	0,033	0,018	0,002	0,054	0,054	0,000
Business travel: air taxi (3)	0,012							
Commuting (2)	0,415	NR	NR	0,977	0,231	0,866	0,646	0,081
Fixed assets - buildings	1,038	0,853	0,764	0,520	NR	NR	1,392	1,468
Fixed assets - IT	0,262	0,870	0,405	0,876	NR	NR	0,354	0,273
Fixed assets - Commission vehicles	0,004	0,006	0,009	0,002	NR	NR	0,004	
Service and supply contracts	0,150	0,297	0,653	0,837	NR	NR	0,292	0,341
Own waste	0,051	0,031	0,026	0,111	NR	NR	0,165	0,095
Scope 3 : Other (JRC Ispra)								
Business travel JRC Navette							0,10	
Other upstream emissions (LCA tool)							0,06	
Total	4,47	3,96	6,02	9,89	3,68	21,62	14,02	12,17

Notes: NR - Not Reported, Ne - Considered negligible, (1) – Grange is the only site with gas from in-situ tanks, (2) - Can include Commission bus service where appropriate; (3) - Only applies to Brussels; (4) - Not all sites; (5) - Geothermal, biomass and PVs

The main observations arising from Table 4.3 are:

- Scope 1 emissions (own fuels use and direct losses) usually represent less than a third of the total emissions. JRC Ispra is the exception with its gas fired tri-generation plant that accounts for over half of the total.

- Scope 2 emissions (purchased energy) is particularly high for JRC Karlsruhe, which relies on electricity and district heating for almost all of its buildings' energy requirements. The combination of high energy consumption and relatively low proportion of renewables in the energy mix generates considerable per capita requirements.
- Scope 3 emissions (other indirect sources) represent the greatest proportion of the carbon footprint for sites other than Karlsruhe and JRC Ispra. In 2019 they were nearly three times the combined total for Scopes 1 and 2. By definition Scope 3 emissions are more difficult to manage with management having "indirect" control.
(This means that particular attention is required in the tendering process to ensure that contracts include the measures necessary to reduce emissions).
- Estimated per capita carbon footprints ranged from less than 5 tonnes/person (Brussels, Luxembourg, Sevilla the sites with a high proportion of offices) to more than 10 tonnes/person (Grange, Ispra and Karlsruhe) sites with either extensive conference facilities, or experimental facilities.

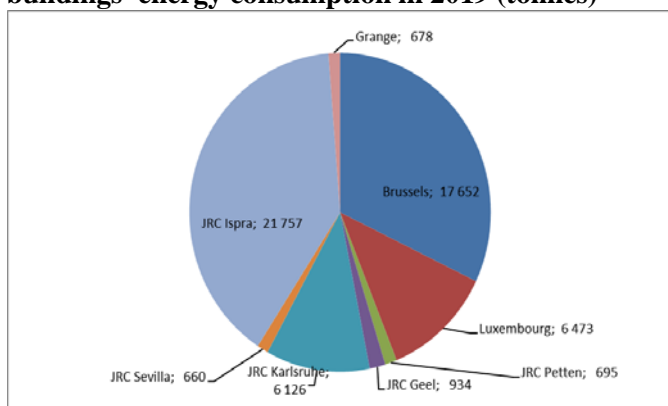
There are Commission 2014-20 targets for both Scope 1 and 2 emissions. Further discussion of different categories of emissions are presented below.

4.4 CO₂e emissions from buildings energy consumption

4.4.1 Emissions due to buildings' energy consumption

Figure 4.2 presents the relative contribution of individual EMAS sites to the Commission's overall emissions in 2019. Brussels and JRC Ispra together account for nearly two thirds of CO₂ emissions, with JRC Seville and Grange responsible for very small amounts.

Figure 4.2 CO₂e emitted from Commission buildings' energy consumption in 2019 (tonnes)

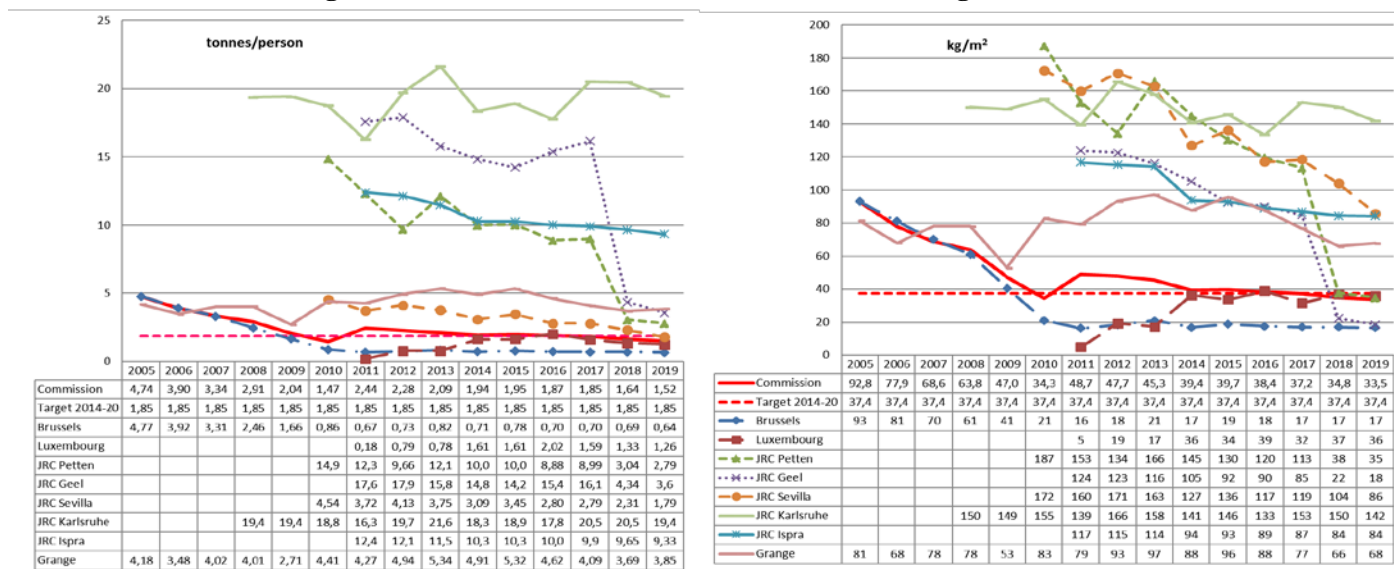


JRC Ispra accounts for a significantly greater proportion of the total emissions (and Brussels significantly less), than their respective contributions for energy consumption reflecting that for Brussels, electricity is supplied from renewable sources.

At JRC Ispra the co-generation gas plant provides for a more efficient energy supply for the site, than would be provided by the market. The grid supplies a small amount of electricity.

Figure 4.3 shows the historical trends in buildings emissions along with the aggregated Commission value and the 2014-20 target.

Figure 4.3 Evolution of CO₂e emissions from buildings to 2019



The data show that in the last year and over the longer term, overall Commission emissions have reduced along with those for most of the sites. JRC's Geel and Petten significantly reduced their emissions in 2018 by switching to an electricity contract with predominantly renewable sources, and at JRC Geel by employing heat pumps in one of the main buildings.

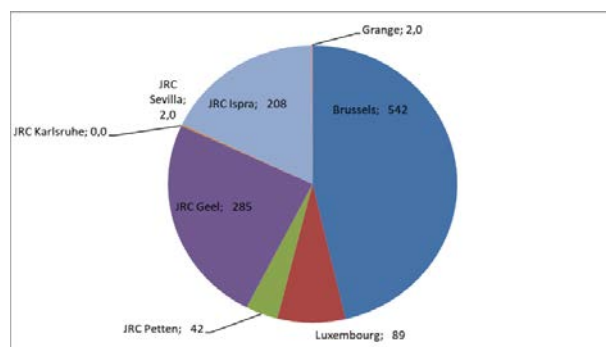
Brussels has reduced per capita emissions by over a half since 2005. Both Brussels and Luxembourg have the lowest emissions in recent years because they contract 95% and 100% respectively of their electricity from renewable sources. JRC sites have higher per capita CO₂e emissions. Karlsruhe has seen a significant reduction in emissions since 2012/13 and this is due largely to a new heating control system in one of the laboratory wings although emissions were greater in 2017 and 2018 before reducing in 2019.

Overall, the Commission has reduced emissions gradually since all sites have been included in reporting in 2011, and had met both 2014-20 targets by 2017. The reduction in per capita emissions since 2017 has been 0.35 tonnes, equivalent to nearly 20%. There are relatively few actions that directly target reducing CO₂e emissions from buildings as this is often an additional benefit of actions that reduce energy consumption. However specific projects in the Global Annual Action Plan include:

- JRC Geel's life cycle analysis (406), and heating from geothermal origin (301) and
- Luxembourg's Urban heating system (496)

4.4.2 Emissions due to refrigerant or coolant loss

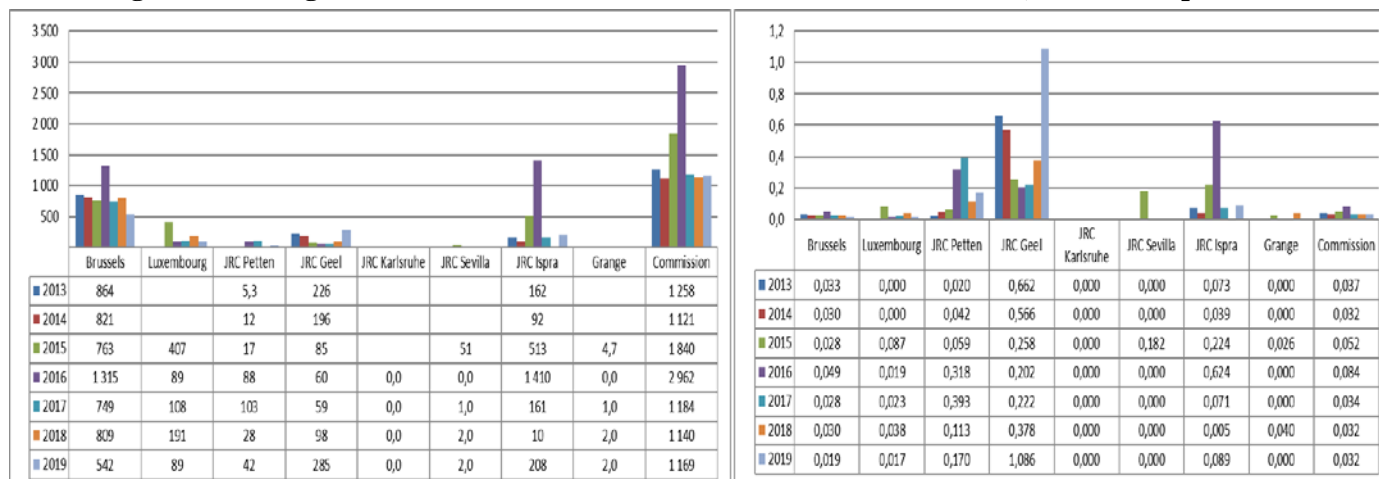
Figure 4.4 CO₂e losses from refrigerant leaks at the Commission sites in 2019 (tonnes)



Refrigerants have Global Warming Potentials (GWP) typically between 1 000 and 10 000 meaning that a leak of just a few kilograms can have the equivalent atmospheric global warming impact of several tonnes of CO₂e. But they typically account for no more than 1 to 2% of buildings' CO₂e emissions. Seventeen refrigerants are recorded in EMAS reporting at JRCs Ispra and Geel, and fifteen at JRC Petten.

Figure 4.4 shows that the four largest sites are responsible for over 95% of the total emissions. Figure 4.5 shows that total losses have reduced at most sites during the last few years, and that the greatest amounts are released at Brussels and Ispra.

Figure 4.5 Refrigerant losses recorded at Commission sites 2013-9 (tCO₂e, and tCO₂e/person)



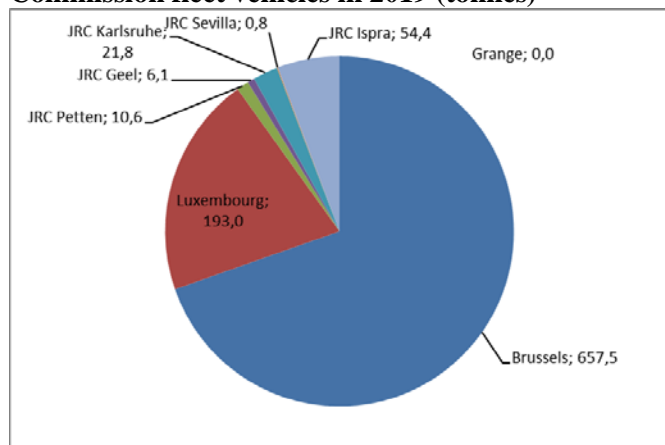
When per capita losses are considered however, it is the above mentioned JRC research sites that are the most important. The recent increase recorded at JRC Geel was due to expanded reporting. JRC Karlsruhe continues to report no losses during normal operation. Overall the Commission's total and per capita refrigerant losses have remained relatively stable since 2017.

Total losses reduced significantly at JRCs Ispra and Petten in 2018, but increased in 2019. JRCs Geel and Petten that accommodate large experimental installations requiring cooling or insulation. Release of R404a is responsible for a large proportion of the JRC Geel emissions.

4.5 CO₂e emissions from the site vehicle fleet

Emissions from vehicle fleet represent a very small, but highly visible, proportion of the total carbon footprint. Figure 4.6 shows CO₂ emissions from Commission fleet vehicles. The three largest sites, which also have the largest vehicle fleets, also generate the most emissions.

Figure 4.6 CO₂e emissions from Commission fleet vehicles in 2019 (tonnes)



Total vehicle fleet emissions in 2019 were almost unchanged since 2017 at 944 tonnes, with Brussels and Luxembourg accounting for over 90 % of the total.

Table 4.4 shows the evolution of vehicle fleet size and distances covered for the Commission EMAS sites. The Commission has reduced the size of its vehicle fleet since 2015 by nearly 30%.

In 2018 and 2019 the overall fleet size was little changed, as was the total distance driven and the total kms per vehicle, averaging nearly 19 500 km.

Table 4.4 Site vehicle fleet characteristics

Site	Fleet vehicles (average)					Total kms					Kms/vehicle				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Brussels	117	107	129	126	131	2 477 072	2 829 675	2 508 253	2 311 311	2 346 590	21 172	26 446	19 444	18 344	17 913
Luxembourg	25	30	30	33	32	665 992	771 824	731 060	812 152	781 567	26 640	25 727	24 369	24 611	24 424
JRC Petten	4	4	4	4	4	30 513	55 440	61 324	56 473	45 396	7 628	13 860	15 331	14 118	11 349
JRC Geel	7	7	7	7	7	NR	NR	NR	NR	11 909	NR	NR	NR	NR	1 701
JRC Karlsruhe	11	11	12	12	12	137 616	133 520	124 944	104 666	77 749	12 511	12 138	10 412	8 722	6 479
JRC Sevilla	1	1	1	1	1	4 356	3 192	4 016	3 859	5 521	4 356	3 192	4 016	3 859	5 521
JRC Ispra ⁽¹⁾	122	123	121	110	110	286 517	240 217	208 053	192 277	200 893	2 349	1 953	2 391	2 185	2 283
Grange	1	1	1	1	0	NR	NR	NR	NR	NR	NR	NR	NR	NR	0
Commission	288	284	218	207	210	3 607 221	4 036 796	3 640 578	3 483 666	3 469 625	12 525	14 214	19 786	20 137	19 714

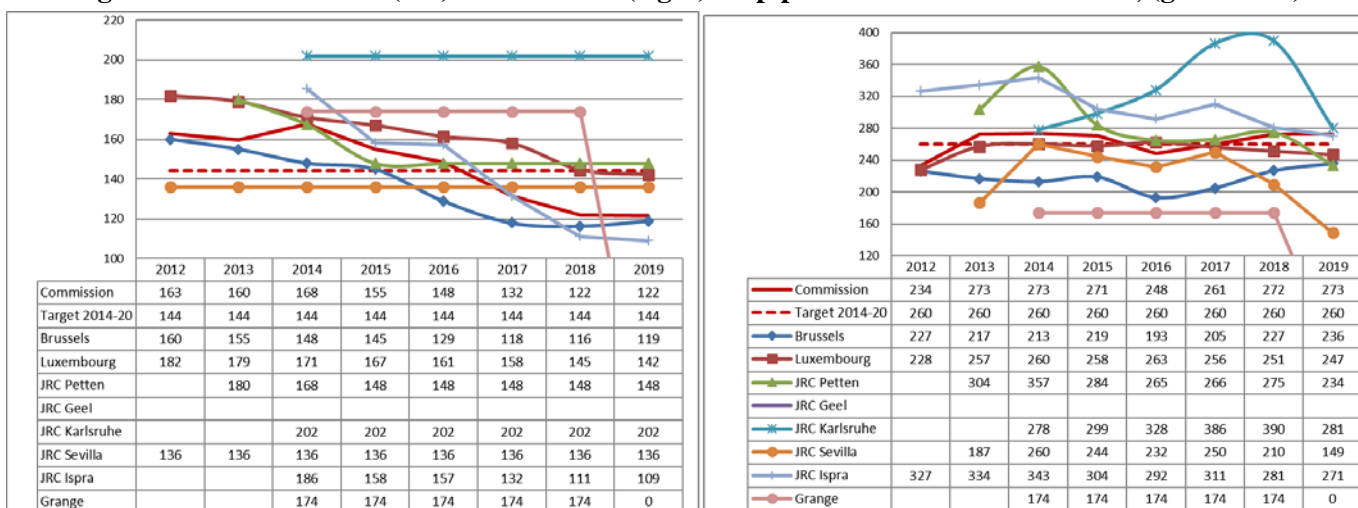
NR: Not reported; ⁽¹⁾ Total kms and kms/vehicle presented for conventional (petrol or diesel) vehicles, ie 87 in 2017, in 74 in 2018

Vehicles in the Luxembourg fleet continue to be used more than those of other sites, and overall since 2015 the Commission has reduced the number of vehicles while using them more intensively.

