EUROPEAN COURT OF AUDITORS

CARBON FOOTPRINT REPORT 2014

March 2016

This report was prepared by *Factor-X The Climate Consulting Group SPRL Belgium* for the European Court of Auditors (ECA) using data provided by the ECA.

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1 Executive summary

- **Context:** The European Union has long been committed to international efforts to tackle climate change and feels that it has a duty to set an example through robust policy-making at home[1]. It has set itself targets for reducing its greenhouse gas (GHG) emissions progressively up to 2050: from 20% for 2020 and, recently, 40% for 2030 under the 2030 climate and energy framework. To fully support these targets, EU institutions and bodies are in the process of assessing the carbon footprint of their activities and implementing strategies to mitigate their GHG emissions.
- **Carbon footprint (CF) assessment:** This is the ECA's first GHG calculation: it covers its 2014 activities.
- **Reduction targets:** The ECA has set two reduction targets: reducing the CO_2 emissions by 7% for the year 2020 and by 18% for the year 2030, compared with 2014.
- **Scope of the assessment:** The carbon footprint evaluation encompasses direct and indirect emissions due to the activities of the Court's staff and other employees of the institution in 2014, as well as the three buildings occupied by the Court in Luxembourg.
- **Methodology used:** The CF assessment relies on the Bilan Carbone® method developed by ADEME (French Agency for Environmental and Energy Management).
- **Carbon footprint results (total):** 8 930 tons of CO_2 equivalent generated by the ECA in 2014.
- **Carbon footprint per FTE[2]:** 8.8 tCO_2eq per occupant in 2014.
- **Most significant ECA emission sources:** Transport of persons (46%), fixed assets (26%), supply of equipment and services (23%).

[1] European Climate Change Programme - http://ec.europa.eu/clima/policies/eccp/index_en.htm

[2] FTE: Full-time equivalent

2 Introduction

In order to tackle climate change and limit the impact of global warming, the European Union has established policy measures and set itself targets for the coming years:

- ✓ by 2020, all member states are committed to cutting their greenhouse gas (GHG) emissions by 20%, targeting 20% of total energy consumption from renewable energy and increasing energy efficiency;
- ✓ For 2030, the EU has established a key climate and energy framework which aims at a CHG cut of at least 40% compared with 1990, 27% of total energy consumption from renewable energy and a 27% increase in energy efficiency;
- ✓ The EU's long-term goal is to cut its emissions by 80-95% compared to 1990 levels.

For EU climate policy to be credible, the EU institutions and bodies also need to design and implement policies for reducing CO_2 emissions generated by their activities. For this purpose, they are required to monitor and report their carbon footprint.

The European Court of Auditors was established by the Treaty of Brussels in 22 July 1975 in order to audit the EU's finances. It contributes towards improving EU financial management and acts as the independent guardian of the financial interests of the EU and its citizens. It promotes accountability and transparency and is committed to being an efficient organization, at the forefront of developments in public audit and administration. To contribute towards reducing GHG emissions and their impact on the environment, the ECA has decided to apply the principles of sound environmental management in its values, mission and day-to-day decisions. In 2013, It launched the EMAS project and adopted its environmental policy with a view to continuously improving its environmental performance and introducing measures to prevent pollution and reduce carbon dioxide emissions. The environmental policy provides a framework for the Court's environmental objectives, against which all the Court's future actions will be assessed.

In order to design and implement measures aimed at reducing its CO_2 emissions, the ECA decided, first of all, to evaluate the GHG emissions associated directly and indirectly with the Court's activities. This first carbon footprint assessment should help the ECA identify the main emission sources and allow it to establish measures to improve its carbon footprint by 2020 and 2030. Following this first assessment, the ECA plans to monitor and report its carbon footprint every year.

3 Objectives of the project

The project aims to:

- Identify and understand the direct and indirect sources of the Court's GHG emissions;
- Estimate the GHG emissions caused by the European Court of Auditors' activities.

This project tries to find a comprehensive approach towards reducing GHG emissions and energy consumption throughout the Court's activities in order to raise awareness of climate change and the steps that can be taken against it.

It can also be used as the basis for monitoring the evolution of the Court's GHG emissions from one year to the next, in particular through the establishment of a collection tool.

4 Objective of the report

This report sets out a detailed analysis of the Court's carbon footprint and lays down guidelines for emission reduction and, to a lesser extent, guidelines for a strategy to offset GHGs.

5 Methodology

5.1 Understanding the Carbon Footprint

A carbon footprint is defined as the total amount of greenhouse gas (GHG) directly and indirectly produced by an individual, an event, an organization, a product or a company and released in the atmosphere. GHGs can be emitted through different human activities, such as the transport, production and consumption of food, fuels, manufactured goods, materials, wood, roads, building, services, etc.

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), refrigerants (HFC's, PFC's, CFC's), sulphur hexafluoride (SF_6) are the most well known greenhouse gas. The table below presents the gas global warming potential (GWP)[3] over a 100-year time horizon and the length of time each gas persists in the atmosphere.

	GWP 100 years time horizon	Time remaining in the atmosphere
CO_2	1	A century
Methane (CH_4)	25	A decade
Nitrous Oxide (N_2O)	298	A century
Sulphur Hexafluoride (SF_6)	22 800	Several thousand years

Table 1: Gas GWP 100 year time horizon

[3] Global warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide. A GWP is calculated over a specific time interval, commonly 20, 100 or 500 years. GWP is expressed as a factor of carbon dioxide (whose GWP is standardized to 1).

Carbon dioxide equivalence (expressed per kg or tonne of CO_2 equivalent, $kgCO_2eq$ or tCO_2eq) is a quantity that describes, **for a given mixture and amount of greenhouse gas**, the amount of CO_2 that would have the same **global warming potential** (GWP), when measured over a specified timescale (generally, 100 years).

As this measuring unit is not common, it can be difficult to picture what 1 tonne of CO_2 really represents. The table below provides examples of what a tonne represents.

1 tonne of CO_2 represents:
3 months of heating in an average flat in Luxembourg
1 return ticket from Luxembourg to Malaga by plane
6 000 kilometres **with an average European car**
¾ of a laptop (manufacturing)
1 200 kilos of industrial bread
4 700 kilos of potatoes
100 kilos of beef

Table 2: Guidance on the equivalents of a tonne of CO_2

5.2 Bilan Carbone® method

We used a French Bilan Carbone® method to assess the ECA's carbon footprint. This method was originally developed by ADEME (*Agence française De l'Environnement et de la Maîtrise de l'Energie, the French environment and energy management agency*) in 2004 for quantifying greenhouse gas (GHG) emissions for **organisations**.

This method is currently coordinated and disseminated by the Bilan Carbone Association[4] in version V7.4.

The Bilan Carbone® method takes into account all GHGs defined by the IPCC[5] resulting from all the necessary physical processes and flows required for the existence of human activities.

The Bilan Carbone® estimates:

- the GHG emissions considered in connection with the Kyoto Protocol : CO_2, CH_4, N_2O, SF_6 hydrofluorocarbons (CnHmFp), perfluorocarbons (CnF2n+2);
- the GHG emissions covered by other international treaties (e.g. CFCs) ;
- water vapour from planes emitted into the stratosphere.

As it is not conceivable to directly measure GHG emissions resulting from a given activity, the Bilan Carbone® method has been designed to **estimate GHG emissions** by converting specific information collected on the processes and flows of the organisation's activities (activity data such as energy consumption in kWh, number of tons of paper used, number of IT devices, etc.) into estimated GHG emissions through the use of emission factors.

Because the methodology relies on estimating GHG emissions rather than directly measuring them, the result of the assessment is provided **within an order of magnitude**.

[4] http://associationbilancarbone.fr/

[5] IPCC - the Intergovernmental panel on climate change - is the leading international body for the assessment of climate change

5.3 Calculation method for uncertainties

Like all "physical" approaches, the Bilan Carbone® provides values subject to a certain degree of uncertainty. One of its basic principles is that the uncertainty related to the results must always be explicitly shown with the results, so that readers will know what degree of confidence the results provide.

In the Bilan Carbone® spreadsheets, each elementary calculation[6] has its own uncertainty. This uncertainty is the combination of the estimated uncertainty of the emissions factor (for example the amount of carbon equivalent kg resulting from burning one litre of fuel is assumed to be known within a 5% uncertainty range) and the estimated uncertainty for the data selected for the calculation (expressing, for example, the inaccuracy with which the amount of fuel burnt is known). The formula used is as follows:

Total uncertainty = 1 - (1 - uncertainty for the emissions factor) x (1 - uncertainty for the activity data)

Thus, if the emissions factor uncertainty is 10% and the data uncertainty is 8%, the total uncertainty will be 1 - (1 - 10%) x (1 - 8%) = 17.2%.

For the ECA's carbon footprint, all the uncertainties applied to the emission factors are those proposed by default by the Bilan Carbone® tool, while the uncertainties tied to the activity data were set by Factor-X, taking into account their accuracy as follows:

- 2% uncertainty when the activity data were reliable and no extrapolation was required;
- 10% uncertainty when the data were extrapolated (assumptions were made) or an allocation ratio was used;
- 30% uncertainty when the data were inaccurate either because of the use of several assumptions to obtain the data or because the data were extrapolated from other available data.

5.4 Scope of the study

The carbon footprint was calculated for the Court's three buildings, K1, K2 and K3, taking into account the activities of its staff and other employees in 2014. As of 31 December 2014, there were 1 017 occupants, with 916 staff members (846 officials and temporary employees, 61 contract staff and 9 seconded national experts) in active service at the Court.

A carbon footprint assessment considers not only GHG emissions for which the organisation is, or feels, responsible, but also all those emissions on which the organisation is dependent. Following international norms (ISO 14 064), three "scopes" (scope 1, scope 2, and scope 3) are defined for GHG accounting and reporting purposes:

- **Direct GHG emissions (scope 1)** are emissions from sources that are owned or controlled by the Court, such as fuel oil burnt by the ECA's emergency power generators as well as fuel oil burnt by the official car fleet;

- **Indirect GHG emissions** are emissions that are a consequence of the activities of the organization but occur at sources owned or controlled by another organisation:

    - ✓ **Scope 2** accounts for GHG emissions from the generation of purchased electricity and purchased heating consumed by ECA where the emissions

[6] An elementary calculation is an activity data multiplied by an emissions factor

physically occur at the facility where the electricity and heating are directly generated (hydropower plant and urban heating system).

- ✓ **Scope 3** is a reporting category that allows processing of all indirect emissions other than those covered by scope 2. For instance, the following items are covered by scope 3: the extraction and manufacturing of purchased materials, the transportation of purchased supplies, commuting from home to work, business trips, etc.

The figure below matches the emissions sources taken into account in the ECA's CF with the corresponding scopes.

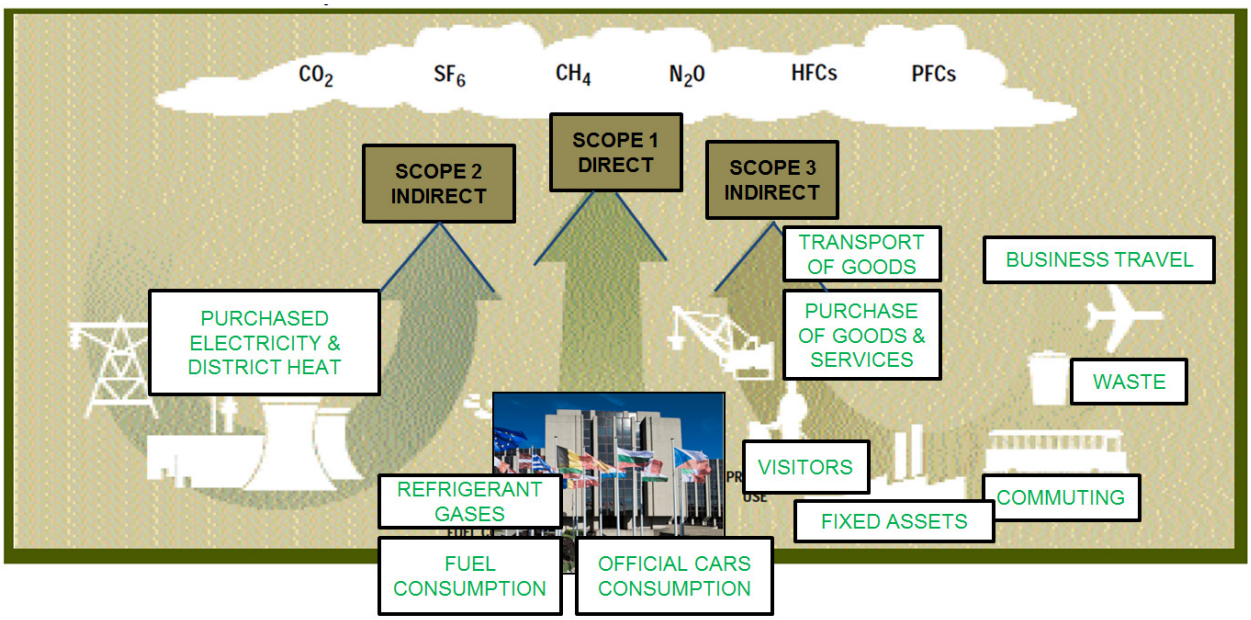

Figure 1: Overview of scope and emissions

Source: adapted from WBCSD[7], 2004

The following table below shows the emissions sources that make up the ECA's carbon footprint linked **to the emission categories** to which they belong and the corresponding scope (scope 1, 2 or 3).