Figure 4.7 shows the target for the 2014-20 reduction in tailpipe CO₂e emissions as defined by manufacturer specifications and by actual performance. Commission emissions per kilometre (manufacturers' specifications) have fallen, due to fleet replacement and the introduction of electric vehicles, so the 2014-20 target was achieved in 2018.

Actual emissions, as calculated from fuel purchases, have not demonstrated the same trend and remain above the 2014-20 target. Actual emissions include those arising from fuel supply which adds approximately 25% to the total.

Figure 4.7 Manufacturer (left) and actual ⁽¹⁾ (right) tailpipe emissions for vehicle fleet, (gCO₂e/km)



Note (1) – Actual emissions include upstream (well to tank) component for carbon footprint reporting purposes (except Brussels), but these are not included in the manufacturer figures.

Table 4.5 indicates the type of vehicle in Commission site fleets in 2019. Brussels and Ispra lead the way with electric vehicles which are widely used for local journeys. Most of the Commission vehicle trips in Luxembourg are longer distance, for which electric vehicles currently lack sufficient range. Grange no longer has a Commission vehicle.

Table 4.5: Number of vehicles by type at Commission sites in 2019

Type of vehicles	Brussels	Luxembourg	JRC Petten	JRC Geel	JRC Sevilla	JRC Karlsruhe	JRC Ispra	JRC Grange
Electric	13	4	1	1	0	2	36	0
Hybrid	32	5	0	0	0	0	1	0
Euro 6	86	21	0	1	0	2	1	0
Euro 5	0	1	2	1	0	7	1	0
Euro 4	0	1	0	0	1	1	39	0
Euro 3	0	0	0	0	0	0	18	0
Euro 2	0	0	0	1	0	0	4	0
Euro 1	0	0	0	0	0	0	6	0
Euro 0	0	0	0	0	0	0	4	0
Total vehicle fleet	131	32	4	7	1	12	110	0

Note: For Petten, Geel and Karlsruhe, total includes some specific utility equipment not included in these categories

JRC Ispra has increased the number of electric vehicles from 3 in 2014 to 36 in 2019. Brussels has increased the number of charging points to 13, for four new service vehicles and has installed charging points for staff in several Brussels buildings. Further installations are ongoing for staff vehicles. It is possible that the relative 'actual' inefficiency of the JRC Ispra fleet compared to those of other sites shown in Figure 4.17 is due to a large number of journeys being of a very short distance. If conventional engines do not warm up, they do not approach optimum performance. Luxembourg purchased 7 electric and hybrid vehicles, a significant step forward.

The following are examples of site level actions in the Global Action Plan to reduce CO₂ emissions for the vehicle fleet :

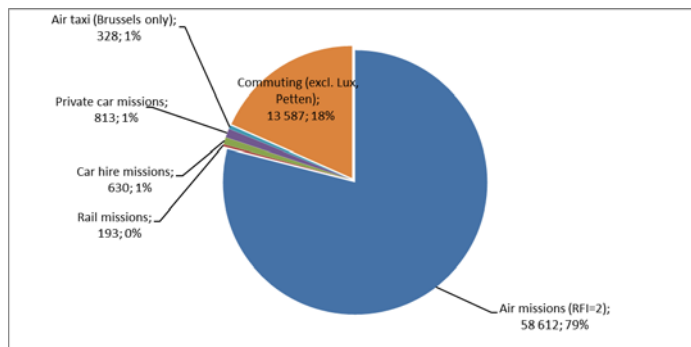
- Detailed energy efficiency plan – Brussels (1)
- Sustainable mobility plans - JRC Seville (425, 427) and JRC Ispra (302)
- Bike policies and facilities – JRC Ispra (128) and Luxembourg (534)
- Study or introduce new electric vehicles –Brussels (131, 296, 474, 502, 521), Luxembourg (497), JRC Ispra (127), or hybrid vehicles Brussels (474), Luxembourg (497), JRC Ispra (132)
- Install charging stations for service and private e-vehicles – JRC Sevilla (429), JRC Ispra (129)

4.6 CO_{2e} emissions from staff missions

4.6.1 Staff missions breakdown by EMAS site

Air travel accounts for over 90% of missions emissions. Air travel and staff commuting together represent 97% of the measured emissions for staff mobility as shown in Figure 4.8.

Figure 4.8 CO₂e emissions from commuting and mission travel in 2019 (tonnes and %)

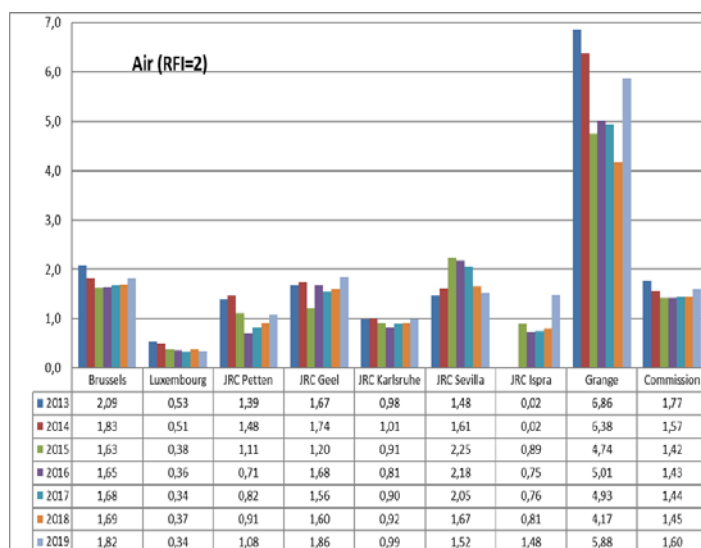


The Commission has estimated CO₂ emissions for missions undertaken by staff at the EMAS sites using data provided by the Commission's travel agency³² which made use of the Commission's proprietary management system³³.

The overall warming effect of aircraft emissions, especially at higher altitudes, ie for flights exceeding 400 - 500 km, is greater than that produced by CO₂ emissions alone. This is

because other jet engine emissions such as soot and water vapour are thought to contribute to an overall warming effect between two and four times that generated by CO₂ emissions alone. Although there is considerable uncertainty, and research is ongoing, a radiative forcing³⁴ index (RFI) of 2³⁵ has been used to calculate flight emissions.

Figure 4.9 Per capita emissions for air for missions by air (RFI=2), car rental and rail ³⁶ (tonnes CO₂e)



DG SANTE at Grange has the highest per capita emissions for air travel. This is expected as its staff include mainly food and veterinary inspectors who conduct frequent missions throughout the world.

More missions emissions were reported in 2019 than in previous years, except at Sevilla and Luxembourg which continued long standing downwards trends.

Luxembourg staff travel far less frequently by air, but in common with JRC Karlsruhe, conduct more journeys by rental car for which per capita emissions (for sites other than Karlsruhe), are less than a tenth of those for air, as shown below).

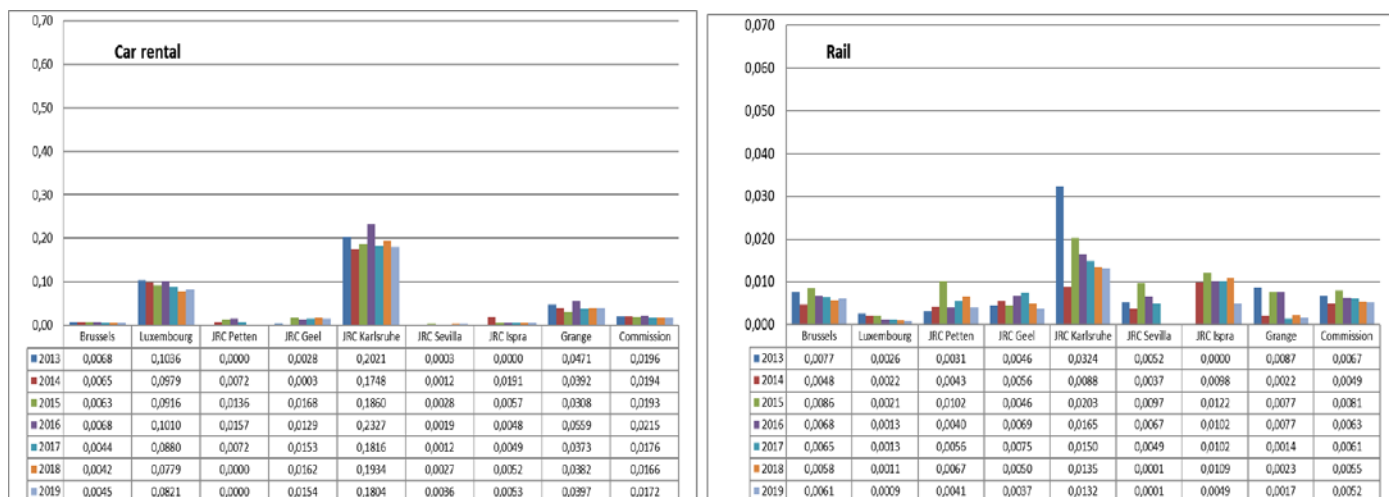
³² American Express report emissions for air train and hire cars, as calculated by Atmosfair who use an approach developed with the German environmental authorities. Note that travel arrangements for Ispra staff are not generally made through this agency so figures are under reported in 2013, 2014, estimations made from 2015.

³³ Commonly known as MIPS.

³⁴ Radiative forcing is a measure of man's contribution to disturbing the natural balance between incoming solar radiation and reflected outgoing radiation as measured at the top of the troposphere, the atmospheric layer extending 10 to 18km from the earth's surface, where weather processes occur.

³⁵ RFI=2 considered (minimum) acceptable (Internal Audit Report, Carbon Footprint of the European Commission, May 2018)

³⁶ Reduced from Agency data, corrections applied to account for journeys not booked through the Commission's travel agency



Per capita rail emissions are roughly one hundredth of those for air travel and reduced in 2019, whereas they increased for both car hire and air travel.

4.6.2 Staff missions breakdown by DG/Service

Although reporting under EMAS is site based, increasingly (and particularly since the inception of the Green Deal), individual DGs and services have wanted to know about their own missions emissions, particularly for air travel. This is available upon request³⁷ to HR.D2 and is based upon analysis of PayMaster's Office (PMO) supplied data obtained from the Commission's Travel Agency. Per capita annual CO₂ equivalent emissions fall into the following ranges:

- > 5 tonnes - 5 DGs/services
- 1 to 5 tonnes - 23 DGs/services
- <1 tonne 17 - DGs/Services

4.7 CO₂e emissions from commuting

Estimates of emissions generated by staff commuting are available for most sites and use mobility survey data, although these are not necessarily undertaken annually. OIB undertakes a survey for Brussels staff every 3 years, the latest in 2017, to inform its local mobility plan that is a requirement of local legislation.

The greatest reported per capita emissions are for those predominantly rural research sites, where public transport is not a viable option. JRC Geel, Karlsruhe and Ispra have per capita emissions between 0,5 and 1 tonne. Commuting emissions for Luxembourg are likely to be in a similar range although this should reduce because the Luxembourg authorities have implemented a heavily subsidised public transport policy (mPass), and are building a tram system. In 2019, JRC Seville held a successful staff awareness campaign on sustainable mobility.

4.8 Alternatives to missions and commuting

Additional generic actions to reduce emissions are recorded in Table 4.7.

³⁷ Ares(2020)3863637 of 22/07/2020 (which includes anonymous and password protected data)

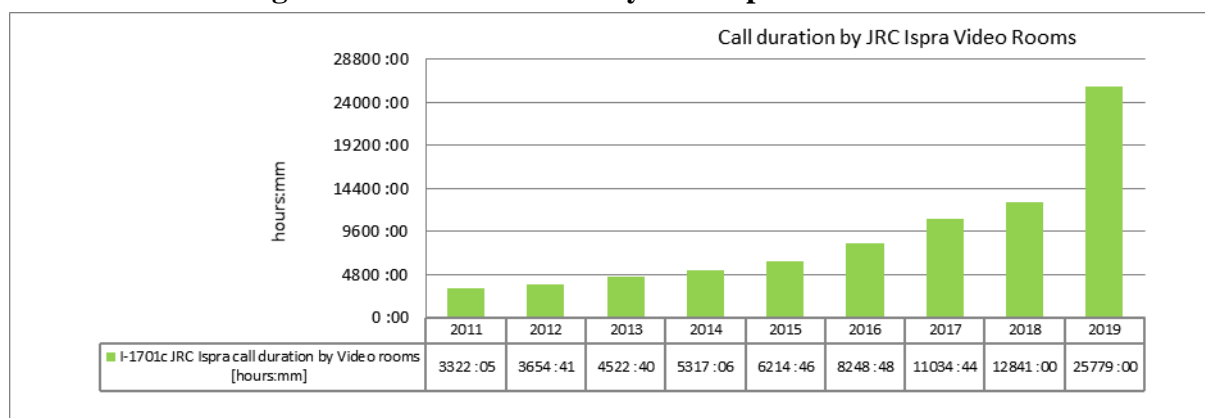
Table 4.7 Additional actions to reduce emissions (as indicated in the EMAS Global Annual Action Plan

	Description	BX	LX	PE	GE	KA	SE	IS	GR	COM
2	Reducing emissions from business travel									
	Promote VCs over missions						•			
	Promote bikes, bike facilities, schemes	•	••							
	Investigate/promote e-bikes		•							
	Reducing emissions from personal travel									
	Commuting study pilot				•					
	Carbon footprint from commuting						••			
	Plan/investigate to install e-charging for cars (and /or bikes)	•			••	•	••			
	Promote car pooling					•				
	Promote public transport range (including transborder)	•••								
	Reducing total emissions									
	External validation of HR.D2 approach to carbon footprint									•
	Develop common approach document for carbon footprint (response to ECA)									•
	Implement LCA for organisation's impact							•		
	Implement "smart" policy							•		
	Install heat pump							•		

Δ denotes actions for which reducing paper consumption was considered a secondary important impact of the action

DG DIGIT has steadily increased the amount of video conferencing infrastructure available across the Commission responding particularly to DG SCIC's requirements for meeting rooms. Some sites, including JRC Ispra have demonstrated their increased use in the last few years, as shown below.

Figure 4.10: Call duration by JRC Ispra Video Rooms



4.9 Emissions from fixed assets

4.9.1 Buildings

These emissions account for nearly 20% of the carbon footprint. The annual rate of emissions depends on the design life³⁸ selected to calculate amortisation, and which varies between sites. Older buildings may be “amortised” in relation to the CO₂e emissions required for their construction. The factors used to calculate these emissions are subject to a relatively high degree of uncertainty (50%), and are shown in Table 4.6a which show the total emissions associated with the buildings at each site, and the annualised value for 2019.

Table 4.6a: Total and annual buildings (fixed asset) emissions for 2019 (tonnes CO₂e)

	Unspecified construction offices	Steel construction			Concrete construction			Emissions	
		industrial buildings	underground parking	restaurants	industrial buildings	underground parking	restaurants	Total	2019
Conversion factor (kgCO ₂ e/m ²)	650	275	220	183	825	656	550		
Site									
Brussels	686 829					317 719	6 847	1 011 395	28 919
Luxembourg	115 380				3 396	32 879		151 654	4 298
JRC Petten	4 900	1 168			593			6 661	190
JRC Geel	6 477	449			31 568		366	38 859	136
JRC Seville									
JRC Karlsruhe									
JRC Ispra	89 546	697			68 955		3 188	162 386	3 247
DG SANTE at Grange	6 442			18				6 460	258
	909 573	2 314		18	104 512	350 598	10 400	1 377 415	37 049

There is a large difference in the factors for steel and concrete construction. Offices of an unspecified nature must be considered to be largely made from concrete given the relatively high value of this factor.

4.9.2 Information technology (IT)

While conversion factors relating to the 16 categories of IT equipment are also subject to considerable uncertainty (50%), they can change as research evolves. Of the factors in Table 4.2 (item 14) that reduced in 2019 several related to larger equipment such as servers and video equipment. Equipment in use for longer periods or reduced inventories are alternative explanations for reduced IT emissions.

³⁸ Design life in years - Brussels, Luxembourg, Petten 30, Geel 60 (varies by building), Ispra 50, Grange 25

Table 4.7 shows the categories of IT equipment responsible for over 100 tonnes per annum of annualised emissions in 2019. Flat screens and network printers & copiers provide the largest per capita emissions.

Table 4.7 Annualised total CO₂e (and per capita) for IT (fixed asset) categories exceeding 100 tonnes in emissions Brussels (2019, tonnes)

Category of IT equipment	Total	Per capita
Desktop PC	460	0,02
Docking stations	526	0,02
Flat screen	3 797	0,14
Laptop	1 011	0,04
Network printers & copiers	1 454	0,05

4.9.3 Purchased goods and services

Associated emissions account for a relatively small proportion of the carbon footprint. Although this includes food from catering (seven categories of the most carbon intensive foods served, including meat, dairy and coffee) data availability is partial (Table 4.8). Per capita annual emissions for catering at reporting sites in 2019 ranges from 0,11 to 0,22 tonnes.

Table 4.8 Catering emissions for seven energy intensive food groups in 2019, (tonnes CO₂e)

Category	Luxembourg	%	JRC Geel	%	JRC Ispra	%	Grange	%
Beef	332	52	12,5	44	203	39	15,6	45
Pork	80,1	12	2,8	10	76,6	15	2,80	8,2
Fish	101	16	6,7	24	144	28	5,83	17
Chicken	83,6	13	2,3	8,1	45,5	8,8	2,27	6,6
Milk	10,2	1,6	0,8	2,7	13,8	2,7	4,89	14
Other dairy (avg yogurt/butter)	28,5	4,4	2,9	10	26,2	5,0	1,47	4,3
Coffee	7,22	1,1	0,3	1,0	9,3	1,8	1,43	4,2
Total reported emissions (tonnes CO₂ e)	642	100	28,3	100	519	100	34,3	100
Total reported emissions (tonnes CO₂ e /person)	0,125		0,108		0,222		0,19	

The new catering contract due to commence in Brussels in 2021 will permit data to be collected for the over 10 000 meals served daily, and will increase the figure per capita emissions for this category considerably. The catering related emissions for JRC Karlsruhe are likely to be very limited as within the site boundary a small coffee bar offers a very limited range of food options.

4.9.4 Waste disposal,

Table 4.9 shows emissions from the 11 categories of waste disposal in 2018 and 2019.

Table 4.9: Emissions generated through waste disposal in 2018 and 2019 (tonnes CO₂e)

Waste Disposal Category *	Tonnes		Percentage of total	
	2018	2019	2018	2019
Incinerated waste - domestic waste	2 729	2 690	36,7	35,3
Incinerated waste - food	0,00	0,00	0,0	0,0
Methanisation - food	394	456	5,3	6,0
Recycled/reused - paper	2 401	2 404	32,3	31,6
Recycled/reused - cardboard	14	12	0,2	0,2
Recycled/reused - wood	89	58	1,2	0,8
Recycled/reused - glass	78	88	1,1	1,2
Recycled/reused - plastic PMC	186	193	2,5	2,5
Recycled/reused - others...	950	930	12,8	12,2
Hazardous waste - all types	555	752	7,5	9,9
Landfill	34	27	0,5	0,4
Total	7 430	7 611	100	100

These account for account for a very small part of the carbon footprint, with four sites reporting less than 0,1 tonnes per person total annual emissions. Overall, however, represent nearly 4% of the Commission's carbon footprint. Landfill represents 0.4 to 0.5% of the total emissions arising from waste disposal. Incinerated waste and paper recycling are the two largest sources of CO₂e emissions.

4.10 Total air emissions of other pollutants

The EMAS regulation requires emissions of other air pollutants to be reported where appropriate (including as a minimum NO_x, SO₂ and PM₁₀). The results for 2017-9 are as follows:

Table 4.10 'Other' air emissions at Commission sites in 2017-9 (kg)

Site	Emissions in 2017 of:					Emissions in 2018 of:					Emissions in 2019 of:				
	NO _x	SO ₂	PM ₁₀	VOC	CO	NO _x	SO ₂	PM ₁₀	VOC	CO	NO _x	SO ₂	PM ₁₀	VOC	CO
Brussels	16 459	63	86	1 805	NR	16 151	62	84	1 771		15 921	61	83	1 746	
Luxembourg	5 771	23	30	633	NR	4 171	16	22	457		4 140	18	22	454	
JRC Petten	425	NM	NM		NR	448	NM	NM	65		417	NM	NM	65	
JRC Geel	376	11	2	42	2	362	13	2	41	2	384	12	3	43	2
JRC Karlsruhe	NA	NA	NA	NA	NA	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	
JRC Sevilla	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
JRC Ispra	32 317	n.a.	n.a.	n.a.	37 375	21 962	n.a.	n.a.	n.a.	30 886	37 322	n.a.	n.a.	n.a.	46 092
Grange	NR	NR	NR	NR	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Commission	55 348	97	118	2 480	37 377	43 094	91	108	2 335	30 888	58 184	90	107	2 308	46 094

NA - Not Applicable, NR - Not Recorded, NM - Not Measured

Brussels, owing to the large number of buildings, (and consequently boilers) is one of the two main contributors of NO_x. JRC Ispra's gas plant generates electricity and is therefore responsible for a large proportion of the reported NO_x emissions and the only site to report a significant amount of CO emissions in addition to the highest quantity of NO_x.

JRC Petten has reported since 2010 and includes physical measurements and calculations for NO_x and whereas VOC data is based on purchase and consumption of solvents. SO₂ and PM₁₀ emissions are excluded because the authorities consider them negligible.

Owing to its active nuclear activities, Karlsruhe filters and tests its air emissions regularly for nuclear (alpha and beta) particles.

5 IMPROVING WASTE MANAGEMENT AND SORTING

Waste management practices vary from site to site. Some, such as JRC Geel, consider all waste generated on site to be the Commission's direct responsibility and therefore include all contractors' waste in their waste reporting system, and Karlsruhe, that due to its nuclear status must ensure that all site waste generated is disposed of by very tightly controlled channels. In other sites, the quantity of waste directly disposed by contractors may not be included in the site's figures. As indicated in Section 4.9, only 0.4 to 0.5% of emissions due to waste disposal arise from landfilling, underlining the importance of the circular economy.

5.1 Non hazardous waste³⁹

Figure 5.1 indicates that in 2019 Brussels generated nearly 75% of the Commission's non-hazardous waste, with JRC Ispra and Luxembourg responsible for much of the remainder. It should be noted that at some sites contractors' construction and demolition waste is included in the total (JRCs Petten, Geel) and this can give rise to significant year-to-year fluctuations. Works at JRC Ispra contribute to significant year on year variation. Figure 5.2 shows the evolution of per capita waste generation at Commission sites and the 2014-20 targets.

Figure 5.1 Generation of non-hazardous waste at Commission sites in 2019(tonnes)

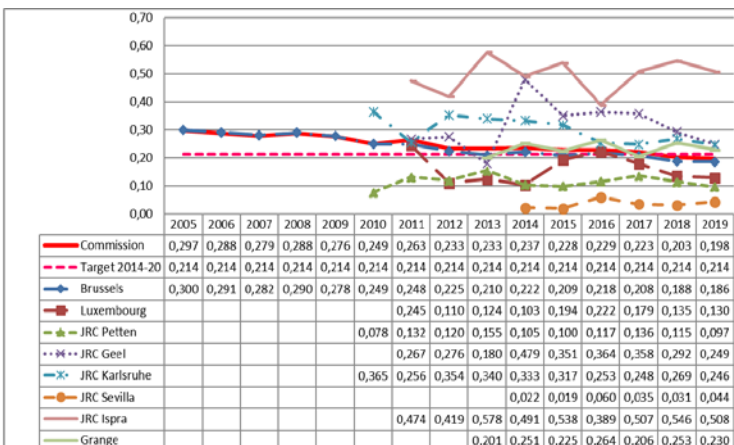
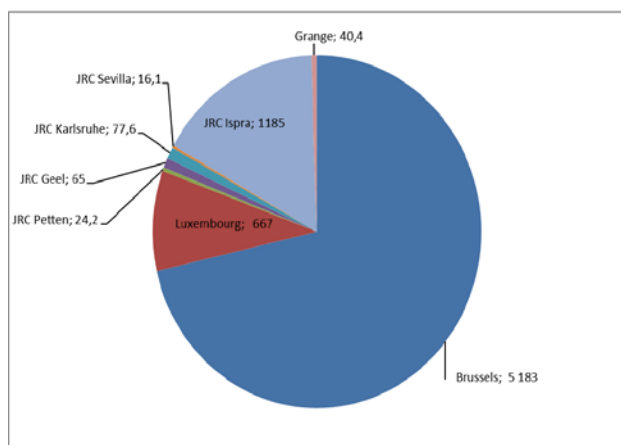


Figure 5.2 Evolution of non-hazardous waste generation (tonnes/person)

The Commission has reduced non-hazardous waste generation from nearly 300 kg/person in 2005 to less than 200 kg/person in 2019, and already meets the newly revised 2014-20 target. There is some fluctuation in recent years particularly of sites newer to EMAS. JRC Seville cooperated with its landlord to develop a new waste management plan.

Luxembourg experienced a considerable reduction in per capita waste generation in 2012, but the relocation of staff from the Jean Monnet (JMO) building generated considerably more waste in 2016 and

³⁹ Definition of non-hazardous and hazardous waste according to the EU Waste Directive 2008/98/EC

2017. JRC Ispra site's rate of waste generation has fluctuated in recent years owing to variable infrastructure works across the site, but reduced by 7% in 2019. Luxembourg made waste a central issue in their Waste Free day in the Mercier buildings, an initiative that was awarded under the EMAS waste campaign).

The Commission has sought particularly since 2018 to reduce the use of single use plastics in its vending machines and catering facilities, and part of this involved replacing non-recyclable cups and installing water fountains. The EMAS Coordination team was initially able to identify and report on 49 actions across the 8 EMAS sites demonstrating progress in this initiative, and these have progressed considerably.

The EMAS Global Action Plan 2020 recorded the actions included in Table 5.1 to reduce and manage non-hazardous waste:

Table 5.1: Actions at EMAS sites to reduce waste

	Description	BX	LX	PE	GE	KA	SE	IS	GR
	Raise awareness	•		•				•	
	Improve waste management procedures, GPP	• •	•				•		
	Contractor to report on their own waste		•						
OPERATIONAL OPTIMISATION	Improve demand management in self restaurants	•					Δ		
	Improve demand management for childrens' facilities	•							
	Improve demand management for printed publications or improve publication process						• •		
	Reduce number of bins	•	•		•				
	Replace plastic cups with alternatives, or other reusable crockery	• •	•		•				• •
	Reduction of single use plastic (SUP)	• • • • • •	•				•	• • • • • •	• • •
	Replace disposable cups with porcelain		•						
	Stop using "set de table" in canteens		•						
	Reuse (unused) office supply		•						
	Install water fountains or dispensers	• •						•	•
	Replace printing devices (JRC policy)						•		

Note: Δ denotes actions for which reducing waste generation was considered a secondary important impact of the action

Actions are in place at most sites, with the greatest number in Brussels. Several of these address either directly or indirectly the specific objective adopted by the ESC in 2017 of reducing the use of single use plastic. Brussels and JRC Ispra have moved towards installing water fountains. JRC Karlsruhe implemented many waste reduction initiatives associated with plastic many years ago. JRC Geel reduced SUP generation by introducing glass bottles and drinking water fountains in 2019, while JRC Ispra has also continued its commitment to avoid the use of SUP, and encouraging staff to do so, through awareness campaigns.

5.2 Hazardous waste⁴⁰

The Commission generates far less hazardous than non-hazardous waste. Figures 5.3 and 5.4 show the composition in 2019 and trend in total amount generated by site. Per capita hazardous waste for the Commission as a whole was up slightly in 2019 continuing an upwards trend since 2015 and above the 2014-20 target. JRC Petten made a hazardous waste disposal in 2017, not having done so in 2016, and Luxembourg's figure increased in 2017 owing to JMO closure.

Ispra has recorded a significant drop since 2011 due to a new site policy aimed at reducing the quantities of chemicals used and stored in laboratories. Karlsruhe achieved a significant drop in 2014 which continued in following years.

Year to year comparisons for the research sites may not always be appropriate because some hazardous wastes are stockpiled prior to disposal, and the type and quantity of waste will vary with the experimental program. For this reason the EMAS Steering Committee decided to withdraw the target for 2014-20.

Figure 5.3 Hazardous waste generation in 2019 (tonnes; %)

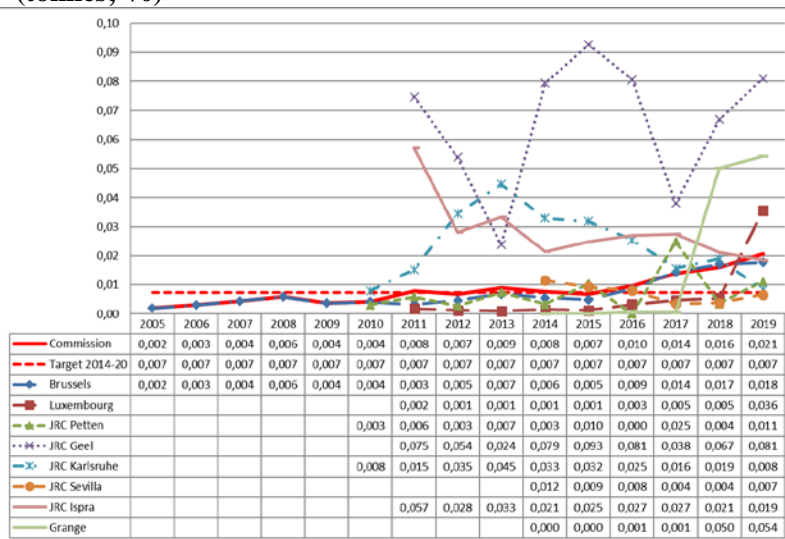
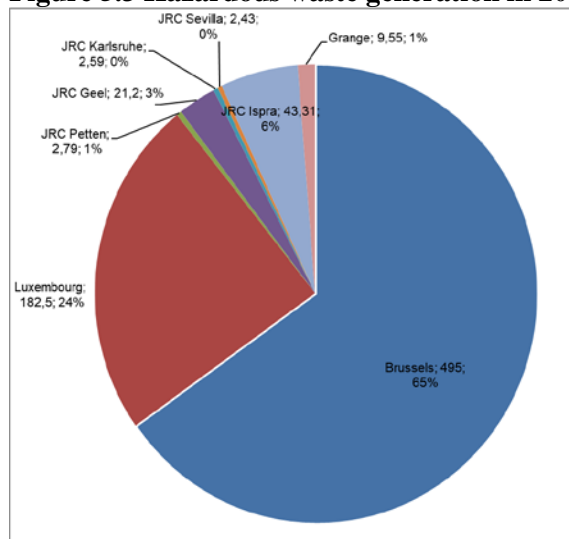


Figure 5.4 Evolution in hazardous waste generation at Commission sites (tonnes/person)

⁴⁰ Such as batteries, oils, greases, toners, fluorescent tubes, chemicals mineral oils, etc

Some of the actions included in the EMAS Annual Action Plan to reduce hazardous waste included:

- JRC Geel - Increasing staff awareness on the origins of hazardous waste (157), and improved monitoring (137) and clarification of procedures for controlled waste – JRC Ispra (168, 305)
- JRC Ispra - new purpose built hazardous waste shed (160), daily presence of an onsite waste operator (167), clarification of procedures for controlled waste (168, 305)
- Brussels – replace offset printing technology (511)
- Luxembourg – re-use out of date H & S equipment for training (548), phase out single use batteries (549)

JRC Ispra also was able, as part of its nuclear decommissioning programme, to sign an agreement with the Radiopharmaceutical Chemistry Department of the Czech Technical University in Prague to transfer a cyclotron, thus avoiding it being dismantled and processed as nuclear waste. The first shipment of containers occurred place in November 2019.

5.3 Waste sorting

Figure 5.5 Evolution of sorted waste as proportion of total waste at EMAS sites (%)

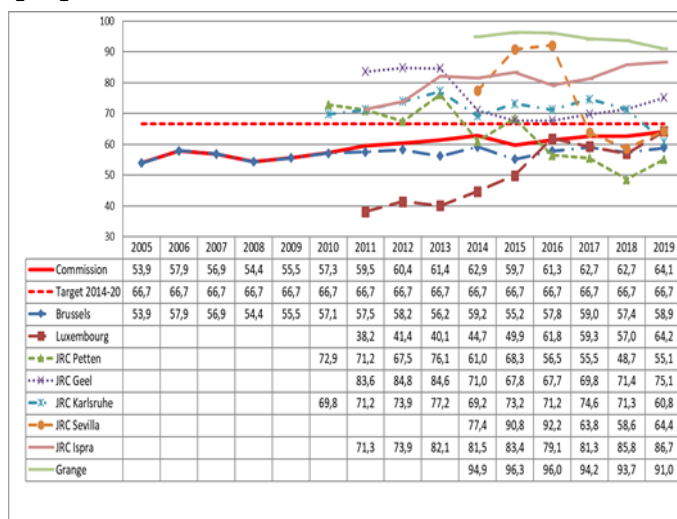


Figure 5.5 presents the percentage of waste sorted into different streams (excluding that which is "thrown away" when all other options are exhausted). It therefore represents all waste except what is usually referred to as "domestic" or "municipal" waste.

Following several years of achieving 60 to 63%, in 2019 the value increased to 64%, moving closer to the 2014-20 target of 66,7%.

JRCs Geel and JRC Ispra sort considerably more of their waste (75% and 87%) in 2019 than either Brussels or Luxembourg (59% and 64% respectively). Grange records very good results

(over 90%) largely because the waste contractor undertakes additional sorting post collection, and report the data to site. Results at individual sites were mixed however with JRC Karlsruhe recording a 10% reduction in waste sorting. Brussels has improved waste sorted through improved awareness and the successful introduction of new waste collection points, initially installed as pilot trials in several DGs.

JRC Geel achieved better waste sorting through a thorough review of its process and procedures and achieved its waste sorting objective. Better performance at JRC Seville was due to better control of the waste management process through a new system and increased awareness of waste management contractors. Approximately 0.5% of waste goes to landfill with JRC Ispra and Grange sites reporting this activity in 2018 and 2019.

Initiatives in the 2020 Global Action Plan to reduce waste are summarised in Table 5.3.