	Emission source	Scope
Energy in-house	Combustion (direct use of fossil fuels burnt by the emergency power generator)	1
	Electricity (purchased electricity)	2
	Urban Heating system (purchased heat)	2
	Technical losses (electricity losses during transport)	2
Non energy in-house	Leakage of refrigerant gases in air conditioning and cooling systems	1

[7] WBCSD: World Business Council for Sustainable Development

Supply of equipment and services provided by third parties[8]	Purchase of supplies, notably paper and office furniture, ink toner and cartridges, food, catering supplies, etc.	3
	Services provided by external providers (catering, cleaning, consultancy, external translation and interpreting, etc.)	3
Transport of goods	Transport of goods from the suppliers' headquarters to the ECA	3
Transport of persons	Commuting by ECA staff and members	3
	Business travel with official cars	3
	Business travel by means other than official cars	3
	Visitors' travel between their places of origin and the ECA's location	3
Fixed assets[9]	Buildings and car parks	3
	Kitchen assets (e.g. furniture, fridges, etc.)	3
	Vehicles leased by the ECA	3
	IT equipment (computers, printers, servers, etc.)	3
	Office furniture	3
	Offset Printing machines	3
	Buildings and car parks	3
Direct sewage and sewage disposal	GHG emissions linked to end-of-life waste processing	3
	Wastewater	3

Table 3: Emissions sources included in the ECA's carbon footprint

[8] The production of basic materials (glass, steel, metals, plastic, etc.) emits GHG emissions essentially due to the fossil energy and electricity consumed in the industrial manufacturing processes (coal for steelmaking, for example).

[9] This item covers GHG emissions generated by the manufacture or construction of consumer durables. GHG emissions from fixed assets are divided up over a certain lifespan, using a system comparable to the financial concept of amortization, so that the various annual carbon footprint results can be compared.

6 Results

6.1 Overall Results

The overall result of the 2014 carbon footprint is 8 930 tCO_2eq. The table and chart below indicate that the three following main sources represent more than 95% of the carbon footprint:

- ✓ Transport of persons (46%)
- ✓ Fixed assets (26%)
- ✓ Supply of goods and services (23%).

Emission sources	tCO_2eq.	% of the 2014 CF	Uncertainties (in tCO_2eq)	Uncertainties (%)
Energy in-house	**210**	**2%**	32	15%
Non-energy in-house	**201**	**2%**	70	35%
Supply of goods and services	**2 036**	**23%**	310	15%
Transport of goods	**16**	**0%**	8	53%
Transport of persons	**4 087**	**46%**	569	14%
Direct waste and sewage	**33**	**0%**	9	27%
Fixed assets	**2 345**	**26%**	331	14%
TOTAL Carbon footprint	**8 930**	**100%**	**732**	8%

Table 4: the ECA's overall carbon footprint results

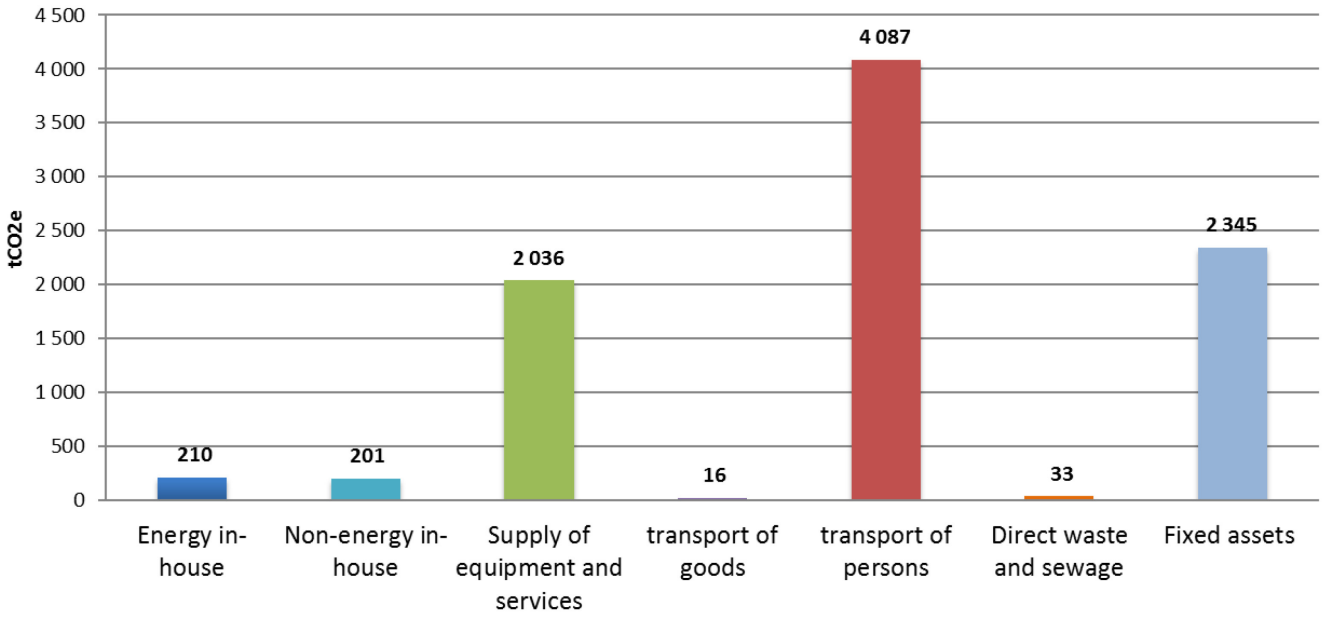

Figure 2: Overall Carbon Footprint results of ECA

The result shows **8.8** tCO_2eq per occupant in 2014.

In other words, over one year, an ECA occupant generates nearly as much as an inhabitant of Belgium (9 tCO_2eq) - only considering CO_2 emissions in 2013 from fossil fuels and cement manufacture, but no other emissions such as those from land use, international shipping or the consumption of imported goods. For other comparisons, the CO_2 emissions generated by people in Luxembourg and France amount to 20 tCO_2eq and 6 tCO_2eq respectively.

It is also essential to bear in mind that, in order to keep the global mean surface temperature rise under 2°C, the following ratio needs to be reached by 2050: **1.7 tCO_2eq per year per person.**

6.2 Uncertainties of results

The overall uncertainty of the ECA carbon footprint amounts to 8% (732 tCO_2eq) meaning there is a reliable probability (at least 95%) that the real carbon footprint lies within the range of 8 198 tCO_2eq and 9 661 tCO_2eq where the calculated carbon footprint accounts for 8 930 tCO_2eq. See below a chart including uncertainty rates for each item.

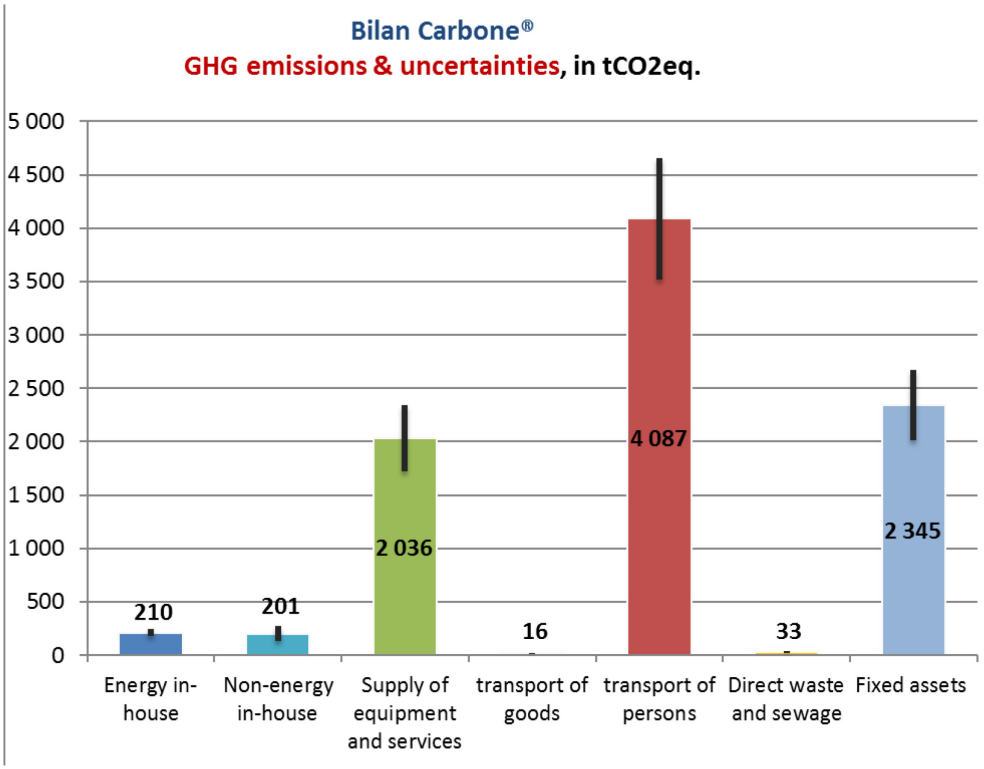

Figure 3: GHG emissions & uncertainties of the ECA's carbon footprint

6.3 Results by building

The next table shows the overall emissions broken down by building. It may be noted that the K1 building has the highest carbon impact (4 050 tCO_2eq – 45%) due to its larger size and number of occupants.

Emission sources / Buildings (in tons of CO_2eq)	K1	K2	K3
Energy in-house	59	72	79
Non-energy in-house	21	17	163
Supply of goods and services	649	495	893
Goods transportation	5	4	7
People transportation	1 302	993	1 793
Direct waste and sewage	11	8	15
Fixed assets	732	513	1 100
TOTAL	**2 779**	**2 101**	**4 050**

Table 5: Overall carbon footprint results broken down by ECA building

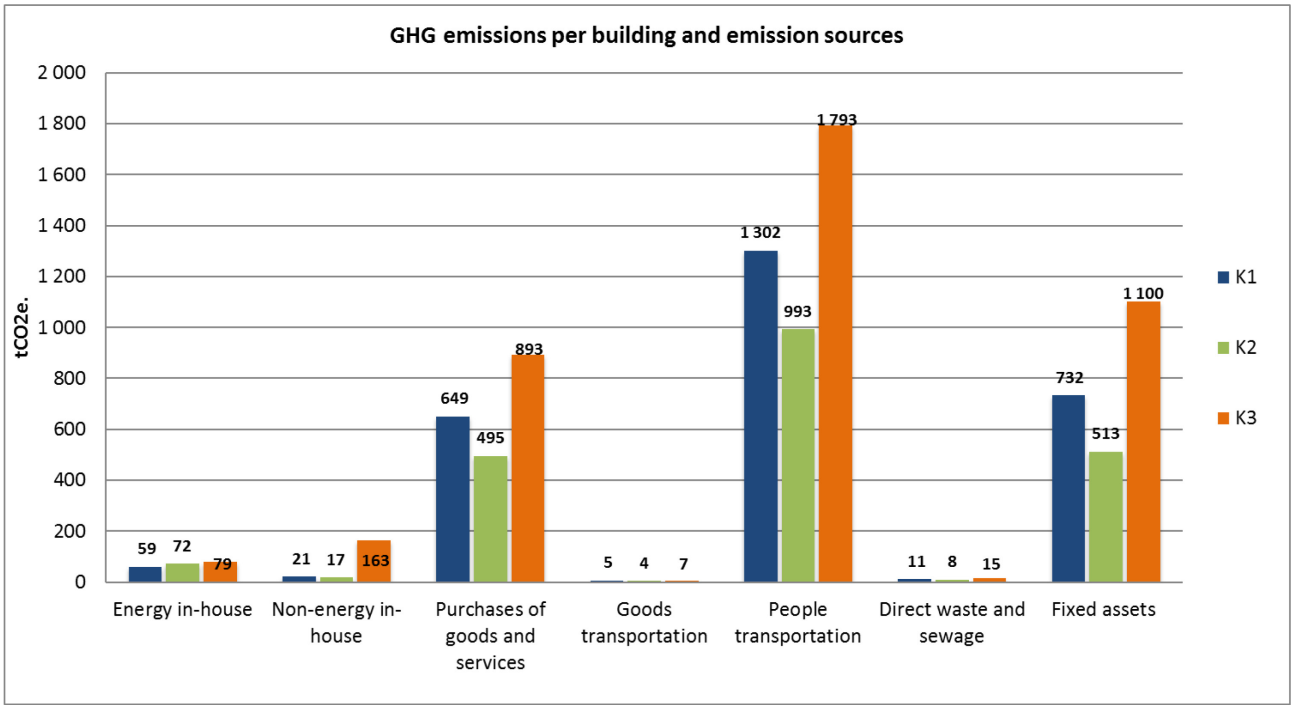

Figure 4: Overall Carbon Footprint results broken down by building of ECA

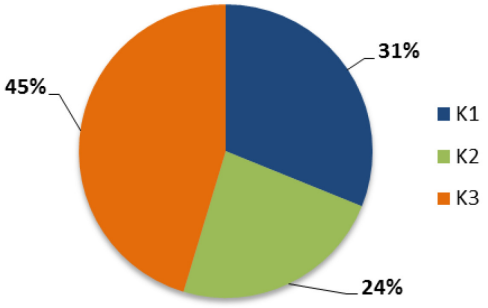

Figure 5: Distribution of the ECA's overall carbon footprint by building

6.4 Breakdown of results by ISO scope

As regards the ISO scopes, the following table and figure show that the ECA's 2014 GHG emissions are low under scope 1 (362 tCO_2eq) and scopes 1+2 (561 tCO_2eq), meaning that most of the GHG emissions are generated by indirect emissions other than those related to energy, namely scopes 1+2+3 (8 260 tCO_2eq).

The difference between scopes 1+2+3 (8 260 tCO_2eq) and the result from the Bilan Carbone® methodology (8 930 tCO_2eq) stems from the fact the Bilan Carbone® methodology also encompasses emissions from GHGs not covered by the Kyoto protocol, such as water vapour trails from aircraft.

Scope	tCO_2eq
ISO 14064 Scope 1	362
ISO 14064 Scope 1+2	561
ISO 14064 Scope 1+2+3	8 260
Global CF	8 930

Table 6: Carbon footprint results split by ISO scope

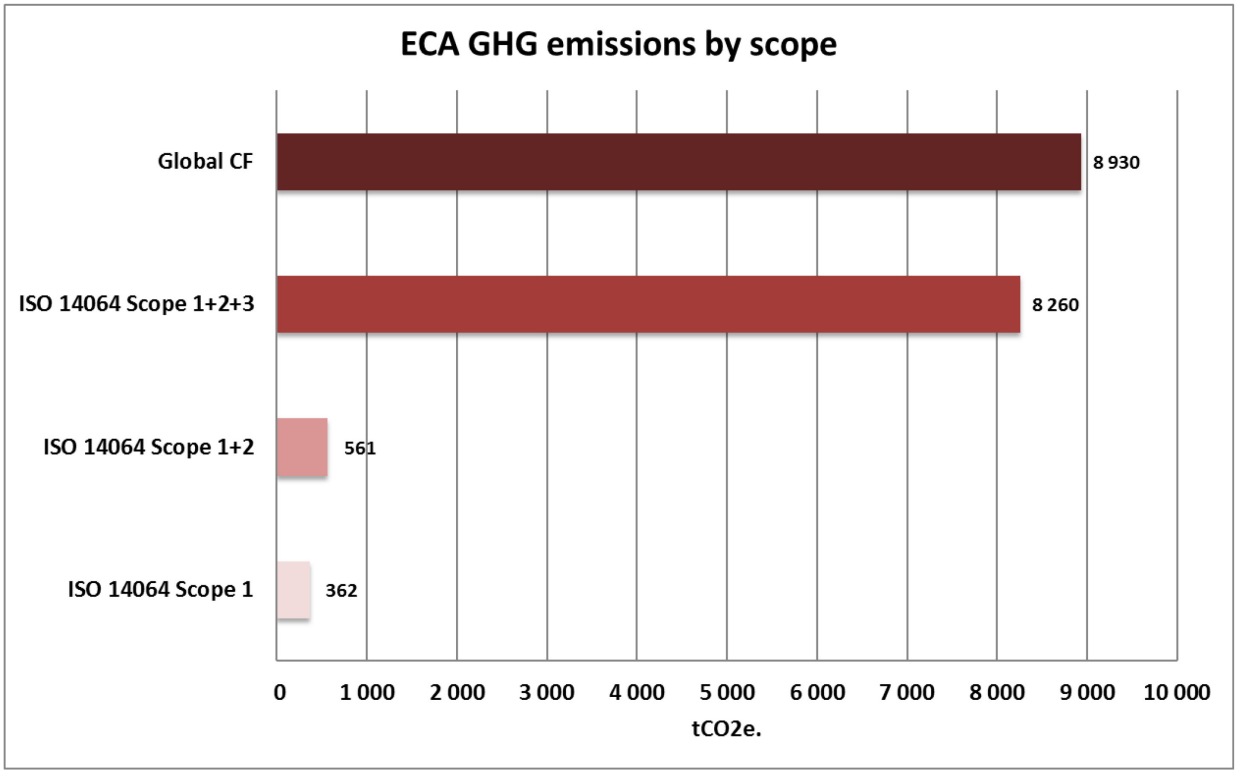

Figure 6: Carbon footprint results split by ISO scope

6.5 Interpretation of results

In order to understand better what a carbon footprint of **8 930 tCO_2eq** means precisely, let us compare it with other emissions sources.

8 930 tCO_2eq can be compared with:

1 261	Luxembourg household consuming energy for 1 year (25 000 kWh for heating from gas and 4 000 kWh for electricity)
8 930	one-return air ticket Paris-Marrakech
17 859	m² of building construction
6 697	laptops (manufacture)

7 Detailed analysis of the carbon footprint

This section aims at giving details on GHGs emitted by each emissions source, namely in-house energy, in-house non-energy, supplies of goods and services, transport of supplies, transport of persons, fixed assets and waste. Specific information on used data, emission factors, assumptions and methodology are reported in the annexes.

7.1 In-house energy consumption

7.1.1 Scope

All types of energy consumed in ECA buildings are included in this emissions source. All energy consumptions are available separately for each building for 2014, and cover:

- ✓ Heat consumption provided by the district heating network;
- ✓ Electricity purchased from the LEO provider;
- ✓ Fuel for the power generator.

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Direct GHG emissions - ISO Scope 1	Direct emissions from stationary combustion sources	Fuel for power generator	Not required as heat, electricity and fuel consumption data are collected separately for each building
Indirect emissions due to energy - ISO Scope 2	Indirect emissions from electricity consumption	Electricity	
	Indirect emissions from steam, heat or cooling consumption	Heat consumption	

Green electricity

Green electricity *is electricity from renewable sources, such as wind, hydroelectric or photovoltaic energy. For customers who have a green electricity contract, electricity suppliers ensure that the quantity of green electricity purchased by the customer will be fed into the European electricity grid. The aim is to promote electricity from renewable sources.*

At the European level, 'green electricity' is recognized through a system of guarantee-of-origin certificates. Each guarantee is a certificate supplied by the electricity generator, who forwards it to the supplier at the time of purchase. In order to ensure that it can only be used once, the certificate is cancelled once the supplier has used it.

However, there is not much demand for green electricity, as a result of which its price is still very low. Consequently, the purchase of green electricity does not currently ensure ***additional generation*** *or local investment in renewable energy.*[10]

For electricity production using renewable primary energy (wind, solar, wood, geothermal, etc.), the emission factors proposed by Bilan Carbone® only considers upstream emissions for energy, such as the emissions from the manufacture and maintenance of the power generation unit whereas the use of primary energy in itself is considered emission free.

[10] Source: European Parliament. 2014 European Parliament Environmental Statement for 2013, 2014

7.1.2 Overview of Results

The ECA's overall energy consumption in 2014 accounted for 210 tCO_2eq (2%) and breaks down as follows:

Type of energy	$tCO_2eq.$	kWh
Purchased electricity	20	5 024 031
Electricity in-line losses	2	452 163
District heat consumption	178	3 762 880
Fuel oil[11]	10	31 474
TOTAL	**210**	**9 270 547**

Table 7: Energy consumption and GHG related emissions in 2014

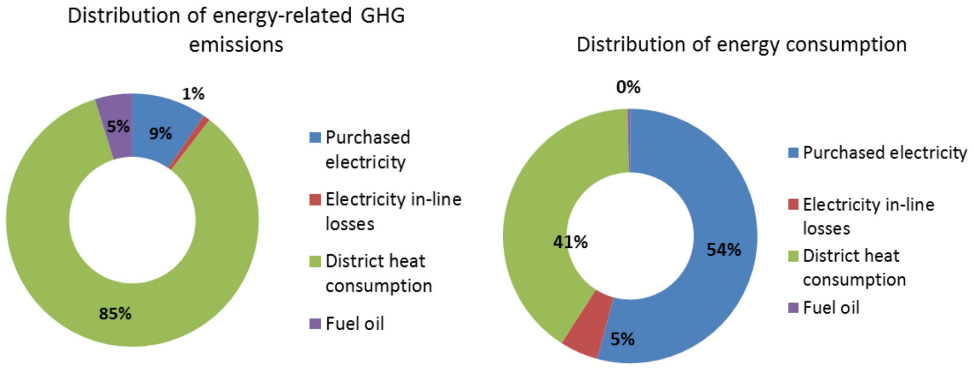

Figure 7: Distribution of energy consumption and distribution of energy-related GHG emissions

While consumed heat only represents 41% of the overall energy consumption, it generates 85% of energy-related GHG emissions, since 1 kWh of heating energy generates 43 gCO_2eq (compared to 1 kWh of green electricity only generating 4 gCO_2eq).

7.1.3 Results by building

It should also be noticed that the K3 building is the most electricity-intensive building, whereas the K2 building mainly uses district heating.

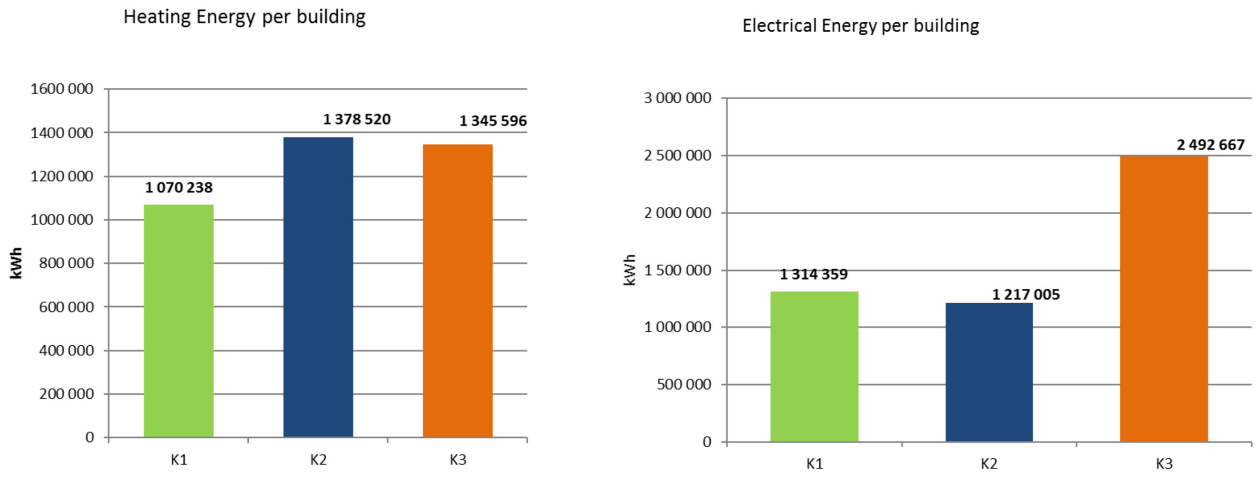

Figure 8: Electricity and heating consumption for each building

[11] * *Conversion ratio: 1 litre of fuel oil = 9,96 kWh*

In terms of GHG emissions, K3 emits more than K2 and K1, due to its higher electricity consumption.

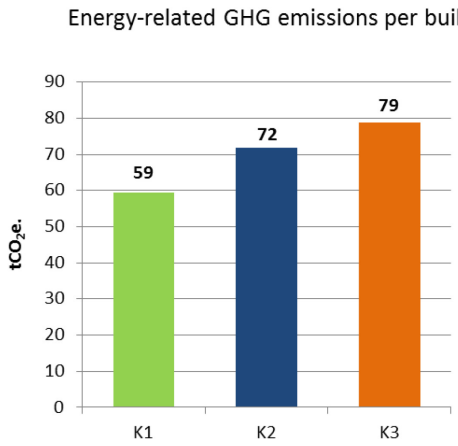

Figure 9: Energy-related GHG emission of each building

7.2 In-house non-energy consumption

7.2.1 Scope

Non-energy consumption refers to the leakage of refrigerant gas from air conditioning and cooling systems in ECA buildings. The circuits that contain the cooling fluids are never completely leak-proof and, during normal operation, between 1% and 30% of the fluid contained in the appliances escape into the atmosphere over a year.

Data on air conditioning and cooling systems with their cooling power (in kW) and the type of cooling gas used are available for each building.

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Direct GHG emissions - ISO Scope 1	Direct emissions from non-energy processes	Air conditioning	Not required as data are separately collected for each building
		Cooling systems	

7.2.2 Results

The carbon footprint resulting from non-energy consumption amounts to 201 tCO_2eq. In terms of GHG emissions, the K3 building emits more than K2 and K1, because this building contains more powerful air-conditioning installations as well as the refrigerating installations of the kitchen.

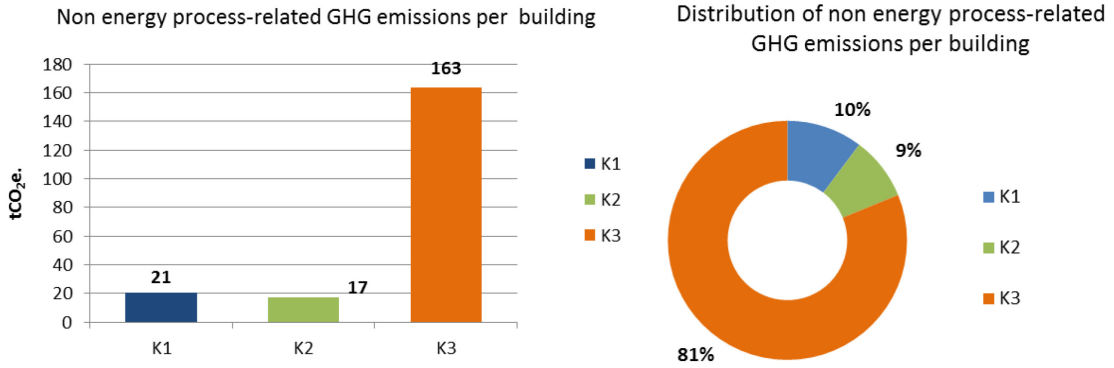

Figure 10: Non-energy-related GHG emission for each building

7.3 Supply of goods and services provided by third parties

7.3.1 Scope

This item encompasses all of the incoming flows of materials and services used by the ECA:

- ✓ Purchase of supplies, notably paper and office furniture, ink toner and cartridges, food for the restaurants, catering supplies, etc.,
- ✓ Services provided by external providers (catering, cleaning, consultancy, external translation and interpreting, etc.).

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Other GHG indirect emissions ISO Scope 3	Purchased goods or services	Purchase of supplies	Based on the numbers of occupants per building
		Services provided by third parties	

7.3.2 Results

Because of the large quantity of purchased services, the services provided by third parties are the most GHG emitting item (1 196 tCO_2eq), followed by software and office equipment purchases (559 tCO_2eq) and served meals (168 tCO_2eq).