Table 5.3: Initiatives to improve waste sorting

	Description	BX	LX	PE	GE	KA	SE	IS	GR	CO M
3 c	Target 2014-20 (%) Significant aspect	5,2 y	45 y	5,0 y	-5,2 y	4,8 n	-15 n	9,3 y	5,2 y	6,0 y
STUDIES, AWARENESS	Staff awareness		•	Δ	•			••	•	
	Documentation and procedures	•			••		•	•		
	Contractor awareness	•	••							
	New tender for waste management contract	••	•							
OPERATIONAL OPTIMISATION	New clearance procedure for controlled areas				•					
	Contractor to manage own waste		•							
	Standardise waste contractors management		•							
	Signing and distribution of bins	••	•							
	Introduce waste sorting stations, or new storage areas	••	•		••					
	Centralised organic waste collection from restaurants/café		••							
	Replace plastic cups by biodegradable ones				Δ					
	Collect coffee grounds								•	

Note: Δ denotes actions for which improving waste sorting was considered a secondary important impact of the action

There are several actions seeking to improve waste sorting with Brussels, Luxembourg and Geel appearing to be the most active. The involvement of contractors appears an important element of several actions.

5.3.1 Recycling obsolete IT and office equipment:

DG DIGIT has an agreement contract with Oxfam Solidarity (Oxfam) since 2006 and since 2017 also with Close the Gap, for the “removal and recycling, for humanitarian purposes”, of goods no longer used by the Commission but still useful beyond their economic life, and thus providing a useful social outcome. The sales fund their humanitarian and welfare activities. Through the agreements, DIGIT aims to reuse on average at least 70% of units collected from the Commission. Table 5.4 shows actual recycling rates for IT collected in Brussels (and Luxembourg), indicating that far higher rates were achieved until 2017. The data includes material collected in Luxembourg which is transferred to processing facilities in Belgium.

Table 5.4 Number of IT and telephony items collected and recycled in Brussels and Luxembourg

Parameter	Year of collection									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Collected items	15 462	12 531	19 360	24 744	27 513	30 918	23 969	18 133	15 988	30 001
Processed items ¹	15 301	12 531	19 251	19 935	27 375	30 918	23 554	18 088	15 988	29 355
Items for second hand use	12 509	10 960	17 469	17 298	24 759	27 952	21 736	14 287	10 549	14 255
Second hand use (%)	82	87	91	87	90	90	92	79	66	49
Recycled or dismantled (%)	18	13	9	13	10	10	8	21	34	51
Weight of collected items (tonnes)	42,72	34,62	53,49	68,37	76,02	72,33	45,00	67,50	55,54	207,4

Note 1 - processing could take place in following years, (source DG DIGIT)

Left over equipment is transferred to authorised operators on behalf of Recupel, the non-profit organisation responsible for recycling electrical and electronic waste in Belgium. During the annual audit of Oxfam Solidarity under its EMAS registration, the auditor verified that its recycling measures complied with environmental regulations and noted the generally good progress it had made in relation to legal requirements.

The data reported are for IT and telephony, with the split between the two available since 2017. Although recycling of combined IT and telephony has fallen below 70% in 2018 and 2019, IT alone has remained above 70% according to data from Oxfam and Close the Gap. If docking stations are excluded, re-use of IT was 85% in 2018 and 84% in 2019. Charities report that they cannot sell docking stations as they are generally not used in homes. Since the Commission has implemented telephony through its IT equipment it has disposed of most of its fixed phone sets. But the charities send these to Recupel for dismantling as there is no market for them, recycling rate of telephony was 23% in 2018 and 0% in 2019.

The high re-use rates for IT equipment were achieved despite the falling cost of new goods, which make older IT equipment less attractive. This is due to the generally good quality of the collected items, and systematic recycling effort made by Oxfam in the context of its EMAS registration and by Close the Gap through the ISO9001, ISO14001, OHSAS18001, R2 and WEEELABEX certificates of its partners.

The weight of IT material collected was reported by Oxfam for the first time in 2015 at 72 tonnes almost doubling the quantity of hazardous waste that is generated by Brussels, and has been incorporated into the Brussels waste reporting. The amount of collected by Oxfam (including donations to Close the Gap fell from 68 tonnes in 2017 to 56 tonnes in 2018 and more than doubled in 2019.

ICT strategies such as replacement of desktop by laptops, suppression of personal printer, splitting of computer and screen life cycles⁴¹, replacement of fixed line phones with VoIP software solution explains the variations in terms of volume and weight.

Recycled office equipment under the same contract amounted to over 500 tonnes in 2016 and 2017, but reduced to 256 and 247 tonnes respectively in 2018 and 2019.

⁴¹ CRT monitors and Desktop computers had roughly the same life expectancy. Since LCD screens were introduced, computers are replaced more frequently than the standalone screens which have a higher life expectancy.

Table 5.5 shows the evolution for different categories of IT equipment in 2018 and 2019, and from which it is evident that:

- The number of desktops continues to fall drastically
- There is a large increase in the number of laptops and docking stations as the outcome of the Commission-wide policy of shifting the end-user equipment from “desktop to docked laptop”.
- The number of individual and network printers, scanners and fax machines has reduced
- Fixed line telephones decreased by a third due to the introduction of a VoIP solution.
- The number of televisions increased but other types of video equipment decreased.

Table 5.5: Evolution of reported IT inventory from 2018 to 2019 at Commission sites*

Category of equipment	2018	2019	% change
Computers and screens			
Desktop PCs	23 908	14 299	-40,2
Laptops	28 267	35 769	26,5
Docking stations	26 237	35 382	34,9
Flatscreens	61 041	63 308	3,7
Printers and scanners			
Individual printers	7 361	3 503	-52,4
Network printers and copiers	5 911	5 394	-8,7
Scanners	495	385	-22,2
Fax machines	242	168	-30,6
Telephones and faxes			
Simple (portable) phones	160	150	-6,3
Smartphones	9 062	9 314	2,8
Fixed line telephones	43 376	30 884	-28,8
Servers and switches			
Informatics server	6 160	5684	-7,7
Firewall router switch	2 392	2490	4,1
Video equipment			
Projectors	845	670	-20,7
Videoconference installations	1 418	1 194	-15,8
Televisions	437	523	19,7

*Excluding JRCs Sevilla, Karlsruhe

6 PROTECTING BIODIVERSITY

Annex IV of the EMAS Regulation has been updated, and including the parameters associated with biodiversity. Table 6.1 shows how the components associated with the new measure, which now includes reference to “nature oriented areas” both onsite and offsite (where an organisation participates in the management of an area outside its perimeter). Owing to the large number of buildings in the Brussels site will incorporate this new measure in 2020 reporting.

Table 6.1 Biodiversity indicators in 2019

Site	Brussels	Luxembourg	JRC Petten	JRC Geel	JRC Karlsruhe	JRC Sevilla	JRC Ispra	Grange
Total use of land (m2)	NR	138 339	332 500	380 316	43 170	12 094	1622 948	90 000
Per capita	NR	27	1 335	1 452	137	33	696	513
Total sealed area (m2)	NR	104 029	59 909	70 336	43 170	23 487	660 884	18 000
Per capita	NR	20	241	268	137	64	283	102
nature oriented area onsite (m2)	NR	34 310	75 591	309 980	200 000	12 094	962 744	18 250
Per capita	NR	7	304	1 183	635	33	413	104
Nature oriented area offsite (m2)			197 000					18 000
Per capita			791					102

NR: Not Reported

As shown in Table 6.1, JRCs Petten and Geel are the most sparsely populated sites, with JRC Ispra and Grange also occupying several hundred square meters of land per person. The experimental JRC sites have relatively extensive sealed areas, likely due to the widespread presence of experimental apparatus. There is also plenty of room for nature at the experimental JRC sites. Only JRC Petten is involved in managing natural areas outside the site perimeter. Occasional activities in Brussels organised by volunteer groups have created some potted plant areas at locations in front, or inside building open courtyards.

6.1 Natura 2000 site at JRC Petten



Staff from an external company analyzing the nature in the Natura-2000 dune area adjacent to the JRC Petten premises

Part of the JRC Petten site is located in a Natura 2000 protected habitat, and the site is one of the stakeholders involved in its management. Developing and implementing a NATURA 2000 plan (170) is an important aspect of site activities.

The site is located among sand dunes only hundreds of metres from the coastal beaches. There is a large presence of sea gulls and particularly during the mating season, or after the chicks are born, they can become aggressive to staff who need to access roof areas for maintenance.

6.2 JRC Geel's forestry management

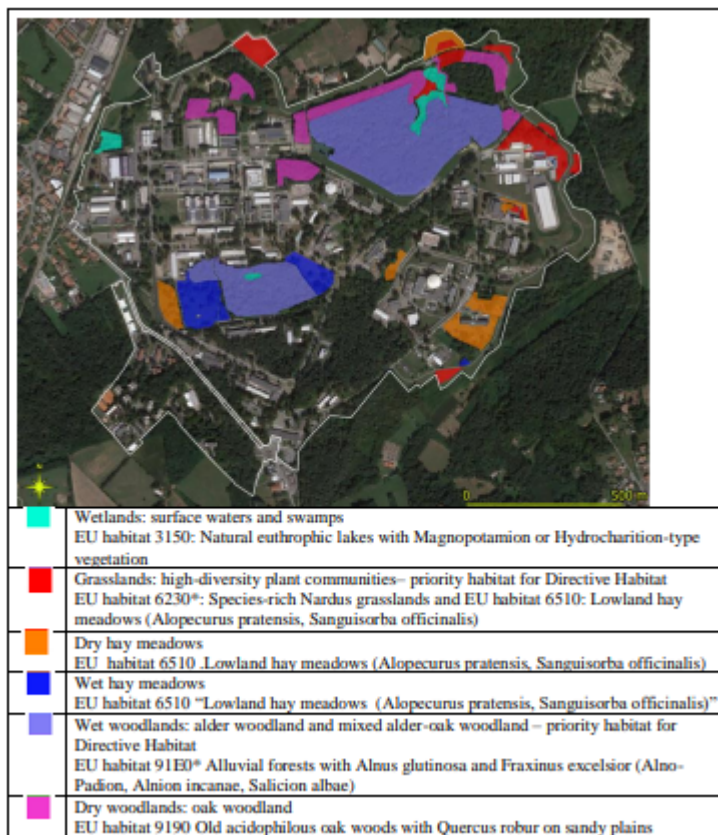
A forestry management plan at JRC Geel aims to restore diversity in the surrounding forest. In recent years pine has become overwhelmingly dominant at the expense of native broad leaf species. JRC Geel - Forest management plan (171, 309), monitoring fauna/flora (464) and creating new habitat including insect hotels (463) are listed in the Annual Action Plan.



Insect hotels at JRC Geel

Volunteers at JRC Ispra's 2019 tree day

6.3 JRC Ispra's habitat mapping and species protection



JRC Ispra habitat map

Such activities have included the planting of native trees, the creation of meadowlands, and allotments for staff.

More recently, DG Grange signed a contract for a multi-annual plan for a bio-diversity project that will be rolled out across the site over the next five years, to conserve and restore indigenous flora and fauna. On top of the net biodiversity gain, an increased carbon offset is expected as the landscape scheme establishes and matures.

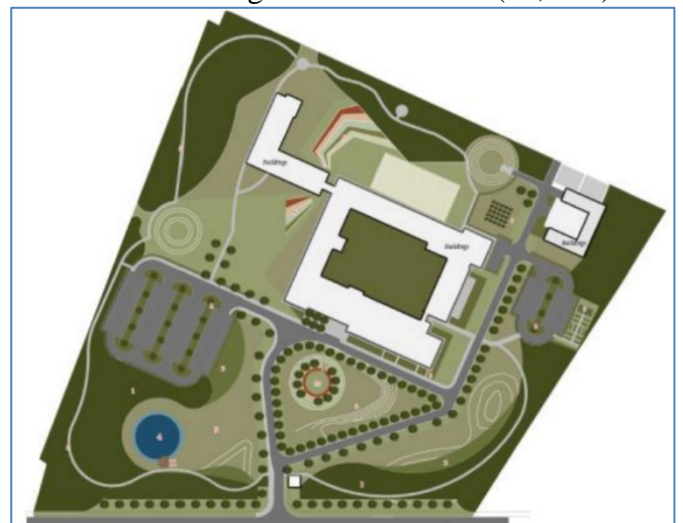
Projected landscape enhancement at DG Grange (right)

Although there is no formally designated protection area at JRC Ispra, the site is nonetheless very engaged in biodiversity related issues having recently conducted a study to record the main plant species and natural habitats and map the different types of green areas.

A field survey recorded the population of different species of amphibians, including a protected species of frog. The site used the BREEAM certification process for the refurbishment of a new building under which it evaluated its ecological impact from construction to operation and designed mitigation measures for implementation.

6.4 Ecological enhancement at Grange

Activities listed in the Global Annual Action Plan are for ecological enhancement (79, 522).



7 PROMOTING GREEN PUBLIC PROCUREMENT (GPP)

7.1 Incorporating GPP into procurement contracts

The EMAS sites have been recording for several years, the proportion of procurement procedures that include environmental criteria, beyond the requirements of the financial procedures, as shown in Table 7.1. This approach is currently being superceded as described in Section 7.2, in an effort to provide more information on the strength of the measures adopted.

Table 7.1 Contracts greater than 60k EUR with additional "eco" criteria (%)

Site	2012	2013	2014	2015	2016	2017	2018	2019
Brussels	0	94	80	100	82	93	100	100
Luxembourg	65	92	100	100	94	83	100	71
JRC Petten	NR	NR	NR	NR	NR	NR	76	76
JRC Geel	NR	NR	NR	NR	22	33	35	29
JRC Karlsruhe	NR	NR	8	8	8	28	17	17
JRC Sevilla*	NR	NR	1	2	1	1	2	15
JRC Ispra	NR	17	32	9	9	10	17	12
Grange	0	0	2	4	100	100	100	100

NR - Not Recorded; *Total number, not % reported prior to 2019

In recent years both Brussels and Luxembourg have increased the number of their procurement contracts, managed by OIB and OIL respectively, that include some form of "green" criteria in the contract or award process, in addition to the standard clauses. The JRC sites and Grange have also started to incorporate such criteria.

DG ENV chairs an inter-service working group on developing and promoting GPP as part of the Commission's response to its obligations under the Circular Economy Package. The Commission participates in an inter-institutional GPP contract managed by the European Parliament and which allows staff-preparing tenders to seek specialist advice regarding implementation of environmental criteria from a helpdesk provided by an external service provider.

7.2 Rating the level of sustainability achieved in contracts through GPP

The Commission started, in 2018, to use the European Court of Auditor's recommended grading scale⁴² to show the degree to which tenders incorporate sustainability, as follows:

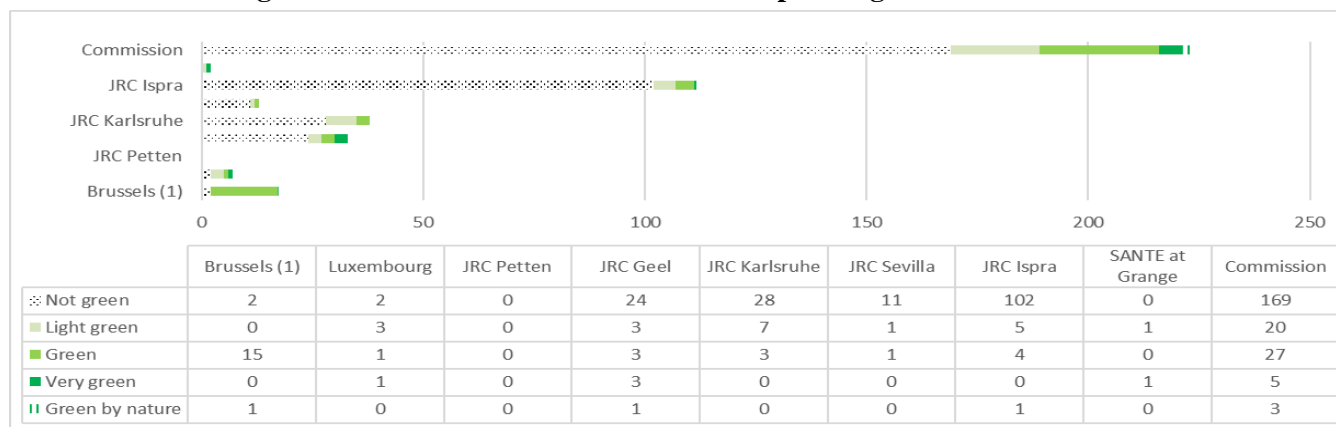
- **Not green:** Tender documents without environmental considerations or have clauses without impact on purchasing approach
- For **light green** to **very green** a main difference is in the weighting of the environmental criteria as a share of the total (for price and quality), as follows:
 - Light green: < 10%;
 - Green 10% to 25%, and
 - Very green >25%

⁴² Scale recommended in P41 Annex to the European Court of Auditors Special Report 14 - How do the EU institutions and bodies calculate, reduce and offset their greenhouse gas emissions? This approach may eventually supercede that described in Section 7.1

- **Green by nature:** Where the primary purpose is “green”, eg construction of a green roof, or consultancy services to improve environmental performance

Figure 7.1 presents the results at site level for the five categories:

Figure 7.1 Breakdown of the extent of incorporating GPP criteria in 2019



Note: (1) 'Green' total includes light 'green' and very 'green'

Although 32% of contracts in 2018 were either *green by nature* or had some GPP elements, this reduced to 27% in 2019. A relatively small proportion of contracts at JRC Ispra had any degree of greening, and this led to a reduction in the proportions overall total. JRC Petten has yet to adopt the new GPP criteria.

7.3 Measures taken for IT procurement

DG DIGIT is responsible for IT across the Commission sites. It uses environmental criteria in the technical evaluation of all invitations to tender for the purchase of IT hardware and incorporates these criteria into the financial evaluation. Where pertinent the financial evaluation includes the cost of energy consumed by the equipment during its lifecycle.