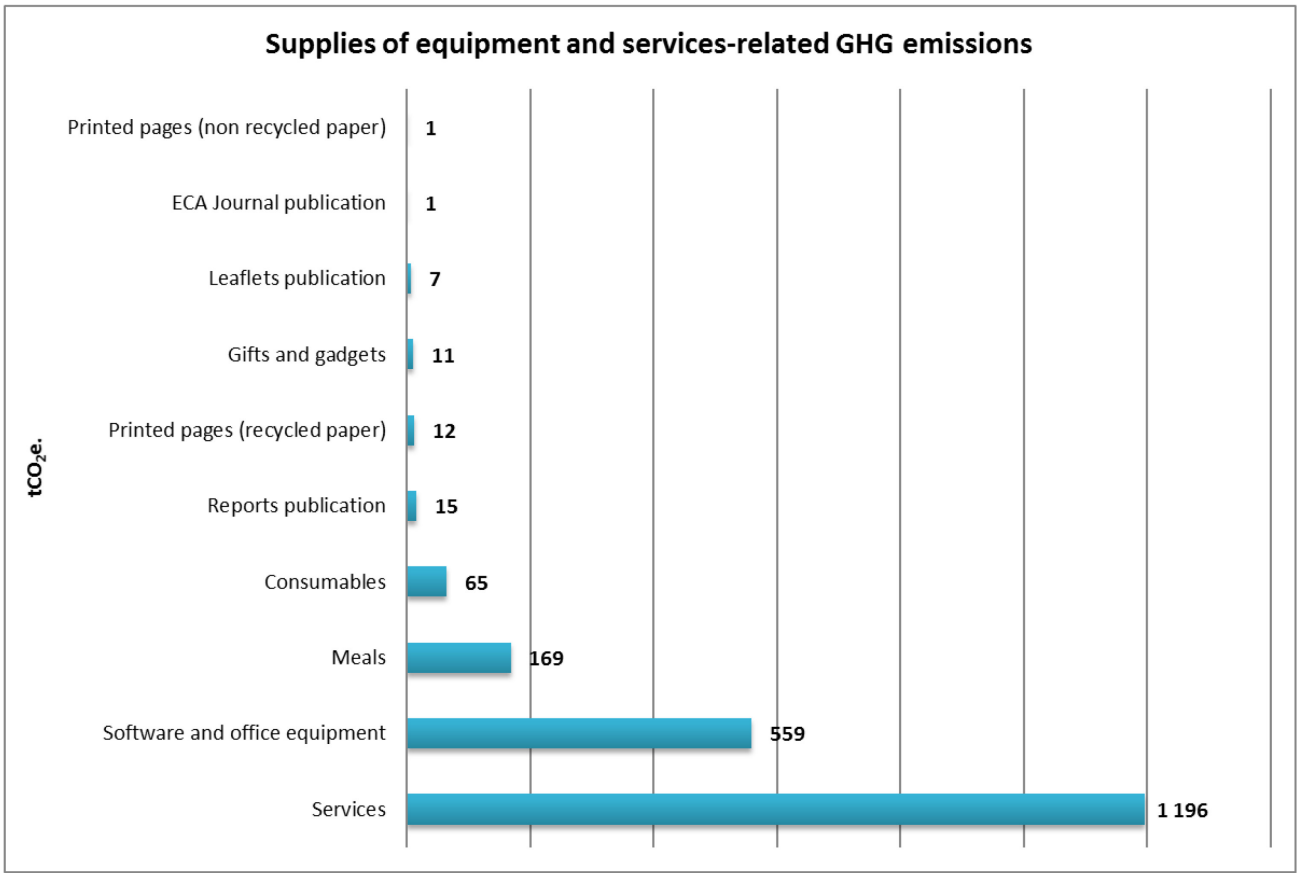

Figure 11: Supplies of equipment and services-related GHG emissions

On this basis, it is important to look closely at each component of purchased services (which are responsible for the release of the highest emissions – 1 196 tCO_2eq).

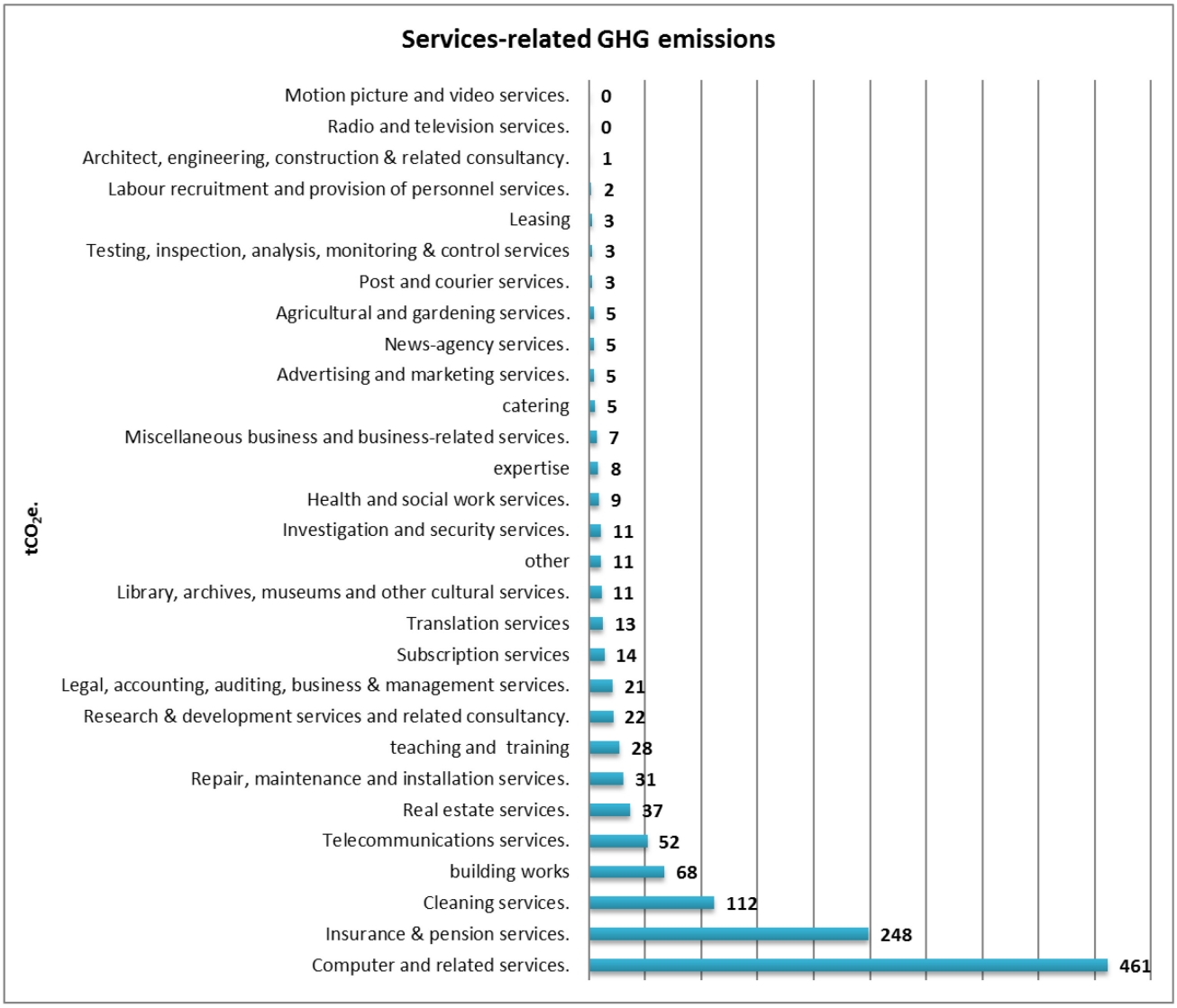

Figure 12: Supplies of services-related GHG emissions

The three most impacting items are:

- ✓ Computer and related services (461 tCO_2eq),
- ✓ Insurance and pension services (248 tCO_2eq),
- ✓ Cleaning services (112 tCO_2eq).

Next, the graph below presents the GHG emissions related to purchased goods and services allocated to each building, based on the number of occupants in each building.

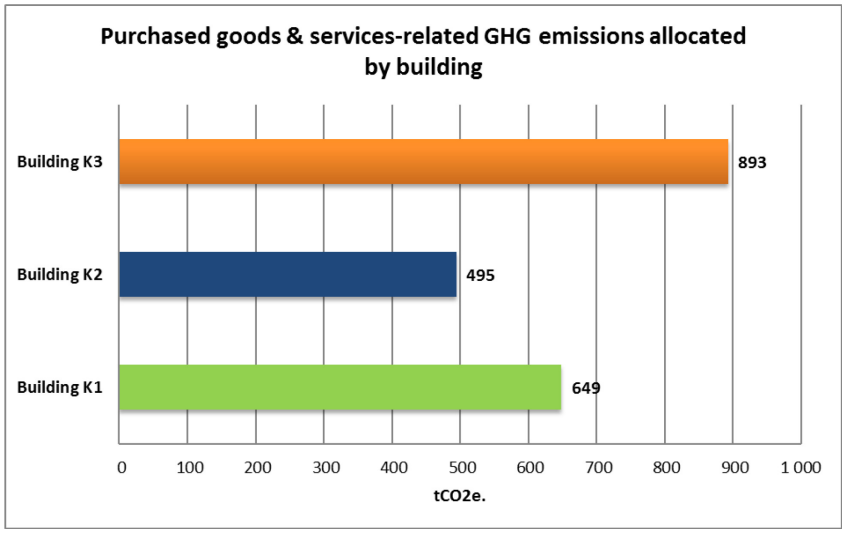

Figure 13: GHG emissions related to goods and services for each building

7.4 Transport of supplies

7.4.1 Scope

This emission source covers the transport of goods between the provider's headquarters and the ECA's buildings. The methodology developed only considers the last journey segment (from the vendor HQ location to the ECA) instead of the journey from "cradle" to "gate" (from the raw material origin to the ECA), as it would be complex to collect data on the entire journey.

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Other GHG indirect emissions ISO Scope 3	Upstream transportation of goods	None	Based on the number of occupants by building

7.4.2 Results

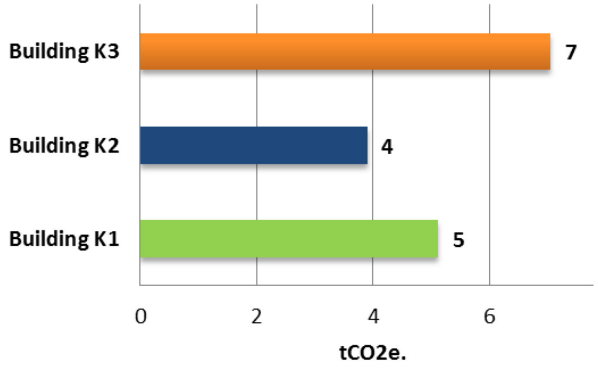

Figure 14: GHG emissions related to transport of goods to each building

The overall result is quiet low (16 tCO_2eq) since, as mentioned above, only the last travel segment has been considered, due to the lack of available data. The allocation rule between each building is based on the number of occupants per building.

7.5 Transport of persons

7.5.1 Scope

This item includes:

- ✓ Commuting by ECA staff and members
- ✓ Business travel with official cars
- ✓ Business travel by means other than official cars
- ✓ Visitors' trips between their places of origin and the ECA.

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Direct GHG emissions ISO Scope 1	Direct emissions from mobile combustion engine sources	Transport related to the use of official cars	All official cars have been allocated to K1
Other GHG indirect emissions ISO Scope 3	Business travel	Transport related to missions of court's staff	Based on the number of building occupants
	Visitors' travel	Transport of visitors' groups	
	Employee commuting	Commuting between home and work by the court's staff	

7.5.2 Results

It is clear that the transport of persons is the main source of emissions (4 087 tCO_2eq) in the ECA's carbon footprint, and it can be broken down as follows:

Transport of persons	tCO_2eq
Commuting	1 973
Business travel	1 291
Visitors' travel	823
TOTAL	**4 087**

Table 8: GHG emissions from the transport of persons

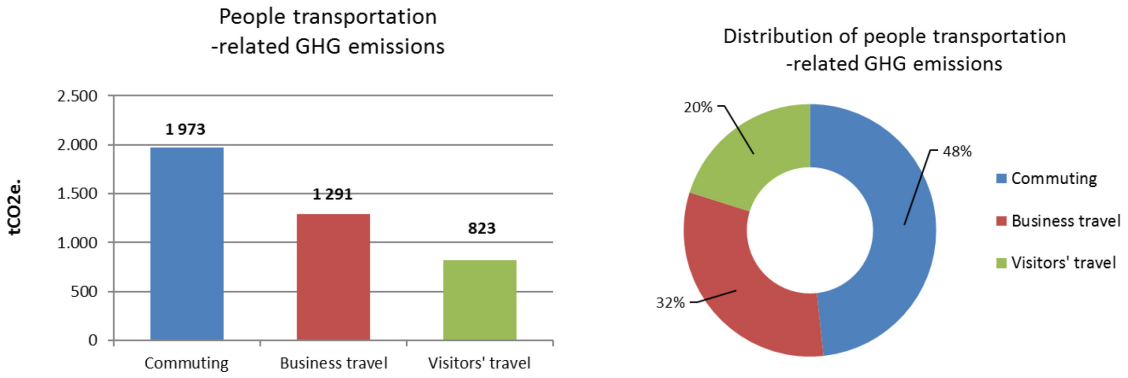

Figure 15: GHG emissions related to transport of persons

Commuting

Commuting is definitely the emission source (1 973 tCO_2eq for 48%) against which action will need to be taken. Most emissions (86%) originate from cars (1 701 tCO_2eq).