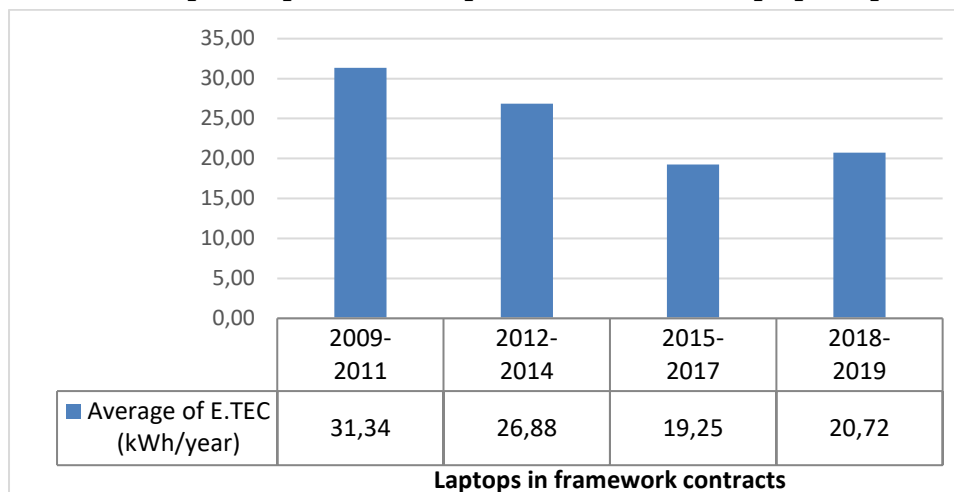
The performance of desktop computers purchased by the Commission improved while power consumption decreased. Although they are being phased out, the following table shows improvement in several parameters in recent years across three successive tender frameworks, for example reduction in typical energy consumption (ETEC) between 2014 and 2017 (Energy Star 5.2 and 6.1).

Table 7.2 Improved power consumption in Commission desktop computers

Framework contract	DI-6720				DI-7350		DI-7630
Energy Star Scheme	5.0	5.0	5.2	5.2	5.2	6.1	6.1
Model	Dell Optiplex 780 DT	Dell Optiplex 790 DT	Dell Optiplex 7010 DT	Dell Optiplex 3020 SFF	HP ProDesk 600 G1 SFF	HP ProDesk 600 G2 SFF	HP ProDesk 600 G3 SFF
Year in production	2009	2011	2012	2014	2014	2016	2017
Maximum	114,04	78,03	70,76	78,15	42		
Short Idle						14,662	14,3
Idle Mode	55,65	47,15	39,25	26,09	17,5	12,705	13,43
S3 "Sleep" Mode	0,94	0,94	0,87	1,36	1,5	2,131	0,84
ETEC (kWh/year)				94,23	64,72	67,13	64,70

Since 2017 laptops have been replacing desktops with a Commission target of 100% mobile computers by 2021. This saves more energy as laptops have evolved from requiring half the consumption of desktops to a third in the most recent models.

Table 7.3 Improved power consumption in Commission laptop computers



7.4 Purchasing through the office supply catalogues

Data in Table 7.4 shows that Brussels and Luxembourg have increased the percentage of "green" products in the standard office supply catalogue. Since 2012, at both Brussels and Luxembourg the percentage of "green" items has roughly doubled. JRC Ispra has a smaller proportion of "green" products in the catalogue, but a large number of items.

Table 7.4 Proportion and number of "green" products in the office supply catalogue

	Percentage "green"								Number "green"							
	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Brussels	27	36	36	46	47	48	48	47	169	186	186	330	364	358	351	110
Luxembourg	18	23	26	23	26	36	35	54	99	88	94	89	87	118	108	98
JRC Ispra	26	26	24	24	32	30	28	29	153	153	165	171	232	200	210	203

7.5 Specialist advice on Green Public Procurement

The Commission supports an inter-institutional consultancy contract coordinated by the European Parliament through which a helpdesk can provide tailored advice on how to incorporate more sustainable elements into individual contracts.

8 DEMONSTRATING LEGAL COMPLIANCE AND EMERGENCY PREPAREDNESS

8.1 Prevention and risk management

Sites have their own standard operating procedures including internal and external audits that are required to demonstrate compliance with operating licenses and legislation. Sometimes environmental and health and safety compliance are integrated. The approach adopted depends on the site, who retains overall responsibility, and is described in the site annexes to this report.

The EMAS coordination team organises an annual internal auditing exercise for all the eight sites which is conducted on the Commission's behalf (and participation), by an external consultant. This is an EMAS system requirement.

The sites are also subject to annual EMAS external verification audits, the successful completion of which is a prerequisite for EMAS registration. In 2019, for the second year the verification took place in June. The consulting company used 12 auditors to visit the eight sites over 23 days, with usually two or three per site.

HR.D2 encourages the external auditors to take into account the resources available to Commission staff when formulating their findings, and prioritise accordingly. The audits identify, in increasing order of urgency of response:

- Good practices;
- Scopes for improvement (SFI) – which can be considered as professional advice with no obligation;
- Observations – findings which if not addressed, could become non-conformities;
- Minor non conformities – findings to be addressed immediately but not a systems threat;
- Major non-conformities – serious findings that put the system at risk and address immediately.

The Commission records and follows up all audit findings using workflow software (JIRA). The external verifiers must immediately approve auditees' actions to address both minor and major conformities. The Commission monitors the number of EMAS non-conformities each year as shown in Table 8.1.

Table 8.1 Non-conformities from EMAS verification audits at Commission sites

Site	2011	2012	2013	2014	2015	2016	2017	2018	2019
Brussels	21	5	3	3	4	1	1	1	0
Luxembourg	19	3	0	0	2	4	6	4	0
Petten			1	1	1	1	4	4	1
Geel				3	3	2	4	4	0
Sevilla				1	0	0	0	2	5
Karlsruhe					4	4	1	0	3
Ispra					0	0	0	1	1
Grange					4	3	4	3	3
Total	40	8	4	8	18	15	20	19	13

The total number of non-conformities decreased in 2019, and for the first time there were none at three sites. Since 2016, HR.D2 has circulated to site management a summary⁴³ of the main outcomes of each verification exercise including a "heat map" showing how the audit findings correlate with different parts of the EMAS Regulation. The note for 2019 highlighted:

- Several good practices⁴⁴ for all the sites
- Observations and scopes for improvements on several horizontal themes including the need for:
 - periodically validate factors to convert waste volumes to mass,
 - more efficient data collection and processing,
 - better anticipation and reaction to abnormal monitoring data, and

⁴³ Internal Commission communication Ares(2019)5925897 - 24/09/2019

⁴⁴ Including JRC Ispra's annual external stakeholder initiative "EMAS Round Table" with regional authorities, which resulted in signing a Sustainable Development Agreement with the Lombardy Region in 2019, when it also achieved a record participation.

- Considering how to better improve the information collected in day-to-day follow up of technical problems by Commission services.
- Only one major non-conformity, and no evident pattern or trend in the occurrence of minor non-conformities across the sites.

8.2 Improving compliance (and performance) by registering more buildings under EMAS (Brussels and Luxembourg)

All buildings in Brussels and Luxembourg have their own environmental permits issued by the local authorities. Registering individual Commission buildings in Brussels and Luxembourg under EMAS helps to ensure that the Commission complies with the permits, of which up to 20 or 30 could be undergoing modifications at any one time, and in so doing delivering ever-improving environmental performance.

It also ensures the Commission adheres to additional local regulatory requirements, such as COBRACE in Brussels that are mandatory targets for reducing energy consumption. Owing to the administrative workload associated with incorporating new buildings in EMAS (including system implementation, data preparation and reporting internal and external audits), the scope of the Commission's system has expanded gradually by adding a "manageable" number of buildings every year.

EMAS reporting for Brussels in 2015 reached a milestone with all occupied buildings (62) included for the first time. However the real estate portfolio changes from year to year, with typically either one or two buildings entering or leaving the estate. In 2018 three buildings were not included in the scope, but in 2019 both MO15 and MERO buildings underwent successful audits were added to the Brussels registration, leaving one remaining building (PALM) which is undergoing refurbishment. So 60 of 61 buildings in Brussels are formally incorporated in the EMAS registration.

In Luxembourg, reporting on environmental performance has included all buildings and 14 out of 18 are EMAS registered representing 84% of useful floor space (153 172 m² of 181 623 m²).

As indicated in Table 2.3, 494 of 501 building structures (99 %) are registered in the Commission's EMAS scope in 2019, representing 98 % of useful floor space (1 610 185 m² out of 1 640 581 m²).

8.3 Emergency preparedness

Each Commission site has structures and procedures for responding to emergencies. In 2015, a page was introduced into the EMAS intranet corporate portal (MyIntracomm) explaining the different emergencies in Brussels and Luxembourg with links to all pages related to the follow-up of incidents and emergencies. This was necessary because for these large centres multiple services share responsibility for emergency preparedness and response making it sometimes difficult to see exactly where responsibilities lie between the Security Office, Health and Safety services, infrastructure services, etc.

In addition, summary sheets of emergency contact numbers are circulated to offices, and HR.D2 also prepared an intranet page to relay air quality alerts from the local authorities in Brussels. Automatic SMS to staff can also convey emergency information, for example when buildings evacuations enter into force and when they are lifted.

9 COMMUNICATION AND TRAINING

9.1 Internal communication and training

This section describes the corporate communication and training actions common for all the Commission sites. Every year, HR.D2 prepares detailed corporate communication and training action plans, sets up corporate internal communication campaigns, supports individual services in setting up local staff awareness campaigns, updates EMAS training material and delivers training and technical support to the EMAS Site Coordinators and to the EMAS Correspondents Network. The more important actions are outlined below.

9.1.1 Leadership and commitment

During 2019, Commission's senior management took an active role demonstrating leadership and commitment in relation to the environmental management system. Specifically:

(a) *#EUBeachCleanUp campaign: EU organises record number of cleaning actions worldwide*



On beaches across Europe and the world, EU staff are joining hands with local communities to clean up marine litter as part of the #EUBeachCleanUp campaign. Launched on 19 August, this year's campaign ran through October, culminating on Saturday 21 September, the International Coastal Clean up Day, with actions taking place in over 80 countries, on all inhabited continents.

Commissioner for Environment, Maritime Affairs and Fisheries, Karmenu **Vella** was proud of the campaign and invited everyone to participate: *"The European Union has some of the most ambitious policies to fight marine pollution in the world. Together with the United Nations, we want our oceans to be cleaner and healthier - in line with the UN's Sustainable Development Goal 14. This year, we have a new partner: the Smurfs. Blue, brave and with an exceptional appeal to young and old, they are the ideal partners of our campaign. Join our events and help us build a global wave of ocean activism!"*

During 2019 more than 40 000 volunteers participated, from well over 70 EU delegations and representations - but also from UN offices, international organisations, embassies and NGOs - have together removed 850 000 kg of waste from shores across the world. That is 10 times the result of 2018, when the international campaign first launched. But this year, the Smurfs also lent a hand; they were great ambassadors to reach out to new enthusiasts, especially children and youngsters.

(b) *EU Mobility Week (16-22/09): promoting walking and cycling for better towns and cities*

The 18th edition of EU Mobility Week, the European Commission's flagship campaign promoting clean and sustainable urban transport run from 16-22 September, in almost 3 000 towns and cities from about 50 countries promoting safe walking and cycling with the call to action "Walk with us!". EU Mobility Week culminates each year in the well-known Car-Free Day, when streets close for traffic and open for people!



Speaking about EU Mobility Week 2019, Commissioner Violeta **Bulc** responsible for Transport said: *“This year we would like to remind EU citizens that walking is enjoyable, healthy and completely free of charge. Many times it’s also a connecting mode for a smooth multimodal journey. The EU has invested a lot of effort to make it safe as well. So put on your walking shoes and walk with us!”*

(c) VéloMai now a worldwide challenge! (May 2019)



The third edition of the inter-institutional Velomai challenge, celebrated a month of intensive cycling. Over 3,300 colleagues from 10 different EU Institutions took part, including the European External Action Service and 22 of its delegations – making Velomai a worldwide initiative. With around 600 000 km cycled in over 100 000 rides, staff not only reached the moon, but almost came back to earth as well. The impressive number of kilometres covered represent nearly a 50% increase compared to last year, and savings of over 75 000 kg of CO₂. In addition to this, over 1 000 colleagues took part in the numerous events organised during the month of May including: safe cycling training courses, lunchtime conferences, repair workshops and guided bike rides. This year, on top of the EEAS, Velomai also welcomed the participation of the four European Schools in Brussels, the European Ombudsman and the European Data Protection Supervisor.

DG HR Deputy Director-General Bernard **Magenhann** and Head of Unit for communication in the European Parliament Jean-Yves Loog gave speeches and congratulated the winners, who all received prizes. Mr Magenhann stressed that while Commission colleagues use sustainable transport modes more than the average for the Brussels region, we could do even more.

(d) *European Green Deal: Europe to be first climate-neutral continent by 2050*

Europe is set to be the first climate-neutral continent in the world by 2050, thanks to the European Green Deal, presented by the College on 11/12/2019. Described by President **von der Leyen** as “our new growth strategy”, the package of measures will also be good for the economy, and for people’s health and quality of life – with no-one left behind. The green deal will act as a roadmap to make the EU’s economy sustainable, by turning climate and environmental challenges into opportunities across all policy areas.



The goal is to boost the efficient use of resources by moving to a clean, circular economy, stop climate change, revert biodiversity loss, and cut pollution. The package outlines the investments needed and the financing tools available, and explains how to ensure a just and inclusive transition.

President von der Leyen said: *"The European Green Deal is our new growth strategy – for a growth that gives back more than it takes away. It shows how to transform our way of living and working, of producing and consuming so that we live healthier and make our businesses innovative."*

Her words were echoed by Executive Vice-President **Timmermans**, who added: "*We are in a climate and environmental emergency. The European Green Deal is an opportunity to improve the health and well-being of our people by transforming our economic model... Our responsibility is to make sure that this transition is a just transition, and that nobody is left behind as we deliver the European Green Deal.*"

The Commission's EMAS Steering Committee adopted its annual Global Action Plan in January 2020 containing 227 ongoing or new actions addressing resource use (energy, water, paper), carbon dioxide emissions, waste and biodiversity amongst others. To continue to lead by example in 2020 it will present a comprehensive action plan implementing itself the principles and recommendations presented in the Green Deal with the objective of **becoming climate neutral itself by 2030**.

9.1.2 Communication to staff

(a) Corporate seasonal communication campaigns:

There were two main corporate communication campaigns during 2019:

- *Inter-institutional EMAS Days 2019* (18-19/03) and “*What does EMAS mean for you?*” campaign (12-22/03);
- The *Less Waste, More Action* - Waste Reduction campaign (November-December)

Inter-institutional EMAS Days 2019 (18-19/03) and “What does EMAS mean for you?” campaign (12-22/03)



The *Inter-institutional EMAS Days 2019*, organised by the Commission and five other European institutions, dedicated to implementing the Eco-Management and Audit Scheme (EMAS). The two-day event covered a number of themes such as making public procurement greener, gradually suppressing single-use items, and involving staff in the commitments made by EU institutions against climate change and plastic pollution in the oceans. Activities included participatory workshops, film-screenings, including the documentary *A plastic ocean*, many thematic debates and conferences in which colleagues could for example get advice on biological gardening, score some wild honey flower seeds or discover that Brussels houses 12 couples of hawks (in total approx. 500 participants).

In addition, a corporate campaign “*What does EMAS mean for you?*” addressed Commission staff via (a) an online competition in which 544 colleagues took part. The award ceremonies rewarded 80 winners in Brussels and 51 in Luxembourg and many more in all other EC-sites. Reusable water bottles made of sugar cane and bamboo, 100% renewable sources, were distributed; and (b) Panel discussions were organised in Brussels and in Luxembourg among different members of the EMAS Network, including members of the corporate coordination team, the site coordination teams, EMAS Correspondents and volunteers.



“Less Waste, More Action”: Waste Reduction Campaign (04/11 – 16/12)

The 2018 campaign targeted plastic and single-use items among others; the 2nd edition in 2019 centred around four themes, one for each week of the campaign: single-use plastic and other items, correct waste sorting, greening office supplies and sharing ideas on how best to reduce waste. In addition, an action on the returning of personal printers and digital clean-up was set up in collaboration with DIGIT.

**Less Waste,
More Action**



The menu of the 2019 “Less waste, more action” campaign included three competitions throughout November. Competition 1 sought the most innovative best practice on waste reduction implemented at local/service/site level. Competition 2 (only for Brussels) rewarded the most highly-performing building/DG/service on waste reduction and competition 3, co-organised by DG HR and DG SCIC, was the first ever on sustainable conferences and events in the Commission.

On the latter, DG SCIC Director-General Florika **Fink-Hooijer** said: *"Conferences are one of the most important means for the EU to engage with the wider public and to shape EU policies together. Beyond debating our policy work, they are also an opportunity to show that the Commission is an institution that cares deeply about the environment and is committed to preserving our planet."*



The highlight of the campaign was the EMAS Awards Ceremonies on 16 December. The winners of the two competitions – one on most innovative local waste reduction, and the other on the best performing buildings in terms of waste reduction – were handed their award from Deputy Director General of DG HR and acting President of the EMAS Steering Committee, Bernard **Magenhann**, and Director General of DG SCIC Florika **Fink-Hooijer**.

The most innovative local waste reduction practices included: eco-talks on reducing our environmental footprint by DG MARE, the first Zero Waste Day (info-fair) in Luxembourg, the setting up the “greening the DG” events in DG AGRI, DG REGIO and DG TAXUD, the organisation of the “PLASTIC DETOX” campaign, including the art exhibition and conference on ZOOplastics by DG BUDG. In addition, a special mention was addressed to the EC Representation in Slovenia (DG COMM) for integrated initiatives on paperless office, reduction of plastic usage and promotion of tap water.