Transport means	tCO_2e	Travelled distance km
Official cars	14	59 536
Car – alone	1 701	5 225 515
Carpooling	60	366 114
Train	22	548 537
Bus	172	1 118 475
Motorcycle	5	18 962
Bicycle	0	77 689
Foot	0	99 232
TOTAL	**1 973**	**7 337 139**

Table 9: GHG emissions related to commuting

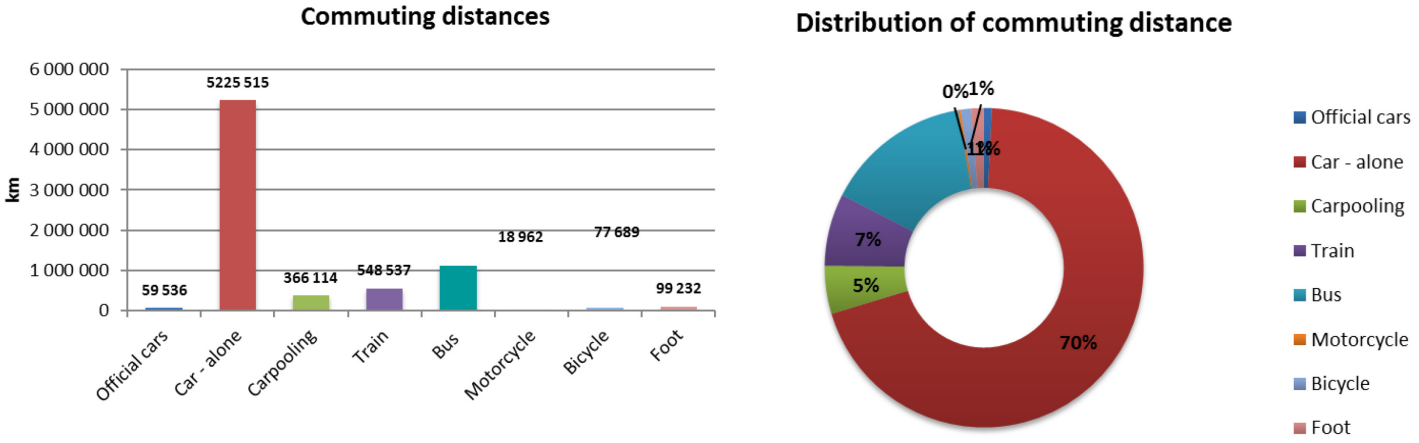

Figure 16: GHG emissions related to commuting

Business travel

GHG emissions due to business travel amounts to 1 291 tCO_2eq. Travelling by plane is definitely the transport mode with the most impact, at 906 tCO_2eq (70%).

Means of transport	tCO_2eq	Distance travelled
Plane	906	4 332 818
Official cars	179	745 166
Private cars	126	385 828
Rented cars	33	101 178
Train	30	748 937
Boat	1	1 397
Other	17	109 922
TOTAL	**1 291**	**6 425 246**

Table 10: GHG emissions related to business travel

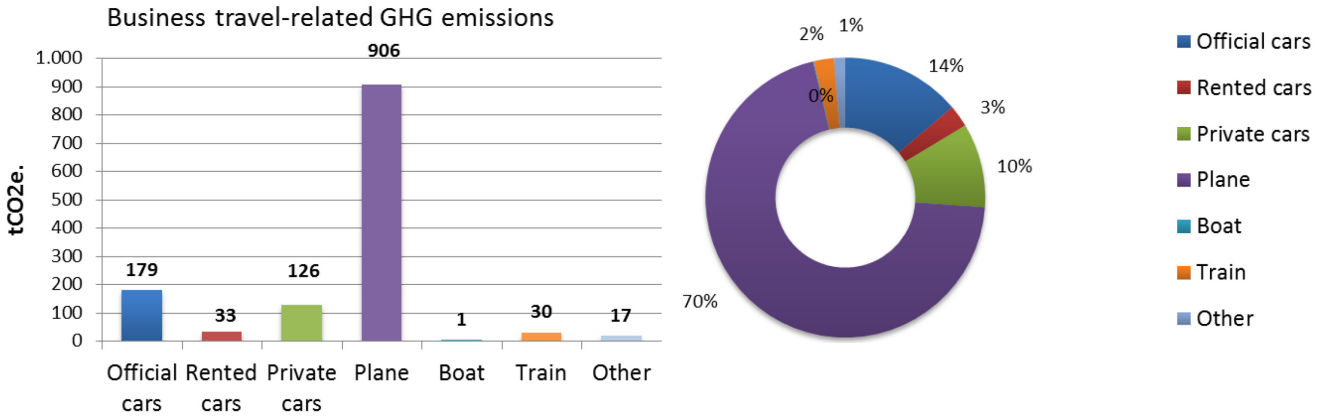

Figure 17: GHG emissions related to business travel

Visitors' travel

Official visitors coming to the ECA in Luxembourg are responsible for 823 tCO_2eq, with short and long haul aircraft representing 69% of the total.

Transport means	tCO_2eq	Travelled km
Long haul aircraft	406	1 818 000
Short haul aircraft	165	788 506
Bus	147	952 383
Car	89	273 335
Train	17	416 144
TOTAL	**823**	**4 248 368**

Table 11: GHG emissions related to the transport of visitors

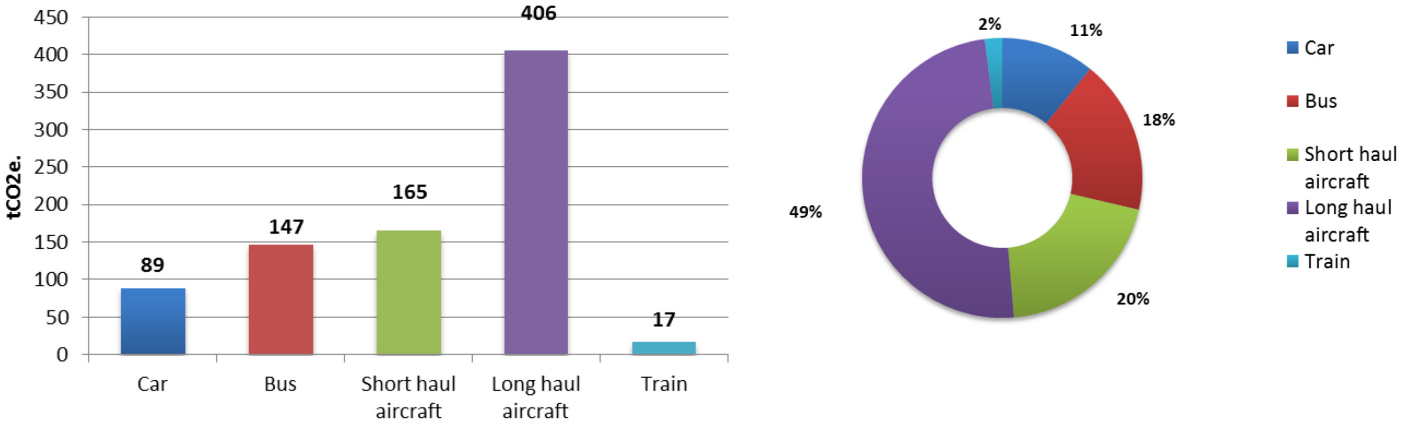

Figure 18: GHG emissions related to visitors' travel

Results by building

Except for official vehicles, which are only allocated to the K1 building, since the garage and staff members using them are located there, all other emissions sources (commuting, business travel, visitor travel) were allocated to each building in accordance with the number of building occupants.

Buildings	tCO_2eq
Building K1	1 302
Building K2	993
Building K3	1 793
TOTAL	**4 087**

Table 12: GHG emissions from the transport of persons

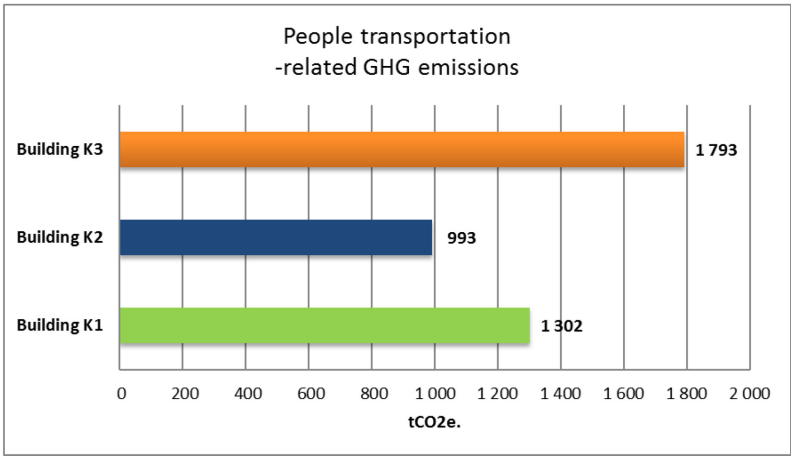

Figure 19: GHG emissions related to the transport of persons broken down by building

7.6 Fixed assets

7.6.1 Scope

This category covers GHG emissions generated during the manufacture or construction of consumer durables. Under the Bilan Carbone® method, GHG emissions are depreciated over a certain period of time. They are divided up over this period using a system comparable to the financial concept of amortization, so that the various annual carbon footprint results can be compared.

Fixed assets comprise:

- ✓ Buildings and car parks;
- ✓ Kitchen assets (e.g. furniture, fridges, etc.);
- ✓ Vehicles leased by ECA;
- ✓ IT equipment (computers, printers, servers, etc.);
- ✓ Office furniture;
- ✓ Offset printing machines

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Other GHG indirect emissions ISO Scope 3	Fixed assets	Building	Not required as data are separately collected for each building
		Car parks	
		IT	
		Vehicles	
		Furniture	
		Equipment	

7.6.2 Results

Fixed assets are responsible for the emission of 2 345 tCO_2eq broken down as follows:

Type of assets	tCO_2eq
IT equipment	782
Buildings (over ground)	702
Building assets	670
Car parks (underground)	94
Vehicles	85
Kitchen assets	11
Electricity generator	2
TOTAL	**2 345**

Table 13: Fixed asset-related GHG emissions

The above table and the graphs below show that IT equipment is the most emitting item (782 tCO_2eq), followed by buildings (702 tCO_2eq) and buildings assets (670 tCO_2eq)

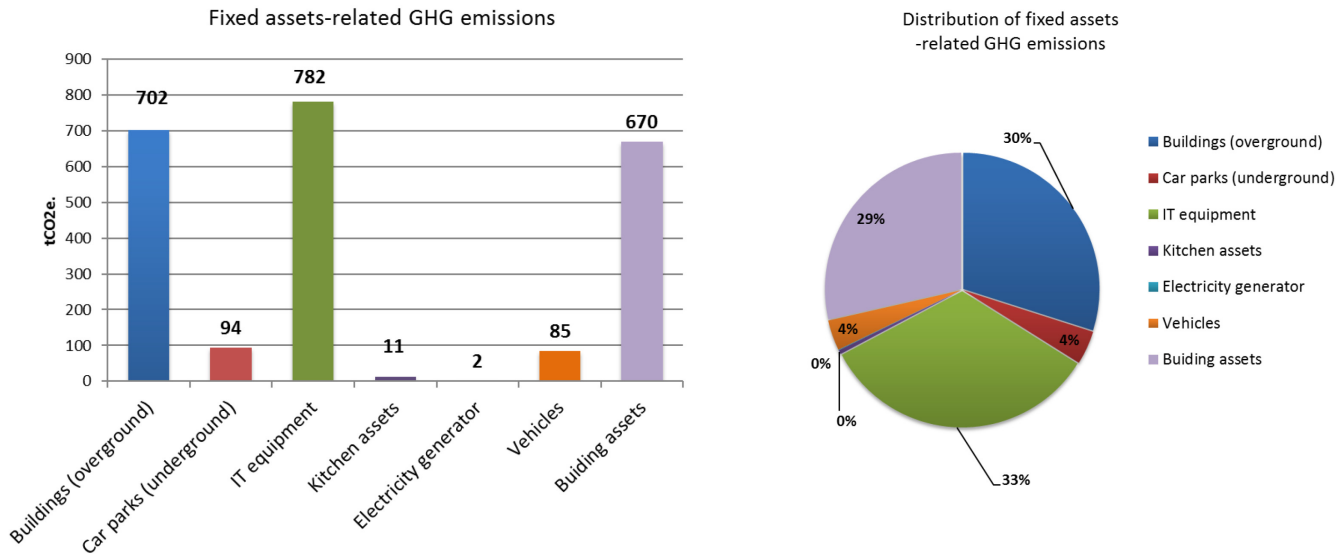

Figure 20: GHG emissions related to fixed assets

All data were available separately for each building. Hence, the distribution of fixed assets-related GHG emissions among the individual buildings is straightforward; no allocation rule is required.

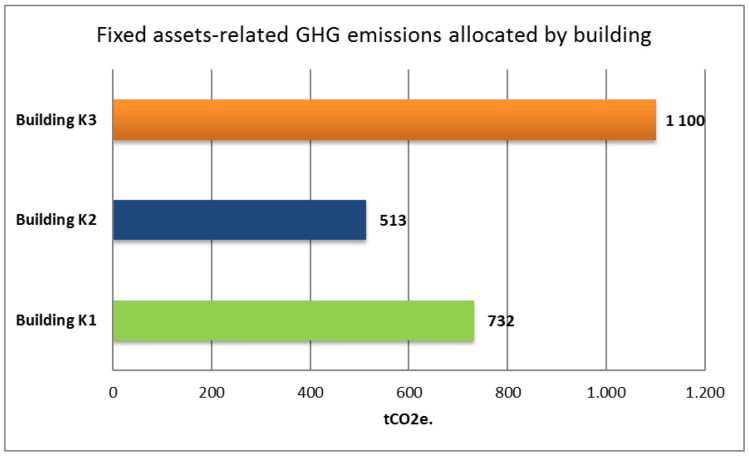

Figure 21: GHG emissions related to fixed assets for each building

7.7 Direct waste and sewage disposal

7.7.1 Scope

This item comprises GHG emissions associated with end-of-life waste processing as well as those from wastewater.

Emissions categories	Emissions sources	Emissions sub-item	Allocation rule for a breakdown by building
Other GHG indirect emissions ISO Scope 3	Direct waste	Waste production	Based on the number of occupants per building
		Waste water	Not required as data are separately collected for each building

7.7.2 Results

GHG emissions from waste disposal amount to 33 tCO_2eq and are broken down as follows:

Type of waste	tCO_2eq	Tons	m^3
Batteries and accumulators	0.0	0.1	
Paper and cardboard	2.2	67.6	
Food waste	0.9	18.0	
Domestic and similar waste	14.6	40.3	
Scrap	0.001	0.03	
Light bulbs and fluorescent tubes	0.02	0.2	
Plastic waste (including packaging)	0.01	0.3	
Glass packaging waste	0.1	3.2	
Packaging waste with harmful products	0.1	0.1	
Various packaging waste	0.1	4.4	
Waste electrical and electronic equipment	0.01	0.1	
Food fats and oils	12.8	18.0	
Waste water	2.5	-	9 597
TOTAL	**33**	**152.2**	**9 597**

Table 14: GHG emissions related to waste

The most impacting wastes are household waste (14.6 tCO_2eq) and food fats and oils (12.8 tCO_2eq).

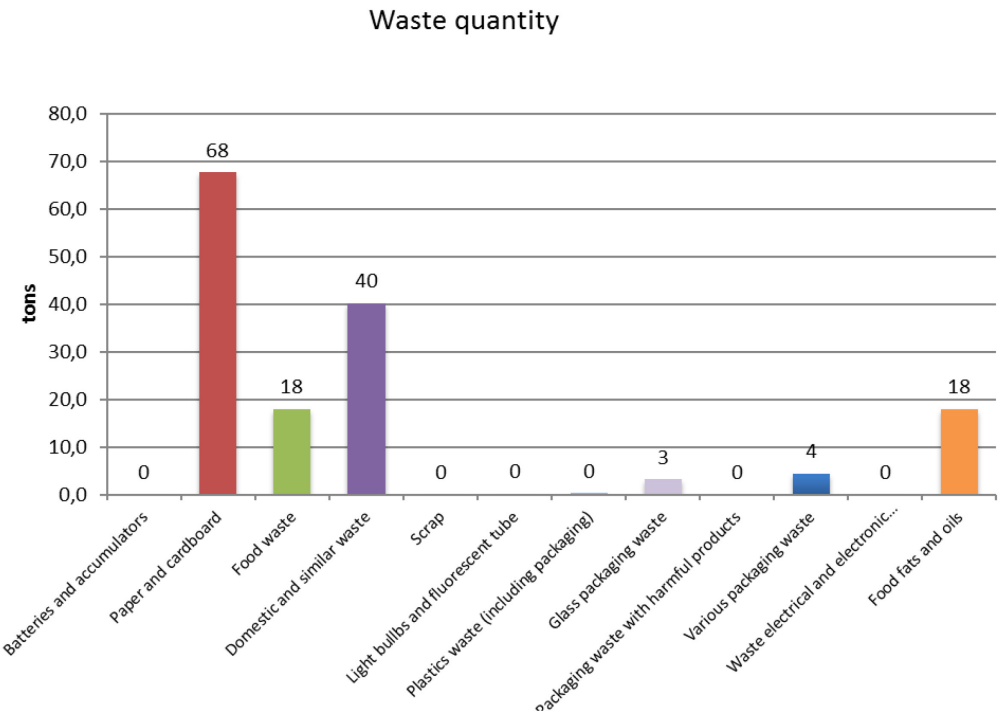

Figure 22: Waste quantity discarded by ECA

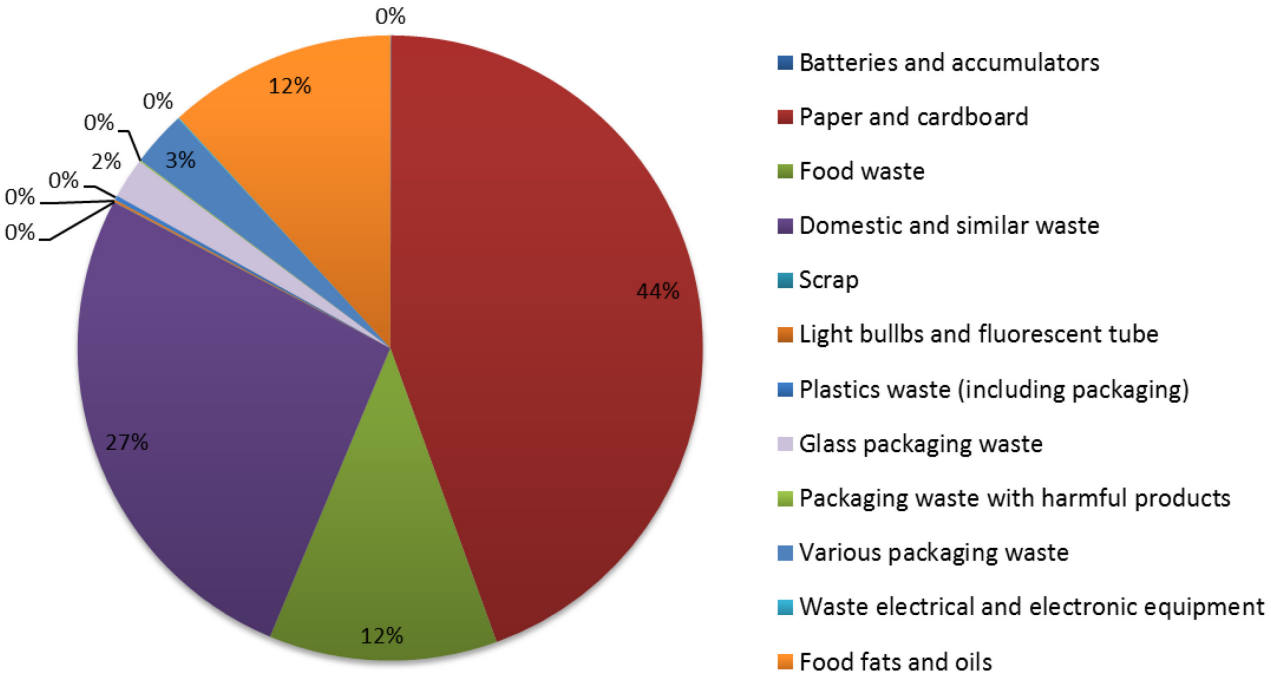

Figure 23: Waste-related GHG emissions

8 Emission reduction strategy

8.1 Setting a GHG target

Needless to say, a GHG emission reduction target is the logical follow-up to developing a GHG inventory.

Common drivers for setting a GHG target include:

- ✓ *Demonstrating leadership and responsibility: With the emergence of GHG regulations and growing concern about the effects of climate change, setting a public GHG target demonstrates leadership and corporate responsibility;*
- ✓ *Achieving cost savings: Implementing a GHG target can result in cost savings by driving improvements in resource efficiency;*
- ✓ *Minimizing and managing GHG risks: A GHG target will help raise internal awareness about the risks and opportunities presented by climate change and ensure the issue is on the agenda.*[12]

8.2 GHG emissions targets

The ECA's target boundary relates to its total scope 3 emissions of 8 930 tCO_2eq for the 2014 baseline year, as 2014 is the first period for which it drew up a GHG inventory.

Absolute short and long term GHG reduction targets have been set for two target achievement years (2020 and 2030), for which the ECA will aim to reduce its GHG emissions by:

- ✓ 7 percent below 2014 levels no later than 2020
- ✓ 18 percent below 2014 levels no later than 2030

Objectives	Fixed Targets	Reduction target (in tCO_2eq)	Foreseen Carbon footprint (in tCO_2eq)
2014			**8 930**
2020	**7%**	- 657	8 273
2030	**18%**	- 1 568	7 362

Table 15: the ECA's GHG emissions targets

These absolute targets were set by examining the potential reduction of GHG emissions related to each mitigation action (See further below the mitigation action plan comprising all the actions) and estimating their effects on total GHG emissions. These targets have been set aside from a potential supplementary offset strategy.

[12] World Resources Institute and World Business Council for Sustainable Development. The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard: revised edition 2004.

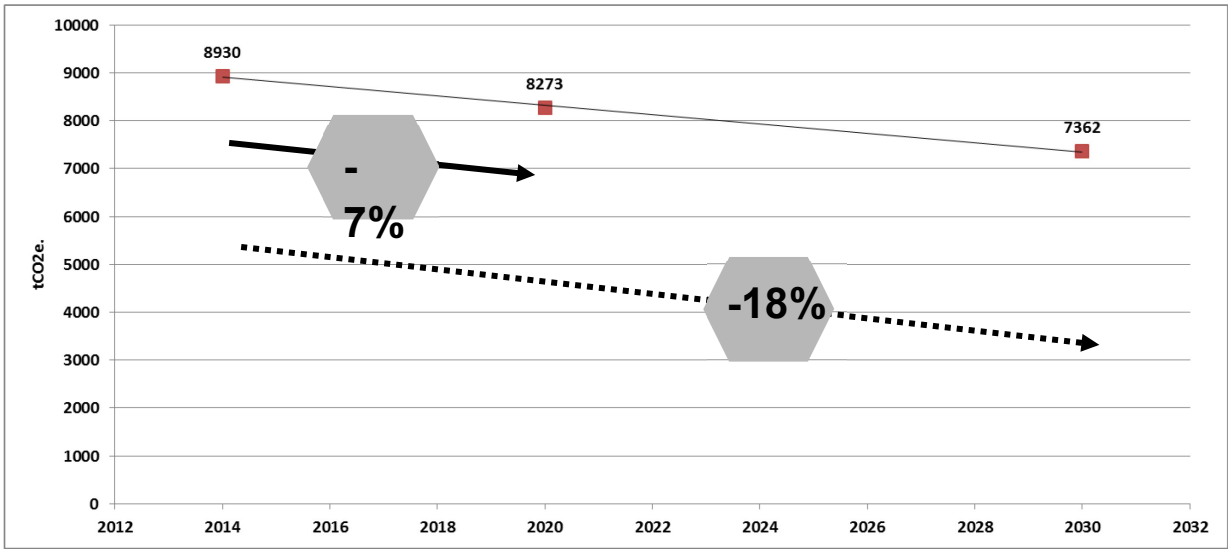

Figure 24: ECA's targets to cut its scope 3 - GHG emissions

8.3 Proposal of ECA reduction plan

With regard to the scope 3 emission inventory, the three following sources of emissions should be addressed as a priority, as their potential for reduction is the highest:

- ✓ Transport of persons, especially commuting and business travel
- ✓ Supply of equipment and services
- ✓ Fixed assets

The action plan therefore presents the measures, organized by the **sources of emissions** that they intend to address.

The **type of measure** is also described and categorized as follows:

- ✓ **Data improvement,** where it concerns the improvement of data collection
- ✓ **Sufficiency,** where it enables a reduction in the level of production/consumption/transport/…or is related to a shift in staff behaviour
- ✓ **Efficiency,** where it improves a process resulting in a reduction of energy consumption
- ✓ **Renewable energy,** where it concerns the implementation of renewable sources of energy such as solar etc.

The **status** of the measure refers to its degree of implementation:

- ✓ **Already done** in the past few years;
- ✓ Still **in progress** and needs to be continued;
- ✓ **To be implemented** if the measure has not yet started;

Measures are also classified using the following **priority level**:

- ✓ **Immediate,** for measures that can be implemented now at very low cost;
- ✓ **Top priority,** for measures with a high potential for short-term emissions savings, but requesting a certain investment cost;
- ✓ **Strategic,** for measures with a relative potential for long-term emissions savings as well as a significant cost.

The **timetable** for implementation is proposed with different choices:

- ✓ The implementation has already been carried out
- ✓ The measure takes place in a particular year (2016 for instance)
- ✓ The implementation of the measure is **continuous**
- ✓ The schedule still needs to be determined (**TBD**)

The **investment cost (in €)** required to implement the measure: Where the collected data and information are not sufficient to estimate the cost, it is assessed as follows:

€ : low cost

€€ : medium cost

€€€ : high cost

The return on investment was also assessed as follows:

+ : short return on investment

+ - : medium return on investment

- : long return on investment

Finally, the **technical issue** of implementation accounts for the difficulty involved in setting the measure up and is indicated by:

***** : easy

****** : moderately easy

******* : difficult

In order to follow-up the degree of implementation of each measure, some **key monitoring indicators** are proposed.

8.3.1 Mitigation measures related to energy

Even though most measures related to energy savings have already been implemented with regard to the low emissions generated by energy consumption (as a reminder, GHG emissions related to energy consumption in both buildings amounts to 210 tCO_2eq), there are still some relevant steps to be taken.

Implementing the proposed measures by 2020 would cut emissions by 30 tCO_2eq (14% of total GHG emissions related to energy), while implementing proposed measures by 2030 would cut emissions by 79 tCO_2eq (37% of total GHG emissions related to energy).

8.3.2 Mitigation measures related to non-energy processes

There are no real emission cuts with regard to non-energy processes. Indeed, only 201 tonnes of CO_2eq are attributed to non-energy processes. For the time being, the best action to implement is a “data improvement” action rather than a mitigation action (See action plan to improve data collection in section 8.4).