The best performing EC buildings/services in Brussels regarding waste reduction demonstrated reductions of generated waste between November 2018-November 2019 of 41% to 50%!

In addition, several innovative and original initiatives that took place across services, for example:

- Two zero waste workshops on 8/11 and 29/11 (in collaboration with DG RTD, DG MARE, SJ and DG COMP);
- Two lunchtime zero waste guided walking tours around European neighbourhood (22/11 and 6/12) in collaboration with Zero Waste Belgium;

- Sustainable Fashion Conference, clothes' exhibition made of recycled material and clothes' swap in DG RTD;
- Film-screening and children's toys and clothes jumble sale in DG DGT;
- Conference and photo exhibition on Zooplastics in DG BUDG;
- A zero waste info-fair and Green New Year's Resolutions event in DG HR;
- Presentation for staff and brain-storming sessions in SG, DG CLIMA, DG ENV, DG REGIO, DG CNECT, DG NEAR, DG FISMA and DG COMM;
- DGT-EMAS kids' jumble sale (19/11), to sell and buy children's clothes, toys, games, books, and childcare items. You can also just have a look around and grab a bite to eat, or make a donation to a charity of your choice.



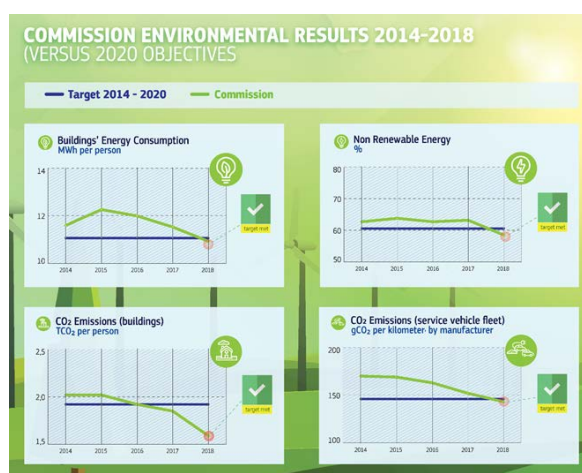
Lastly, a funny **waste sorting video** was created in collaboration with HR.A.4.

b) Additional campaigns:

Additional corporate environmental campaigns have been conducted in relation to:

- **Welcome Office INFO DAY** (20/03/2019) at Berlaymont Piazza for EC Newcomers and their families: the EMAS team and volunteers hosted an EMAS stand with information and quiz games about how to be sustainable@work (approx. 400 participants).
- **The 3rd edition of the inter-institutional VéloMai challenge** (May 2019): The action has been the result of a successful collaboration among several actors, HR units, the fit@work programme, EMAS Site Coordinators and EU Cyclists' Group (EUCG). The EMAS team hosted information stands to both opening and closing ceremony promoting greater awareness of environmental issues and traffic safety (approx. 500 participants). Several local events were also organised by the EMAS Site Coordination Teams (as described in the site Annexes).
- A **Sustainable Mobility campaign** (September 2019) organised by the EMAS Site Coordination Teams during EU Mobility Week (16-22/09) across EC-sites (as described in the site Annexes). The EMAS team and volunteers participated with a stand at the opening event open to both public and EC-staff, organised by DG MOVE (more than 400 participants).
- The **2019 Volunteering Week** took place from 18 to 22 November. This year, colleagues ready to devote a half day to help people in need in local communities had the widest range of activities ever to choose from, including environmental projects. Also, the number of NGO partners participating was more than twice as high as last year. For the first time, staff could try out competence-based 'pro bono' volunteering, and among other things ran workshops in areas identified by the NGOs (733 participants from 40 DGs and five agencies).

- The **publication of the Environmental Statement 2019** (data 2018) and an on-line promotional brochure⁴⁵ highlighted the main results.
- Communication on the **EMAS highlights** in relation to the EMAS Steering Committee's meeting on 24/09/2019, celebrating that the Commission has already reached 5 of its 2014-2020 environmental objectives, namely concerning: energy and water consumption, CO₂ emissions from buildings and vehicle fleet, fleet vehicle emissions CO₂ per km (manufacturer spec) and non-hazardous waste generation.
- **Eco-talks and film-screenings in collaboration with DG MARE, DG ENV and DG CLIMA**, specifically the Drawdown Project Conference: *100 solutions to revert climate change* (24/01), the screening of *A Plastic Ocean* (19/03), and the conference with well-known author and activist G. Monbiot: *Can we stop climate breakdown by restoring living systems?* (27/10). In total, around 620 people attended these events, from across the Commission. The conferences triggered reflections and discussions amongst colleagues from across the Commission, to increase their awareness of their carbon footprint, and what measures they could take at small and larger scale, at work and in their personal life, through the policies they work on and in day-to-day actions, to reduce their carbon footprint, including waste generation.



HR.D2 also promoted the **Inter-institutional Green Public Procurement (GPP) helpdesk**, coordinated by the European Parliament. It is open to all Commission services since 2017, as well as to 7 other EU Institutions. The helpdesk can answer general GPP inquiries, provide customised support, with development of green tender specifications, help market research, on new sustainable products and service, give access to best-practices, grouped in an inter-institutional database and offer presentations to EU staff, about greening purchases of goods and services. There has been two GPP Helpdesk conferences, (a) one as part of the Inter-institutional EMAS Days 2019 on 18 March 2019 on *Setting up and Maintenance of Green Areas in Cities* and (b) another on 14 October 2019 on the *Gradual suppression of single-use items* (approx. 100 participants). In addition, articles were published on the electronic newsletter of the RUF Network (Network of Commission's Financial Officers and Procurers, managed by DG BUDG).

c) Other corporate communication

In addition, the Commission:

- Published five articles in the Commission's on-line news portal "Commission en Direct";
- Made several announcements on the Commission's intranet and flat-screens;
- Revised the overall structure and further improved the internal EMAS webpages.

d) Communication actions initiated by the EMAS Correspondents

EMAS Correspondents organised local environmental actions in the **26 DGs/services**, in relation to 18 services in 2018. Characteristic examples included sustainable mobility promotional actions in the

⁴⁵ Also available on Europa: https://ec.europa.eu/environment/emas/pdf/other/EMASResults4pages_DigitalVersion.pdf

framework of VeloMai, lunchtime discussions on staff awareness, climate change and the Commission’s efforts. There were greener (nearly zero waste) lifestyle and zero waste workshops, waste reduction and recycling staff awareness and promoting tap water. The Art@work initiative encouraged more eco-friendly behaviour through the organisation of art exhibitions. Green committees were set up with brainstorming for staff on environmental matters; promoting a circular economy in practice via collection of small electrical appliances; green procurement in new framework contracts for events organisation and promotional articles and IT purchases and setting of EMAS / sustainable food choices information stands.

In 2020, the Commission will organise its main communication campaigns around the EU Green Deal and focus on what the Commission and its staff will do to meet the 2030 climate neutrality challenge.

New initiatives will include:

- **A Joint action on CSR volunteering:** Establishing the framework and technical support services for DGs/services/sites who wish to set up local greening volunteering initiatives, with the support of HR.ADV01 - Corporate Social Responsibility Adviser.
- HR.D.02 will contribute, support and promote EMAS actions in the EC Executive Agencies, the **Modernisation communication campaign: Simpler, Smarter, Together** with success stories concerning "EMAS in EC" during 2020-2022, the **internal corporate communication relevant to the EU Green Deal** in collaboration with HR.A.4, DG COMM and SG during 2020-2024.

9.1.3 Dialogue with internal stakeholders

The Commission has a corporate register of internal questions and suggestions submitted via the EMAS in EC functional mail-box and Staff Forums, which recorded in 2019 **328** entries (in relation to 185 in 2018, 188 entries in 2017 and an average of 40-60 entries during the last years), all of which received responses. This significant increase during the last years may be attributed to the aftermath of the EU Green Deal, as well as the high interest of EC-staff towards the current initiatives in relation to the gradual suppression of single-use plastics and suggestions concerning the further improvements of the current catering contracts.

The three most popular environmental topics for Commission’s staff are i) waste reduction (especially in relation to the suppression of single-use items, mainly plastics and packaging, and setting-up new waste recycling streams, e.g for food waste and setting up local donation of obsolete items such as office supplies and blue binders), ii) general communication and training issues and iii) issues relevant to buildings’ operation and maintenance.

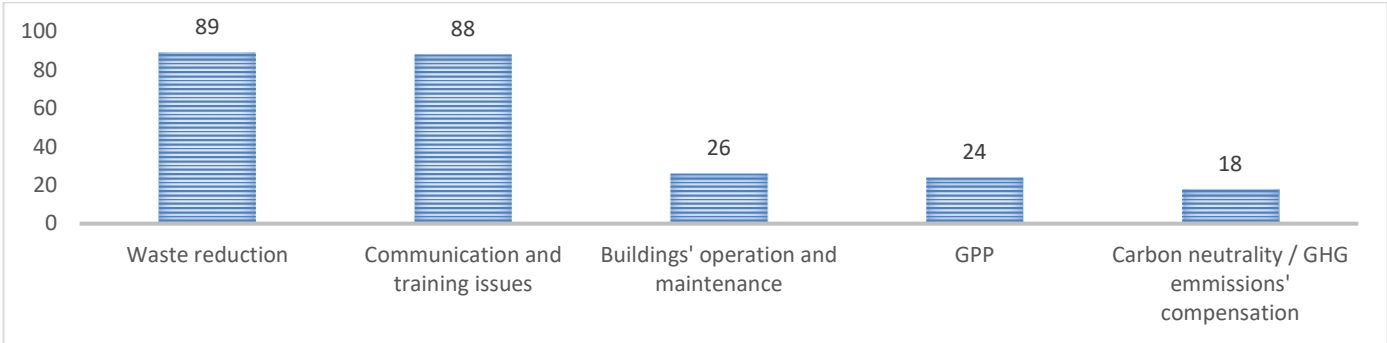


Figure 9.1 The main topics of interest of internal stakeholders' enquiries/suggestions in 2019

In addition, at a local level, EMAS Site Coordinators and EMAS Correspondents keep records of questions and suggestions from staff along with responses.

The Commission conducted a two yearly on-line survey on staff environmental behaviour and awareness in November 2019. The staff survey had a response rate of 27% (2,415 participants) higher than average internal EC staff surveys, demonstrated the increased interest of EC-staff's on environmental matters.

The most important results may be summarized as follows:

- The **overall awareness of environmentally friendly behaviour at work is at an all-time high** with **84%** of staff feeling well or reasonably well informed about it. This represents a 3% points increase since 2017. Interestingly, the youngest staff members (i.e. up to 29 years old) are the least aware, scoring 78%.
- While the **share of staff members taking actions (with any frequency) to reduce environmental impact increased** since the last survey (from 97% in 2017 to **99%** in 2019), **actions are currently taken on a less regular basis**. In 2019, only **68%** of Commission staff declared taking regular actions to decrease environmental impact of their behaviour at work, compared with 90% in 2017.
- Staff awareness of actions taken by the Commission in order to reduce the environmental impact varies across initiatives. Most colleagues are aware of actions in the field of **waste management and recycling** (74%), **paper savings** (65%), **commuting and local travel** (57%) and **energy savings** (56%). The lowest awareness is in the fields of communication with external stakeholders (21%), public procurement (21%) and biodiversity and preservation of green areas (23%).
- **57%** of Commission staff is **aware that the Commission implements a management system** to evaluate, report on and improve its environmental performance (EMAS), showing a 4% points improvement compared with 2017 (from 53% in 2017).
- While no major differences have been identified in staff awareness of **possibility of personal participation in EMAS** when compared with 2017 results, staff awareness of possibility to take environmentally friendly action continues to show declining trend (44% in 2015, 41% in 2017 and 39% in 2019).
- **Involvement of top management** (selected by 47% of staff members), **electronic newsletter** (37%) and **volunteer activities** (34%) are considered the most appropriate means to increase staff environmental awareness at work. Compared with 2017 survey results, **conferences** (including workshops, lunch-time events) gathered substantially more votes (31%; a 13% points increase since 2017) while **Intranet of DG/service** dropped from 54% to 27% and **posters** from 41% to 27%.
- **Top three staff choices for Commissions' long-term priorities** concerning environmental objectives for 2030 are more energy efficient buildings (selected by 66% of staff), promoting circular economy (51%) (e.g. suppression of single-use items) and striving for overall carbon neutrality (37%). Staff working in different locations **are aligned in their perspectives on the top three priorities**
- Overall, **23%** of respondents provided qualitative **906** suggestions on how to make improvements mainly in the areas such as buildings - energy consumption /emissions (19%), mobility – commuting and local travel (16%), catering (11%) and waste management (11%).

Overall, the level of individual environmental awareness and behaviour of Commission staff has strengthened since 2019. However, despite EMAS success, it is important to maintain communication activities and outreach. Lastly, more attention can be paid to inform the EC's actions to reduce its own environmental impacts, and how staff can further contribute to this (preferably through online tools).

9.1.4 Communication among EMAS Correspondents and Site Coordinators

As shown in the table below the annual survey demonstrated an overwhelming improvement in relation to 2018, despite the fact that in 2019 experienced the highest turn-over in the EMAS teams (with 19 new members). This is most probably due to the positive impact of the EU Green Deal among EC-services, especially considering the decline in performance over the past years. Overall, **35 out of 42** EMAS teams demonstrated a performance above or equal to average (in relation to 21 in 2018), representing **83%** of the total population. This is mainly the result of the increased number of volunteer groups (currently active in 5 sites and 16 DGs/services), an increased number of local EMAS action plans in 15 DGs/services and increased contacts of the EMAS teams with senior management (currently in 6 sites and 23 DGs/services). These resulted in the organisation of multiple local environmental actions in all 8 sites and in 26 DG/services.

Survey year ⁴⁶	2013 (max. 10)	2014 (max. 10)	2015 (max. 10)	2016 (max. 10)	2017 (max. 9)	2018 (max. 10)	2019 (max. 9)
Average EMAS team score	5,3	5,5	4,4	4,3	3,6	4,6	6,5

In 2019, there was only one service without an assigned EMAS Correspondent (namely OP), compared with 4 in 2018. HR.D.2 planned several steps to strengthen the EMAS correspondent (ECOR) role. These included: (i) a note to management encouraging ECORs to be identified on a voluntary basis through internal calls of interest, (ii) providing additional hands-on trainings and practical toolboxes, and (iii) creating a corporate group of environmental volunteers across the Commission to support the ECORs in the framework of the sustainable@work campaign, as well as promotion of additional synergies among ECORs.



to be identified on a voluntary basis through internal calls of interest, (ii) providing additional hands-on trainings and practical toolboxes, and (iii) creating a corporate group of environmental volunteers across the Commission to support the ECORs in the framework of the sustainable@work campaign, as well as promotion of additional synergies among ECORs.

Lastly, five (5) EU Executives Agencies participated in corporate EMAS campaigns (REA, EASME, ERCEA, EACEA and INEA) and two (2) (REA and ERCEA) took part in the annual EMAS Network Survey, as part of the gradual extension of the EMAS scope during the coming years.

In 2020, HR.D2 will work to improve the EMAS network's efficiency via synergies with the local Logistics Proximity teams⁴⁷, the Account Management Centres (AMCs)⁴⁸, as well as local groups of environmental volunteers and eco-teams and the new joint action on CSR volunteering.

9.1.5 Training

Corporate level EMAS training organised during 2019 included:

⁴⁶ The criteria are: participation in the annual survey, presence at the network meetings and training sessions, presence of local volunteers, local action plans, evidence of direct contact with top management, implementation of centrally prepared campaigns and local actions.

⁴⁷ The new Logistics Proximity Teams (LPTs), coordinated by the Office for Logistics and Infrastructure in Brussels (OIB), took over the tasks carried out by the Building Managers, Inventoried Items Managers (GBIs) and Office Supplies Managers (GDFs).

⁴⁸ The Account Management Centre in DG HR is a new Directorate which takes over responsibility for the local HR services which were previously delivered by HR units in each DG. From 16 February 2017, the Account Management Centre is your first point of contact for all your personal HR issues.

a) EMAS training for all staff

EMAS training for newcomers: In Brussels, since November 2016, this has consisted of an interactive 1hr 45 min session held every 2-3 months entitled "*EMAS basics for EC Newcomers*". A similar session was introduced in Luxembourg in 2018.

During 2019, there have been in total 9 sessions with **457 participants** (6 sessions with 424 participants in Brussels and 3 sessions with 33 participants in Luxembourg), in relation to 269 participants in 2019. These "*EMAS basics*" trainings received very positive feed-back and received several interesting environmental suggestions by the participants.



In addition, a 10-15 minute presentation is included in the introductory program for Commission newcomers in the JRC-sites and Grange⁴⁹ and in few other DGs/services e.g. DG Energy (ENER) and DG Mobility and Transport (MOVE) and Eurostat (ESTAT).

Lastly, the EMAS section in the new Commission's Training Portal (including a variety of training material from e-books to documentaries, videos and cartoon animations) was updated and further enriched.

In 2020, the EMAS basics sessions will be intensified in periodicity, aiming to reach out to at least 600 participants. Moreover, the "*EMAS basics*" training will be included among the highly recommended trainings **for all EC-staff** (not only EC-Newcomers).

b) Environmental Management System (EMS) Training

There have been three sessions for new EMAS Correspondents (ECORs), i) on 25th January 2019 (5 participants), ii) on 27th August 2019 (7 participants) and iii) on 15th October 2019 (12 participants). In total, **24 members of the EMAS teams** (in relation to 21 in 2018) have attended an induction EMAS training.