#	Sub-category emissions sources	Type of action	Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	Cost Investment	Return on investment	Technical issue of the implementation	2020 target	2030 target	Key follow-up indicators
E1	Heating consumption	Efficiency	In progress	Immediate	Continuous	Follow-up energy audits	Follow-up technical energy audits of each building to identify any mitigation measure for energy consumption and improve the energy efficiency of heating system and the building envelope	0	0	Already covered by the contract with technical contractors	+ -	Not applicable	Not applicable	Not applicable	
E2	Heating consumption	Sufficiency	To be implemented	Strategic	2018	Improvement of K1 building thermal performance	Building envelope insulation & replacement of windows and doors	9	9	**€€€**	- Annual heating savings = 11 468 € per year (based on 0.0570 euro/kWh)	***	- K1: project to insulate the façade in 2019-2020 being studied: the ECA is currently studying the feasibility and the cost - K1: replacement of windows approved and should start in 2018		- Total facade insulated - Total surface of replaced windows
E3	Heating consumption	Sufficiency	To be implemented	Strategic	TBD	Improvement of K2 building thermal performance	Building envelope insulation & replacement of windows and doors	7	7	**€€€**	- Annual heating savings = 9 792 € per year (based on 0.0570 euro/kWh)	***	- K2: façade wall insulation has been approved		- Total facade insulated - Total surface of replaced windows
E4	Heating consumption	Sufficiency	To be implemented	Top priority	2016	Lowering the room temperature of each building by 1°C (pilot test)	Lowering the ambient temperature by 1°C will be implemented as a pilot test in K1. If successful, this measure should be extended to all buildings by 2020. In 2030, a supplementary Celsius degree will be gained compared to 2020.	12	25	**€**	+ Annual heating savings by a 1°C decrease = 15 014 € per year (based on 0.0570 euro/kWh)	*	- Minus 1°C compared to current temperature	- Minus 2°C compared to current temperature	- Winter set point temperature
E5	Heating consumption	Sufficiency	Already done	Immediate	Continuous	Ambient temperature regulation	Heating and cooling systems are switched off during unoccupied period (nights, week-ends and Christmas holidays,...) - K1: ability to cut off the heating system - K2: the heating system remains switched on to generate cooling - K3: a problem has been detected – heating and cooling operate simultaneously → to be fixed			**€**	+	*	Not applicable	Not applicable	
E6	Electricity consumption	Efficiency	In progress	Strategic	Continuous	Efficient lighting	Replacing high energy consuming bulbs with low consumption bulbs such as LEDs: - Action already implemented for emergency lighting and fluorescent tubes, which have been replaced by LEDs in K2. - In 2020 and 2030, respectively 10% and 100% of lights in K1, K2 and K3 to be replaced by energy efficient lights.	0.48	4.82	€€ (- 58 400€ already spent in 2014 for relamping K2)	+ Annual electricity savings by replacing 100% of lights = 61 554 € per year (based on 0.051 euro/Kwh)	**	- 10% of lights will be energy efficient	- 100% of lights will be energy efficient	- Annual electricity consumption /full time equivalent employee - Percentage of energy efficient lighting
E7	Electricity consumption	Efficiency	In progress	Strategic	TBD	Installation of presence sensors	-Light sensors were placed in the corridors of K2 + in the garages of the three buildings (ROI: 10 years) in 2015 - Ongoing study about installing light sensors in K2 offices and natural light sensors in K2	0.60	1.37	**€€**	+ - Return on investment = 10 years regarding the installation of sensors in K2 corridors and garage	**	- 10% of potential sensors will be installed	- 100% of potential sensors will be installed	

#	Sub-category emissions sources	Type of action	Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	Cost Investment	Return on investment	Technical issue of the implementation	2020 target	2030 target	Key follow-up indicators
E8	Electricity consumption	Sufficiency	Already done	Immediate	Continuous	Automatic switching off of computers and lights during unoccupied periods	Automatic switching off of computer workstations/devices/lights during business closure periods (holydays, nights,…)			€	+	*			
E9	Electricity consumption	Efficiency	To be implemented	Strategic	TBD	Data Centre energy monitoring extended to an automatic switching off of servers during unoccupied periods	Project in progress for both data centres: 1. Implementing the European Code of Conduct on Data Centres – Energy efficiency 2. Measuring real electricity consumption (sub-metering the level of consumption of every rack, per month per example) 3. Defining specific targets Power efficiency indicator: KPI: electricity consumption of the data centre			€€ (Roughly between 50 and 100 k€ for DC energy monitoring)	+ -	**	TBD	TBD	Power Usage Effectiveness (PUE)
E10	Electricity consumption	Sufficiency	To be implemented	Immediate	2016	Increase of the set point temperature of air conditioned rooms by 1°C	Increasing the ambient temperature by 1°C for each building will be implemented during the summertime before 2020. In 2030, a supplementary Celsius degree will be gained compared to 2020.	0.60	1.2	€	+ Annual electricity savings by a 1°C increase = 15 014€ per year (based on 0.0570 euro/kWh)	*	Plus 1°C compared to current temperature during summertime	Plus 2°C compared to current temperature during summertime	- Summer set point temperature
E11	Electricity consumption	Sufficiency	To be implemented	Immediate	2016	Promote stair use	Increase staff awareness on stair use instead of elevators by organizing an elevator-free day or by informing staff better on the environmental and health benefits of using the stairs rather than the elevator			€	+	*			

Table 16: List of GHG reduction actions related to energy

#	Sub-category emissions sources	Type of action	Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	Cost Investment	Return on investment	Technical issue of the implementation	2020 target	2030 target	Key follow-up indicators
NE1	Cooling system and air conditioning	Efficiency	In progress	Immediate	Continuous	Follow-up technical audits on cooling and ventilation installations	Follow-up technical audits on cooling and ventilation installations to identify any potential leaks and optimize the system			Already covered by the contract with technical contractors	+ -	Not applicable	Not applicable	Not applicable	
NE2	Cooling system and air conditioning	Efficiency	In progress	Strategic	2017	Replacement of cooling and air conditioning and ventilation installations	Replace the cooling installations that contribute more to GHG emissions with new free cooling installations	0.01	0.01	€€€	-	***	Replacing the current K2 cooling system will cut its corresponding GHG emissions (0.01 tCO2e.)		Cooling gas refills volume per year of each cooling and air conditioning installations

Table 17: List of GHG reduction measures related to non-energy process

8.3.3 Mitigation actions related to transport of persons

Three of the measures linked to the transport of persons (staff commuting, business trips and visitors' trips) are the most significant in terms of GHG savings.

Firstly, **an ambitious teleworking program** could save more than 378 tCO_2eq per year if all employees teleworked at least one day a week. If all employees teleworked at least three days a week, the carbon footprint for commuting could be reduced by 1 082 tCO_2eq per year (meaning 14% of all the emissions caused by the transport of persons in 2014, or 4 087 tCO_2eq).

Videoconferencing is a significant way of reducing travelling by both employees (for meetings) and visitors to the ECA. It also bolsters the teleworking measure by making it easier to work from home. Among other things, this measure would require:

- ✓ a fully equipped room with videoconferencing equipment;
- ✓ guest access to videoconferencing rooms from outside the ECA via smartphone, tablet, computer, etc. in order to relay and rebroadcast meetings or conferences live;
- ✓ the upgrade of professional and private computers to support video and audio conferencing from any device and any user profile via any network (including remote locations) to any device/profile.

If the target of reducing business and visitor trips by 5% by 2020 is achieved, the corresponding GHG savings will be up to 106 tCO_2eq. If the target of reducing them by 10% by 2030 is achieved, the corresponding GHG savings will be up to 211 tCO_2eq compared with 2014 (meaning 5% of all the emissions caused by the transport of persons in 2014, or 4 087 tCO_2eq).

Finally, the last most significant measure concerns continuing and bolstering **the promotion of sustainable means of transport** for commuters, such as bicycles, public transport and, above all, car-pooling. Again this measure could save between 85 and 170 tCO_2eq if 5% or 10% of commuting trips by car were replaced by carpooling trips.

#	Sub-category emissions sources	Type of action	Action Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	Cost Investment	Return on investment	Technical issue of the implement-tation	2020 target	2030 target	Key follow-up indicator
TP1	Commuting	Efficiency	In progress	Top priority	2016	Set up of a teleworking program	Encourage teleworking amongst all ECA staff	378	1 082	€	+++	*	Target of 1 teleworking day for all ECA staff	Target of 2 teleworking days for 80% of employees	Number of teleworking days per year
TP2	Business trips & Visitors' travel	Efficiency	In progress	Top priority	Continuous	Promotion of video-conferencing	-More meeting rooms will be equipped with VC equipment (high quality camera, big screen) - Allowing guest access to the VC equipped meeting rooms from outside the ECA - the upgrade of professional and private computers to support video and audio conferencing from any device, any user profile via any network (thus from remote locations) to any device/profile → Expected results: reduce travelling by both staff and visitors, including staff commuting	106	211	€€ - Video conferencing (VC) equipment: o 15k€ per small o 30k€ per large room - Allowing guest access to VC rooms = 15k€ - Upgrade of professional and personal computers to support video and audio conferencing =~ 500 k€	+++	**	Target of reducing business and visitor travel by 5% via videoconferencing	Target of reducing business and visitor travel by 10% via videoconfere ncing	Number of video-conference sessions per year
TP3	Commuting	Sufficiency	In progress	Top priority	2016	Promotion of sustainable means of transport	- Promote ECA and inter-institutional carpooling platform in order to increase the carpooling offer - Reserve preferential free parking spots for car-poolers	85	170	€€	+	**	Target of replacing 5% of car-commuting trips by carpooling	Target of replacing 10% of car-commuting trips by carpooling	Number of car sharing trips (with corresponding distance) per year
TP4	Official cars	Sufficiency	To be implement ed	Top priority	2016	Eco-driving training for drivers	Eco-driving training has already been planned in the past - but it is worth offering additional training	9.65	9.65	**€** Approximately 200 € per driver then 200*31 cars = 6 200 €	**+++** 5% cuts in Diesel saves > 2 500 € per year → ROI ~ 3 years	*	5% Reduction of GHG corresponding to official cars		Number of eco-trained drivers
TP5	Official cars	Efficiency	To be implement ed	Strategic	2020	Adjustment of official cars size and model	Replace official cars by smaller, less powerful cars or electrical cars			€	+++	*	Not yet applicable	Not yet applicable	Motorization of official cars
TP6	Business trip	Sufficiency	To be implement ed	Strategic	2017	Promotion of public transportation for business trips	Promote train or bus transportation rather than car or plane. In order to take into account the global cost of the trip, when reserving business trips, the booking system should indicate the travel cost plus the extra cost for CO_2 compensation. → Objective: to show that trains are cheaper than flights and more environmentally-friendly → The mission guide needs to be upgraded with this new concept			€	+	*	Not applicable	Not applicable	
TP7	Visitor travel	Sufficiency	To be implement ed	Strategic	2017	Promotion of public transportation for visitor travel	Promote environment-friendly means of transport for visitors coming to ECA by organizing shuttle buses from park and ride facilities for visitors from BE/LU, replacing the use of individual cars			€	+	*	Not applicable	Not applicable	

Table 18: List of GHG reduction measures related to transport of persons

8.3.4 Mitigation measures related to purchases of goods and services

The proposed measures focus on food purchases and catering services for the restaurant, and paper purchases. Their impact on GHGs would be less significant than the transport measures, but are still worth implementing under the overall objective of long-term sustainability.

With regard to food, the application of “green” criteria in the tender specifications, such as giving **preference to local, seasonal and organic food** could contribute to saving from 13 to 27 tCO_2eq compared to the 2014 GHG emissions.

With regard to paper purchases, the main measures concern **the pursuit of a paperless programme,** including the promotion of on-line publications and on-line leaflets with the objective of reducing paper purchases.

8.3.5 Mitigation measures related to waste

As waste already seems well managed, there is not much to be suggested other than reducing food waste and wastewater.

8.3.6 Mitigation actions related to fixed assets

While the impact of fixed assets on the GHG inventory is significant (2 345 tCO_2eq – 26%), there are not many opportunities to decrease it, as buildings, furniture, assets, IT equipment, official cars etc. are essential for the ECA’s activities. The only measure focuses on increasing the leasing period for official cars from four to six years.

#	Emission sources	Sub-category emissions sources	Type of action	Action Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	cost Invest-ment	Return on invest-ment	Technical issue of the implement-tation	2020 target	2030 target	Key follow-up indicator
TG1	Transport of goods	Upstream goods transportation	Sufficiency	In progress	Immediate	2016	Inclusion of GPP criteria in call for tenders, encouraging local business and local origin of goods	Include green requirements in tender documents as part of the technical specifications, the selection and/or award criteria and performance clauses to encourage local origin of goods			€	+	*	Not applicable	Not applicable	
PU1	Purchases of goods	Food purchase	Sufficiency	In progress	Top priority	2016	Inclusion of local/seasonal/organic food criteria in catering tenders	- Bolster of local/seasonal/organic food criteria for catering tender specifications, expected in next contract in 2017 via the promotion of local, seasonal, organic vegetables & organic rise - Less meat as well as low-fat meal one or two days per week expected in the future contract	13	27	€	+	*	- 2020: 25% organic meals instead of currently 16% organic meals	-2030: 35% organic meals instead of currently 16% organic meals	Number of organic meats
PU2	Purchases of goods	Goods purchase	Sufficiency	In progress	Immediate	2016	Decrease in the distribution of gifts and increase in the share of eco-friendly giveaways	Decrease the quantity of distributed gifts and increase the share of eco-friendly giveaways such as organic clothes and sweets instead of classic clothes and sweets, USB flash drives etc.			€	++	*			Number of gifts distributed per type
PU3	Purchases of goods	Paper purchase	Sufficiency	In progress	Top priority	2016	Introduction of a paperless programme	- Adopt paperless programme and paper-use reduction practices: -printing on double-sided paper (already set up by default) - No hard copies unless necessary. - An ID code required to print - E-signature should be extended to more documents. - Control should be extended to copying, starting with a survey of all ECA departments on their copying habits	1.3	3.9	€€	++	**	10% decrease in the number of printed pages	30% decrease in the number of printed pages	Quantity of paper consumed per year
PU4	Purchases of goods	Paper purchase	Sufficiency	To be implemented	Immediate	2016	Promotion of on-line publications and leaflets	Enhance online visibility for publications and leaflets, promote them through alternative systems (such as QR codes) rather than offering printed publications and leaflets in stands	3.5	10.4	€	++	*	10% decrease in the quantity of leaflets and reports	30% decrease in the quantity of leaflets and reports	Number of leaflets and printed publications

Table 19: List of GHG reduction measures related to purchases of goods and services

#	Emission sources	Sub-category emissions sources	Type of action	Action Status	Priority level	Timetable	Action	Description	2020 Target (Savings in tCO_2eq compared to 2014)	2030 Target (Savings in tCO_2eq compared to 2014)	Cost Investment	Return on investment	Technical issue of the implementation	2020 target	2030 target	Key follow-up indicator
WA1	Waste	Food waste	Sufficiency	In progress	Immediate	2017	Adjustment of portion quantities in served meals	Reduction of portion size (calorie content)	1.5	5	€	+	*	-Food waste quantity reduced by 10 %	-Food waste quantity reduced by 30 %	-Quantity of food waste in the kitchen -Quantity of food remaining on served plates
WA2	Waste	Waste water	Efficiency	To be implemented	Strategic	TBD	Installation of water pressure regulators	-Installation of water pressure regulators on taps - Investigate tap sensors for K2	0.1	0.3	€€	++	**	-Water consumption thus waste water quantity reduced by 5%	-Water consumption thus waste water quantity reduced by 10%	-Annual water consumption
FA1	Fixed assets	Official cars	Sufficiency	In progress	Immediate	2016	Increase in the lifespan of official cars	Increase the lifespan of official cars from four to six years	29		€	++	*			