Following the suggestion of the EMAS Site Coordinators, there have been two Site Coordinators' workshops during 2019 (approx. **15 participants/workshop**): one between 26-27/03 in Luxembourg focused on EMS improvements and a second between 28-29/11 in Brussels focused mainly of new EMAS Regulation issues. This brought together the EMAS Site Coordinators for all EC sites. These gatherings are essential to ensure mutual learning and to harmonise local EMAS implementation.



In 2020, HR.D2 will also host two EMAS site coordinators' workshops.

⁴⁹The periodicity of the newcomers' presentations depends on the number of new colleagues. Information relevant to JRC and Grange newcomers' trainings are provided in the relevant annexes.

HR.D2 will set up a **mentorship programme for members of the EMAS Network**, in collaboration with internal experts focusing on 3 main thematic topics, specifically: (i) *Less waste, more action / Zero waste practices*, (ii) *Sustainable food choices*, (iii) *Sustainable mobility*. The experts will train interested ECORs, to set up their own local training actions.

c) *Specialised courses*

Selected staff whose activities may have potentially significant environmental impacts may benefit from externally provided environmental training sessions. Examples are the energy counsellor's course by Brussels Environment (IBGE) and eco-driving training for Commission drivers. External suppliers provide these training sessions.

HR.D2, as a system requirement, has however established a register of training needs for such staff and is seeking to map the current offer of specialist trainings arranged by the sites. During 2019, the majority of the EMAS Site Coordinators updated this register.

Lastly, the Commission will design and offer **GPP trainings** for EC Financial Officers/Procurers/Project Managers, in collaboration with GPP experts from JRC-Ispra, DG BUDG and DG ENV.

9.2 External communication

9.2.1 *Environmental Statement and websites*

This document is the "go to" document for most responses to questions on the subject. It contains information from the all the EMAS sites (as annexes) and is subject to external verification. It is published on DG ENV's EMAS website⁵⁰. In 2019, two pages of infographics have been added as part of the Executive Summary, demonstrating in a visual manner the main EMAS highlights and achievements.



Additional "EMAS in EC" webpages have been created at: The homepage of DG HR on Europa under: "About us" / "Services, standards and principles" / "Environmental impact" at:

http://ec.europa.eu/civil_service/admin/green/index_en.htm

The homepage of DG ENV on Europa: http://ec.europa.eu/dgs/environment/index_en.htm

In 2019, the "EMAS in EU Institutions" section at the official EMAS website (approx. 3 000 hits/year) was updated including overall environmental results and best-practices and success stories by the 12 EMAS-registered EU Institutions and bodies, as part of an inter-institutional communication project in the framework of the Inter-

institutional Group on Environmental Management (GIME).

⁵⁰ http://ec.europa.eu/environment/emas/emas_registrations/emas_in_the_european_institutions_en.htm

In 2020, in the framework of the EU Green Deal, the EMAS logo and information about “EMAS in EC” will be included directly in the Commission's official Europa homepage.

9.2.2 Press announcements

The participation of EU Institutions in Earth Hour 2019⁵¹, the Inter-institutional EMAS Days 2019⁵², as well as the highlights of the Commission's environmental performance⁵³ have been promoted via the news section and the EMAS in EU Institutions section of the official EMAS website on Europa managed by DG ENV.

9.2.3 Parliamentary questions

No parliamentary questions were addressed to the EMAS Coordination Team in 2019.

9.2.4 Communication with external stakeholders

HR.D2 responded to all **58** external queries recorded during 2019 (in relation to 45 in 2018 and 30 in 2017 and significantly increased from 8 in 2016). This is due to the Commission's leading role among other EU Institutions and bodies as Chair of the *Group Interinstitutionnel de Management Environnemental* (GIME).

The main topics of interest for external stakeholders have been EMAS communication/training issues in relation to specific successful Commission's actions, the “EMAS in EC” operational procedures and documentation (including the possible extension of EMAS scope in Executive Agencies/EC Representations and EU Delegations), waste reduction practises especially focusing on the gradual suppression of single-use items.

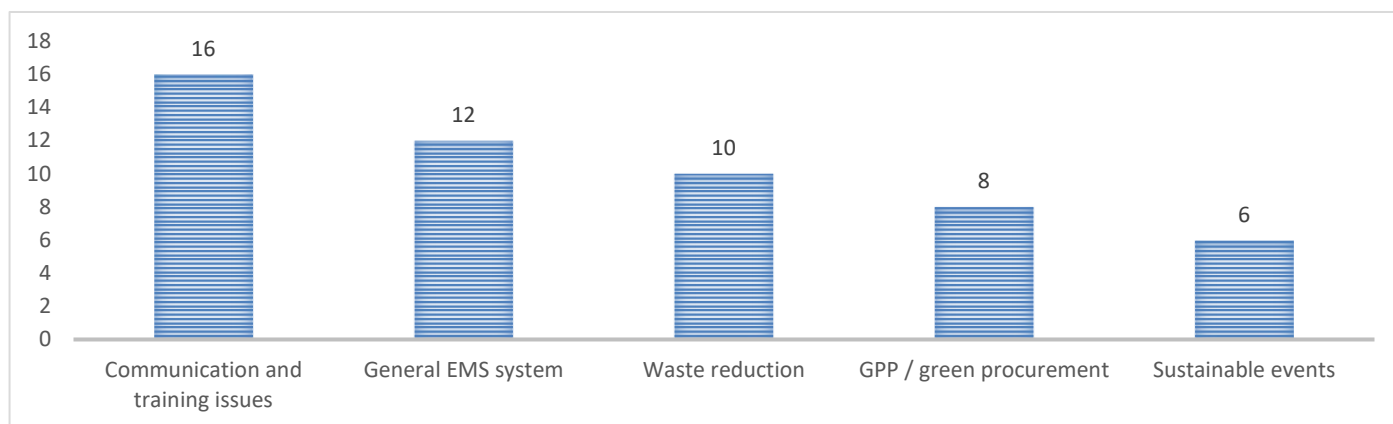


Figure 9.2 The main topics of interest of external stakeholders' inquiries/suggestions in 2019

Inter-institutional collaboration was established on specific themes on a regular basis with EU or international organisations. These include the European Parliament, the General Secretariat of the Council, the European Economic and Social Committee, the European Committee of the Regions, the European Central Bank, the European Court of Auditors, the European Court of Justice, the European Investment Bank, the European Decentralised Agencies, Inter-agency Greening Network and other EU bodies.

⁵¹ https://ec.europa.eu/environment/emas/emas_for_you/news/news90_en.htm

⁵² https://ec.europa.eu/environment/emas/emas_for_you/news/news89_en.htm

⁵³ https://ec.europa.eu/environment/emas/emas_for_you/news/news88_en.htm



Moreover, through a playful and interactive walk by 30 stands (including information about "EMAS in EC" and Commission's impressive environmental results, as part of DG HR stand), the 27th edition of the EU Institutions' Open Day of 4th May 2019 in the Berlaymont presented the main EU policies and highlighted the upcoming European Elections of 23-26 May 2019 with the campaign "*Choose your future*". Innovations included trying new urban mobility tools (such as segways, monowheels, electric scooters), between the Berlaymont building and the European Council. Outdoor activities on the Esplanade proposed a full musical, dance and show programme, together with many circus performers ready to entertain all of the 10,000 visitors.

Lastly, during 2019 the following initiatives were organised within the framework of the GIME:

(i) Following on previous common EMAS events, 6 EMAS-registered EU Institutions have joined forces to organising the **Inter-institutional EMAS Days between 18 to 19 March 2019** dedicated to green public procurement, mobilizing the EMAS networks and groups of volunteers, the gradual suppression of single-use items and the staff involvement on EU institutions' commitments against oceans' plastic pollution and climate change.



The programme included: (a) one event on the *Setting up and Maintenance of Green Areas in Cities*, in the framework of the Inter-institutional GPP Helpdesk, (b) an *EMAS network empowerment - Share your experience workshop* with 5 parallel thematic roundtables on waste, paper, mobility, communication and awareness raising, (c) one interactive workshop on the *Gradual suppression of single use items: EU Institutions lead the way!*, consisting of a best-practice exchange session and three thematic round tables on catering services and vending machine, organisation of sustainable events and "greening" of office supplies and (d) the lunch-time event *Marine litter and screening of the documentary A Plastic Ocean* (20 minute documentary) and presentation by EC: ENV.C2 Marine Environment & Water Industry on both the problem of marine litter and the possible solutions.

The event was also the closing ceremony of the EMAS Days, in the presence of senior management from the Commission, the Parliament, the Council and the Committees. More than 250 EMAS team members, among 500 participants, exchanged best-practices and know-how. All participants agreed that it has been the most successful and productive inter-institutional EMAS event up to now!

(ii) as part of the global **Earth Hour** movement, a common announcement on 30th of March by 39 EU Institutions and bodies (up from 34 in 2018) regarding Earth Hour.

(iii) two meetings of the **GIME Network** on 14 May and 15 November, with the following major outcomes:

- the Commission presented updated results on two GIME surveys among EU institutions and bodies on (a) the current state of environmental management systems' (EMS) implementation and (b) the current state of GHG emissions' calculation and compensation;
- shared feed-back regarding the EMAS Inter-institutional Days 2019;
- exchanged best practices concerning (a) catering services, suppression of single use items, e.g. correct sorting of paper cups and the communication on SUP policies, (b) setting GHG emissions' compensation goals and common compensation schemes;
- shared success stories and lessons-learned by EMAS newcomers (e.g. European Investment Bank).
- the Commission presented the political context of the European Green Deal, its climate neutrality study and definitions and overall context of bio-based and biodegradable plastics.

(iv) HR.D2 made a presentation at the **Inter-agency Greening Network** meeting during 27-28 June in Copenhagen on the *Gradual suppression of single use items: EC leads the way!*

In 2020, the Commission will continue to play a leading role among EU Institutions and bodies, in promoting EMAS implementation, as well as in green public procurement (GPP).

9.2.5 Information for suppliers and sub-contractors

The Register on EMAS information sessions for EC suppliers and sub-contractors has been considered obsolete and suppressed, since the annual follow-up of the common template (Annex 2 to EMS-PRO-001) concerning the needs and expectations of external stakeholders both at corporate and site level, already covers all the additional requirements of the revised Annexes of EMAS Regulation III.

In 2020, the Commission will continue promoting and supporting the Inter-institutional Green Public Procurement Helpdesk coordinated by the European Parliament.

10 EMAS COSTS, SAVINGS AND BENCHMARKING

The Commission has reported on the estimated costs of implementing EMAS and savings that can be associated with reduced resource consumption since 2012. The availability of data varies from site to site and by year.

10.1 Costs of staff and contracts for implementing EMAS

Table 10.1 summarises the estimated direct cost of human resources of Commission staff⁵⁴ along with those of consultancy, and other contracts directly linked with coordinating EMAS implementation.

Table 10.1 Direct total and per capita costs of implementing EMAS for each site (EUR)

Site					Change in 2018-9	Per person costs in:				Change in 2018-9
	2014	2017	2018	2019		2014	2017	2018	2019	
HR.D2+ECOR network ¹	1 007 252	1 049 252	1 119 252	1 133 252	14 000	30,7	31,8	33,6	33,0	-0,7
Brussels	132 000	138 000	148 000	150 000	2 000	4,82	5,14	5,50	5,38	-0,1
Luxembourg	462 000	483 000	370 000	375 000	5 000	114	100,9	73,8	73,0	-0,8
JRC Petten	66 000	69 000	74 000	75 000	1 000	234	262	298	301	2,8
JRC Geel	66 000	69 000	74 000	75 000	1 000	191	260	286	286	0,5
JRC Karlsruhe ¹	71 000	74 000	79 000	80 000	1 000	222	230	249	254	4,8
JRC Sevilla	132 000	138 000	148 000	150 000	2 000	457	429	433	408	-25
JRC Ispra ¹	383 760	486 945	491 928	473 595	- 18 333	164	214	215	203	-12
Grange ¹	47 400	49 356	51 856	56 100	4 244	265	263	290	319	29
Commission	2 367 411	2 556 553	2 556 035	2 567 947	11 912	67,3	72,5	71,8	70,0	-1,9
of which % contracts	10,2	13,1	12,6	11,8						

Note: Includes all staff at Luxembourg and Brussels sites, based on sites participating in verification

1 - Cost include contracts

The total costs were marginally higher in 2019, owing partly to the rise in the cost of employing staff, although JRC Ispra recorded a significant drop. Contract costs represented a slightly lower percentage of the total at 9% compared to previous years. Per capita costs of implementation have decreased in 2019 but this may be due to an increase in the number of staff considered in the EMAS perimeter. The size of the teams supporting the EMAS system at the sites have remained relatively stable.

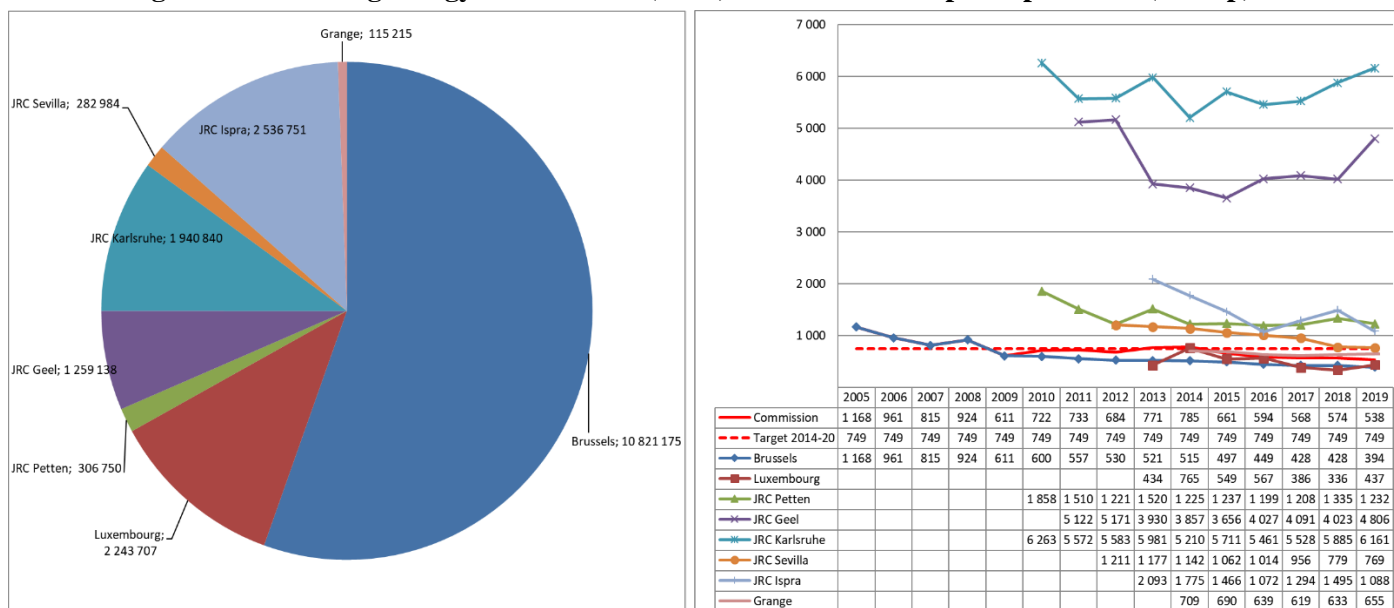
10.2 Savings from reduced energy consumption in buildings

Energy consumption represents by far the greatest single resource cost recorded under the environmental system. So reducing buildings' energy consumption provides greater financial savings than reducing other resource use. Figure 10.1 shows energy costs in 2019 along with the evolution of per capita expenditure in recent years.

Brussels Luxembourg and Ispra account for over 75% of total costs, with Karlsruhe although a small site accounting for the next highest share. Per capita costs vary widely - with sites comprising mostly office buildings, (Brussels and Luxembourg) both below 500 EUR, and JRC sites with their more energy intensive experimental and/or nuclear activities such as JRC Geel and Karlsruhe close to 5 000 and 6 000 EUR respectively.

⁵⁴ Using standard average cost of administrators published by DG BUDG for the Financial units, 150 000 EUR in 2019.

Figure 10.1 Building energy costs in 2019 (EUR) and evolution of per capita costs (EUR/p)



Brussels continues to reduce its per capita costs, year after year and overall by two thirds since its first EMAS registration in 2005. Luxembourg's costs nearly doubled in 2014 because two data centres were included in EMAS reporting but have since fallen because the site now reports operational data for the whole site. A rise in 2019 reflects higher energy prices.

Annex A (the site report for Brussels) contains a simple estimation of the resulting cumulative savings in Brussels since 2005. Total expenditure in 2005 would have been nearly 25 Million EUR⁵⁵, which has reduced to 11 Million EUR in 2019 with cumulative savings over this period of 134 Million EUR⁵⁶.

10.2.1 Water use costs

Per capita water use data (Figure 10.2) indicates that consumption varied between 20 and 60 EUR in 2019 across the EMAS sites, but was higher at JRC Ispra and Geel. Per capita consumption at JRC Ispra is much higher than at other sites, but per capita costs continue to fall heavily since 2015. The Commission continued to reduce its overall water bill, reducing to 48 EUR/p in 2019.

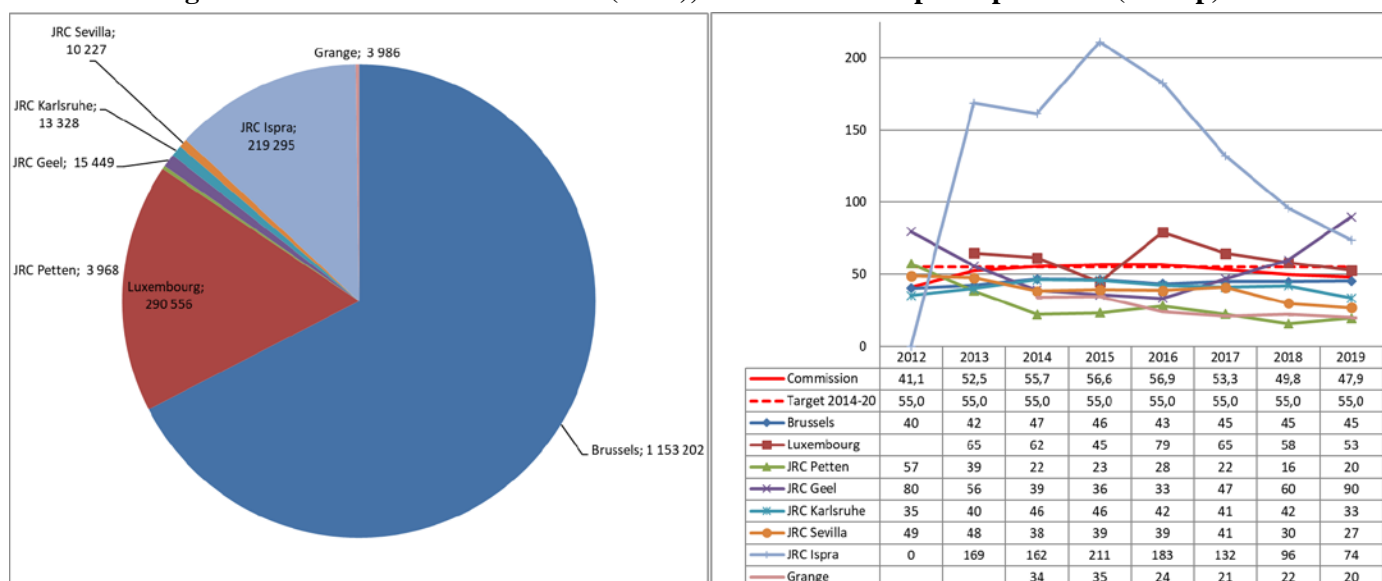
Figure 10.2 shows that Ispra's per capita costs are higher than the other sites but it faces the additional expense of maintaining infrastructure including pumping and filter stations, and a wastewater treatment plant. Its costs therefore include routine and unscheduled maintenance of these structures.

The per capita consumption however is also far higher than elsewhere, owing to the water requirements of the cooling circuits. It also has extensive cooling networks related to the technical facilities, a fire station and mains. Brussels, Luxembourg, and JRCs Sevilla and Ispra all reduced per capita costs in 2018, with the latter both achieving a 27% reduction.

⁵⁵ Assuming that in 2005 per capita consumption within the EMAS perimeter was similar to that outside the EMAS perimeter.

⁵⁶ Not adjusted for inflation, actual savings in real terms would be less – is the difference between actual and continued 2005 consumption level.

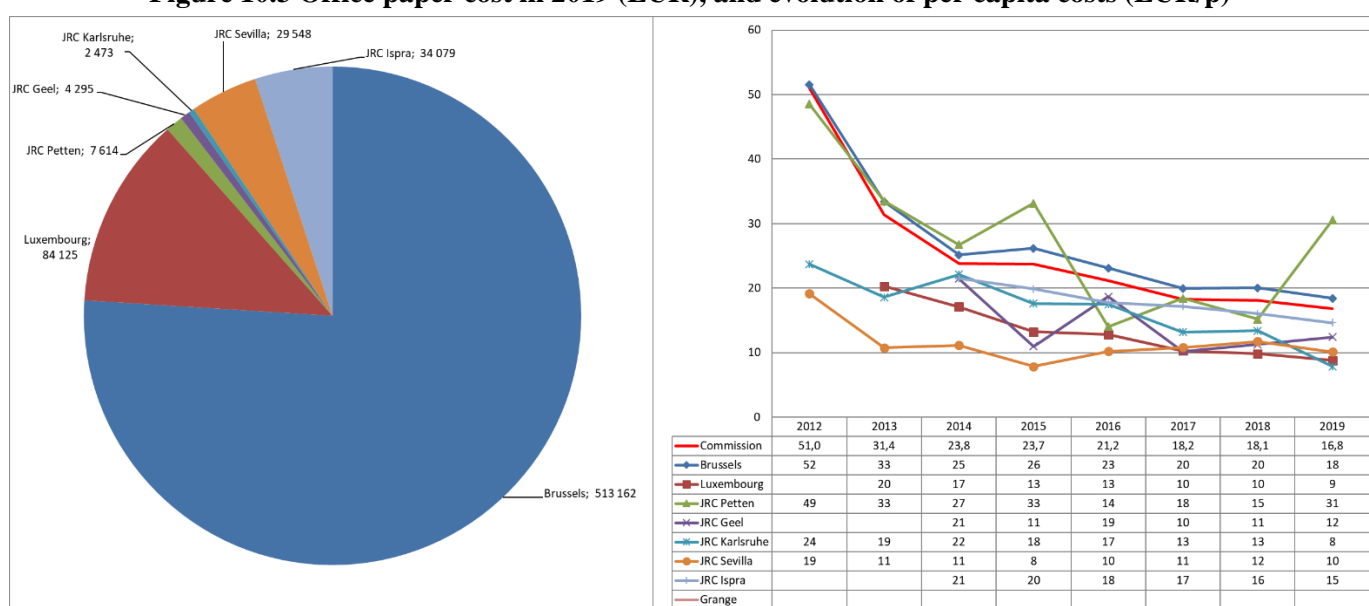
Figure 10.2 Water use costs in 2019 (EUR), and evolution of per capita costs (EUR/p)



10.2.2 Savings from reduced office paper consumption

Figure 10.3 shows that Brussels accounts for over 75% of paper use, with other sites' with Luxembourg and JRC Seville contributing over 5% of the total spend (679 756 EUR).

Figure 10.3 Office paper cost in 2019 (EUR), and evolution of per capita costs (EUR/p)



The long term reduction in paper consumption at most sites is reflected by a sharp decline in overall Commission per capita cost which in 2019 was one third of its 2012 value.

10.2.3 Reducing costs of waste disposal

Some sites have reported waste disposal costs in recent years as shown in Table 10.2.

Table 10.2 Non-hazardous and hazardous waste costs, 2014-19 (EUR/person)

Site	Non-hazardous waste						Hazardous waste					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
Brussels	36,19	34,02	35,61	33,90	30,65	30,32	4,32	3,80	6,66	11,22	13,35	13,85
Luxembourg	35,07	66,23	75,86	57,49	52,55	49,54	4,58	4,01	10,29	1,51	2,13	13,56
JRC Petten	9,43	9,00	10,50	12,28	10,31	8,74	2,55	4,12	4,12	4,12	4,12	4,12
JRC Geel								1,00	2,00	3,00	4,00	4,00
JRC Karlsruhe												
JRC Sevilla			13,75	12,81	12,06	11,21	0,00	0,00	0,05	0,02	0,05	0,03
JRC Ispra	114,63	134,83	132,64	148,61	119,07	113,19	36,40	32,87	62,26	65,63	64,57	55,06
Grange												
Commission	41,71	45,64	48,35	45,75	40,84	39,56	6,64	14,22	17,57	13,73	15,18	16,79

While the unit cost for disposal of hazardous waste is greater than that for non-hazardous waste, the much smaller volumes of the former lead to overall costs that are typically one third to one quarter for the latter.

Aggregated Commission level non-hazardous waste costs have fluctuated around 40 to 50 EUR /person in the last few years. Hazardous waste costs were up sharply in 2019. These costs can fluctuate significantly from year to year as some stockpiling occurs with specialist disposal organised relatively infrequently.

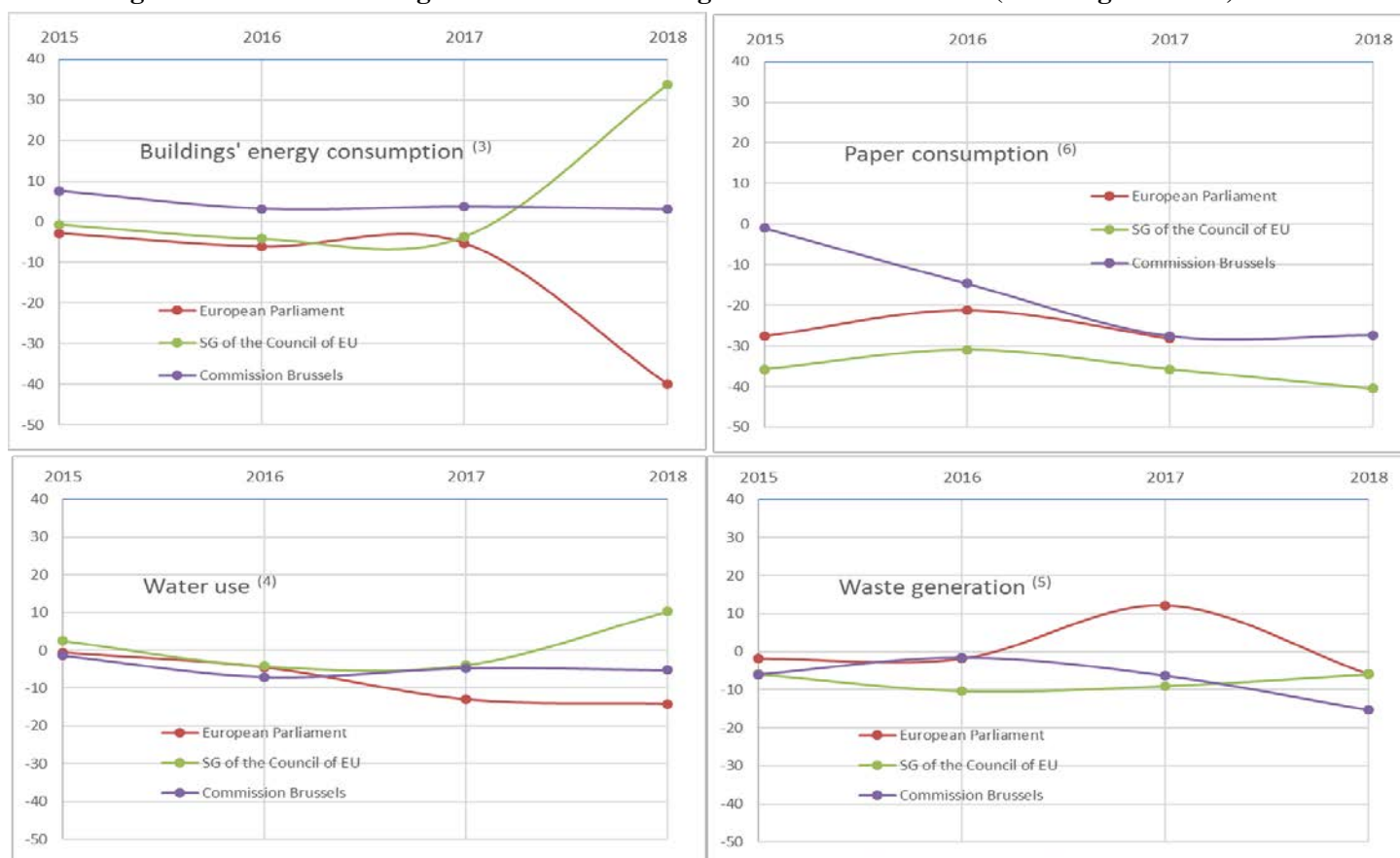
10.3 Benchmarking with the European Parliament and European Council

The EMAS regulations require an organisation's environmental performance to be put into context through comparison with other organisations, i.e. benchmarking. Because EMAS implementation has been incremental at the Commission, and reporting overall results as an organisation (as opposed to as individual sites) began in 2014 in Brussels, current efforts at benchmarking at an organisational level are limited to more recent data. However individual sites with a long history of reporting, such as Brussels, where EMAS data has been published since 2005 are more useful in this respect.

This report includes operational data from eight sites in seven countries, with activities ranging from office administration, to laboratory analysis to large specialist technical and even nuclear installations. Finding suitable organisations to benchmark against is therefore challenging, although below we compare some results for the Brussels site with the European Parliament and the Council of the European Union.

It is also difficult to directly compare results in one category between institutions, particularly energy consumption, because the basis of the calculations can be quite different, and can change from one year to another. For example, the European Parliament's paper indicator changed in 2018, and energy parameters have changed at the SG of the Council of the EU). The European Parliament takes into account visitors. However more informative are the broad trends in performance which are demonstrated in Table 10.3.

Figure 10.4 Benchmarking⁽¹⁾ the Commission⁽²⁾ against other institutions (% change 2014-18)



Notes: (1) - Based on information from Environmental Statements reporting for 2019 (results up to 2018);

(2) - EC annual per capita consumption of energy, paper, water and non-hazardous waste generation;

(3) - EP and Council report primary energy, EC reports metered energy;

(4) - Council reports litres/person/day, rather than m³/p;

(5) - EP reports for office and kitchen waste, EC for per capita non-hazardous waste;

(6) - Indicator changed in 2019 reporting at EP; (7) - The Europa building added to reporting for 2018

There has been improvement in parameters in at the European Parliament, the Council and the Commission in Brussels, but it is difficult to draw further conclusions. Brussels data for 2019 showed improved performance over 2018. The addition of the Europa building to Council reporting in provided an upwards trend in 2018 for indicators other than paper.

11 LESSONS LEARNED AND THE WAY FORWARD

This report summarises the Commission's overall performance using data from the eight largest Commission sites in Europe. It represents consolidation of an EMAS system that started with Brussels in 2005, incorporated Luxembourg in 2012, and then the five experimental JRC sites and DG SANTE at Grange by 2014.

11.1 Conclusions

New developments in reporting for 2019

1. Having enlarged the scope for reporting particularly for the carbon footprint in 2019, further small improvements were incorporated, following expert advice, including:
 - Embodied energy of fixed assets for electricity sourced from renewable sources, and for Commission vehicle fleet and for upstream emissions for electricity from non-renewable sources
 - New requirements of Annex IV of the EMAS Regulation (bio-diversity reporting)
2. Consideration of the Sectorial Reference Document (SRD) for Public Administrations.
3. HR.D2 launched the procedure to reflect upon longer term, post 2020 emissions, and the requirements of the Green Deal, and the Commission's aim to be greenhouse gas neutral by 2030.

Significant impacts and Commission performance for core parameters (2014-20)

4. The environmental factors that could give rise to significant environmental impact vary from site to site, but common to most sites are:
 - resource consumption (particularly energy for buildings, water consumption);
 - carbon dioxide (or equivalent) emissions from buildings construction, and mobility (particularly missions); and
 - waste management and disposal, especially at nuclear sites such as Karlsruhe and Ispra.
5. The Commission's performance up to 2019 for core indicators in relation to its 2014-20 targets, was as follows:
 - **Ahead of target for:**
 - buildings' energy consumption (per capita),
 - renewable energy use in buildings (%),
 - water use (per capita, and per sq. m),
 - office paper consumption,
 - non-hazardous waste generation (per capita),
 - CO₂ emissions due to buildings energy consumption
 - **Improvement achieved but below expectations for:**
 - separated waste (%)
 - actual measured vehicle fleet emissions

- **Off-track for:**

- buildings energy consumption (per sq. m)

6. The largest contributors to the Commission's Carbon Footprint as evaluated using 2019 data, were:

- 47% - Buildings, energy used in operation (28%) and during construction (nearly 19%)
- 30% - Missions – particularly air travel
- 7% - Commuting

(Of these, adopted Commission 2014-20 targets apply to emissions from energy use in buildings.)

11.2 Going forward

The following courses of action are required in order to continue to improve environmental performance, and to meet stakeholder expectations.

Improving the Carbon footprint calculation

7. The calculation for 2019 includes new categories, adding to already extensive data requirements. Further review will be necessary to help build on this 'learning' experience. We need however to

- Ensure that all sites are able to report for all parameters
- Work with internal partners (including and especially the PayMaster's Office (PMO)) to ensure that the basis for reporting of missions, is as broad as possible, taking advantage of the future development of MIPS. This requires:
 - i. an inventory of sources of data on missions;
 - ii. consideration of how to link information on emissions to offers for travel so that appropriate decisions can be made on travel options;
 - iii. consider how to better integrate emissions calculations into possible software solutions
- consider whether a single, Commission wide survey could be introduced and be used, inter-alia, for determining emissions from commuting

Develop a Green Deal Action Plan

8. Contribute to the formulation of the Action Plan that will demonstrate the Commission's own commitments to improve environmental performance under the Green Deal, particularly in relation to emissions. Important elements of this include:

- Incorporating elements of the Greenhouse gas reduction study coordinated by DG CLIMA
- Contributing to progress on other important elements, - such as the mobility policy, missions guide, procedures for procuring buildings,

Expanding the Commission's EMAS registration

9. The Commission will seek to fully include Executive Agencies whose premises are managed by its services first by formal agreement with management and second by extending the ECOR network to those agencies,
10. The Commission will continue its discussions with DG COMM and the European Parliament in order to agree a procedure for incorporating the Commission Representations and Parliament Houses of Europe in Member States within the EMAS Regulation. The Commission has identified two pilot representations to be subject to a gap analysis to understand the work that may be required.

Consolidating the EMAS system and fully incorporating new requirements

11. Owing to the more onerous data and reporting requirements, we will seek to improve data collection and reporting that is currently based on spreadsheets and has recently moved online to SharePoint from CIRCABC.
12. Continue discussions and formulate for adoption post 2020 performance targets.