Table 20: List of GHG reduction measures related to waste and fixed assets

8.4 Proposal of action plan to improve data collection

ECA could improve data collection and thus increase the accuracy of the next GHG inventories in coming years. Here below are some proposals for enhancing data collection

#	Emission sources	Type of action	Action Status	Priority level	Timetable	Action	Action Description	Comments
DI1	Transport of persons	Data improvement	To be implemented	Immediate	2016	Improvement of data on staff commuting	Improve commuting figures by: - implementing systematic yearly survey on commuting - requiring each employee to specify his/her commuting habits (transport mode, travelled distance etc.)	
DI2	Transport of persons	Data improvement	To be implemented	Immediate	2016	Improvement of data on visitor travel	Obtain more detailed information on the means of transport used by visitors and their cities of origin by automatically requesting them	Current methodology is based on assumptions made on transport modes depending on country of origin
DI3	Purchases of goods and services	Data improvement	To be implemented	Immediate	2016	Improvement of data on purchased goods and services	Improve data by collecting purchased quantity of goods (in units or kg) instead of using purchase amount (in €)	Current calculation of GHG emissions from purchased goods and services has been estimated on the basis of the purchase amount (in €) of goods and services
DI4	Purchases of goods and services	Data improvement	To be implemented	Immediate	2016	Improvement of data on carbon footprint of meals	Require directly from the catering service provider the carbon footprint of each type of served meal, (since the provider is likely to already calculate carbon footprints of proposed meals)	Current methodology is based on the number and type of served meals assigning them average emission factors
DI5	Fixed assets	Data improvement	To be implemented	Immediate	2016	Improvement of data on kitchen and building assets	Improve kitchen and buildings assets data by collecting the weight of these assets. Thus, for next purchases, ask the contractors what are the exact weights of furniture are and what are the types of material (wood, steel etc.) used	
DI6	Transport of goods	Data improvement	To be implemented	Immediate	2016	Improvement of goods transportation statistics	Upgrade transport statistics by requiring third parties to provide complete transportation information thanks to tender specification updates such as: - Real origin of goods - Travelled distance - Means of transport	- The current GHG inventory is under-valued since only the last travel segment is taken into account. - The current GHG calculation generates approximate results since there is no information on travelled distances and the means of transport of purchased goods
DI7	Non-energy in-house	Data improvement	To be implemented	Immediate	2016	Improvement of data on cooling fluids	Require your technical equipment provider to automatically include the quantity of any potential cooling fluid refills as well as each type of cooling fluid in yearly technical and maintenance reports	Current GHG calculation generates approximate results because the methodology used is based on the power capacity of cooling system and the type of cooling fluids
DI8	Energy in-house	Data improvement	To be implemented	Immediate	2016	Improvement of data on fuel purchases	Improve data on fuel consumption by: - Requiring your provider to provide details of fuel refills of the tanks separately for each building - tracking the tank fuel level at least at each tank refill with clear information on the date and volume	

Table 21: Measures related to data improvement

9 Offsetting proposals

Carbon offsetting is a mechanism whereby individuals or organizations compensate for their own GHG emissions or for a part of them by paying for an equivalent GHG saving made elsewhere in the world, e.g. emissions savings made through wind farms that replace coal-fired power plants. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been emitted in the absence of the mitigation project that generates the offsets.

As said before, a GHG target should, as a priority, be achieved by mitigation inside the ECA before even considering additional offsetting mechanisms that reduce emissions (or enhance emissions sinks) somewhere else and at a subsequent time.

When reporting on the target, it should be specified whether offsets are used and how much of the target reduction was achieved by using them.

9.1 Current carbon offsetting framework

There are currently no generally accepted methods for quantifying GHG offsets. The uncertainties that surround GHG project accounting make it difficult to establish when an offset is equivalent in magnitude to the internal emissions it is offsetting. This is why companies should always report their own internal emissions in separate accounts from offsets used to meet the target, rather than providing a net figure.

It is also important to carefully assess the credibility of offsets used to meet a target and to specify the origin and nature of the offsets when reporting. Information needed includes:

- ✓ *The type of project*
- ✓ *Geographic and organizational origin*
- ✓ *How offsets have been quantified*
- ✓ *Whether they have been recognized by external programs (Clean Development Mechanism (CDM), Joint Implementation JI, etc.) which are recognized by the United Nations Framework Convention on Climate Change (UNFCCC) in the Kyoto Protocol and are also used by the EU Emission Trading Scheme (EU ETS).*

Additionally, it is important to check that offsets have not also been counted towards another organization's GHG target. This might involve a contract between the buyer and seller that transfers ownership of the offset.[13]

9.2 Alternative proposal

Rather than establishing its own carbon offsetting strategy alone, we recommend that the European Court of Auditors should promote the creation of a strong ambitious collective strategy for all EU institutions and bodies.

It makes sense that all EU institutions join forces together to invest in and support reliable and sustainable projects**, located in Europe**. Such a strong collective carbon offsetting strategy

[13] World Resources Institute and World Business Council for Sustainable Development. The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard: revised edition 2004.

would contribute towards the achievement of the overall EU 40% GHG emissions-saving targets for 2030 and beyond, increasing European leadership in the fight against climate change.

10 Final remarks

In 2015, the ECA undertook its first CF calculation in accordance with its environmental policy, which was adopted in 2014 and included a commitment to continuously improve its environmental performance. Among other things, the ECA environmental policy also mentions measures for reducing carbon dioxide emissions.

The CF footprint inventory and reduction plan relates to the year 2014, which was selected as the baseline year against which future yearly inventories would be compared. Overall GHG emissions amounted to 8 930 tCO_2eq.

The following main sources contribute greatly towards the ECA's overall GHG emissions (all together responsible for more than 95%): Transport of persons (46%), fixed assets (26%) and the supply of goods and services (23%).

While mitigation measures are not easy to set out for fixed assets and the supply of goods and services, they are more relevant if implemented together with a shift or reduction in the transport of persons. Indeed, the following mitigation measures related to staff commuting and business trips are very significant in terms of GHG savings:

- ✓ Firstly, the implementation of **an ambitious teleworking programme** could save more than 378 tCO_2eq per year if all employees teleworked at least one day a week. If all employees teleworked at least three days a week, the carbon footprint for commuting could be reduced by 1 082 tCO_2eq per year (12% savings).
- ✓ Next, the **promotion of videoconferencing** for reducing staff and visitor travel could save up to 106 tCO_2eq by 2020, and up to 211 tCO_2eq by 2030 (2% savings).
- ✓ Finally, the continuation and **reinforcement of the promotion of sustainable means of transport** for commuters, such as bicycles, public transport and, most of all, car-pooling would contribute by saving 170 tCO_2eq (if 10% of commuting trips by car were replaced by carpooling trips), meaning 2% additional savings.

As seen during this CF period, it is challenging to identify mitigation actions to achieve GHG savings. To go beyond 20% GHG savings, incremental change will not be sufficient. If the ECA wants to achieve more ambitious targets in the future, it will have to make **ambitious changes** to its work organisation, the transportation of persons, and the quantity and type of purchased goods and service.

Besides the implementation of the reduction plan, follow-up on progress and year-on-year comparisons are fundamental and will only be achieved if the ECA frequently recalculates its carbon footprint. Now that a CF calculation has been performed once, the next CF procedures should be facilitated by data collection based on the use of template spreadsheets with a single format.

11 Acronyms

ADEME: French Agency for Environmental and Energy Management

CDM: Clean Development Mechanism

CF: Carbon Footprint

CO_2: Carbon dioxide

ECA: European Court of Auditors

EMAS: Environmental management and audit scheme

EU: European Union

EU ETS: EU Emission Trading Scheme

FTE: Full-Time Equivalent

GHG: Greenhouse gas

IPCC: Intergovernmental Panel on Climate Change

ISO: International Organization for Standardization

IT: Information Technology

JI: Joint Implementation

LEO: Luxembourg Energy Office

kgCO_2eq: kg of CO_2 equivalent

tCO_2eq: tonne of CO_2 equivalent

UNFCCC: United Nations Framework Convention on Climate Change

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13 Annexes

13.1 Activity data and emissions factors used per emissions sources

13.1.1 Energy in-house: Data, methodology and assumptions

Scope	Building	Data type	Data value in 2014	Data unit	Assumptions	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 2	K1	Purchased electricity from LEO	1 314 359	kWh		0.004	$kgCO_2eq/kWh$	Bilan Carbone® tool	**5.3**	2.6
Scope 2	K1	Electricity loss	118 292	kWh	Electricity losses = by default 9% of overall electricity consumption	-	-	-	**0.5**	
Scope 2	K2	Purchased electricity from LEO	1 217 005	kWh		0.004	$kgCO_2eq/kWh$	Bilan Carbone® tool	**4.9**	2.4
Scope 2	K2	Electricity loss	109 530	kWh	Electricity losses = by default 9% of overall electricity consumption	-	-	-	**0.5**	
Scope 2	K3	Purchased electricity from LEO	2 492 667	kWh		0.004	$kgCO_2eq/kWh$	Bilan Carbone® tool	**10.0**	5.0
Scope 2	K3	Electricity loss	224 340	kWh	Electricity losses = by default 9% of overall electricity consumption	-	-	-	**0.9**	
Scope 2	K1	Heat from district network	1 058 950	kWh		43	gCO_2eq/kWh	energetique@vdl.lu	**50.1**	15.1
Scope 2	K2	Heat from district network	1 374 270	kWh		43	gCO_2eq/kWh	energetique@vdl.lu	**65.0**	19.5
Scope 2	K3	Heat from district network	1 329 660	kWh		43	gCO_2eq/kWh	energetique@vdl.lu	**62.9**	18.9
Scope 1	K1	Fuel for power generator	1 133	litre	Data estimated from fuel level survey of each building tank in 2015	3.189	$kgCO_2eq/litre$	Bilan Carbone® tool	**3.6**	0.9
Scope 1	K2	Fuel for power generator	427	litre	Data estimated from fuel level survey of each building tank in 2015	3.189	$kgCO_2eq/litre$	Bilan Carbone® tool	**1.4**	0.3
Scope 1	K3	Fuel for power generator	1 600	litre	Data estimated from fuel level survey of each building tank in 2015	3.189	$kgCO_2eq/litre$	Bilan Carbone® tool	**5.1**	1.3

Table 22: Energy consumptions data, assumptions, method and results

13.1.2 Non-energy in-house: Data, methodology and assumptions

Scope	Building	Data type	Type	Data value in 2014	Data units	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 1	K1	Cooling system	R134a	0.013	tonne	1 550	$kgCO_2eq$ per tonne	Bilan Carbone® tool	20.6	8.8
Scope 1	K2	Cooling system	R407C	0.011	tonne	1 550			17.2	7.3
Scope 1	K3	Kitchen refrigeration	R404A	0.00001	tonne	1 550			0.01	0.0
Scope 1	K3	Air conditioning	R134a	0.036	tonne	4 550			162.9	69.1
Scope 1	K3	Kitchen refrigeration	R134a	0.0001	tonne	4 550			0.4	0.2

Table 23: Non-energy consumptions data, assumptions, method and results

The method used for calculating GHG emissions from refrigerant gas leakage is based on the type of gas used and on the power capacity of each air conditioning and cooling system from which a quantity of cooling gas leakage is estimated.

The most exact way to log these leaks would be to determine the weight of cooling fluid which has been refilled into the appliances over the year. As this data was not available in 2014 for the ECA, we estimated these leaks by using more easily accessible data such as the cooling capacity (or charge of refrigerating power) of each appliance.

13.1.3 Supply of goods and services provided by third parties: Data, methodology and assumptions

There are various approaches for estimating the GHG emissions related to the purchase of goods and services:

- ✓ Where the quantity (in tons or units) of purchased goods is available, a method based on purchased quantity and type of material can be used (This is the most accurate method);
- ✓ Where only the purchase value of goods is available, an approximate method based on the purchase amount can be used.

Both approaches were used with regard to data availability on purchased goods and services.

Gifts

From the number of distributed gifts in 2014, we estimated the tonnage of materials indirectly used by the ECA (paper, cotton, plastics, etc.). To do so, we made assumption on the types of material that composed gifts and giveaways and on the weight of each item.

Journal, leaflets and reports

Regarding the purchase of paper required to print the journal, leaflets and reports, we estimated the overall weight of paper consumed by the ECA from the number of printed pages for each of the three documents. This number is tracked by the ECA. However, we had to make two assumptions:

- ✓ The weight of a single paper sheet
- ✓ Two-sided printing for all documents.

Printed paper

From the number of all other printed pages, we estimated the overall weight of printed-paper with the following assumptions:

- ✓ The weight of a single paper sheet
- ✓ 75% of pages were two-sided printed
- ✓ 97% of paper was recycled paper

Scope	Building	Data type	Emissions sources (items)	Type (in Bilan Carbone® tool)	Data value in 2014	Data units	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 3	K1, K2, K3	Gadgets in paper	Inputs	Paper	0.780	tonne	919	$kgCO_2eq$ per tonne	Bilan Carbone® tool	0.7	0.2
Scope 3	K1, K2, K3	Gadget in sugar	Inputs	Sugar	0.030	tonne	733	$kgCO_2eq$ per tonne	Bilan Carbone® tool	0.0	0.0
Scope 3	K1, K2, K3	Gadgets in plastic	Inputs	Plastic - average	0.089	tonne	2 380	$kgCO_2eq$ per tonne	Bilan Carbone® tool	0.2	0.0
Scope 3	K1, K2, K3	Gifts and gadgets in cotton	Inputs	Cotton	0.293	tonne	26 100	$kgCO_2eq$ per tonne	Factor-X calculation	7.7	3.9
Scope 3	K1, K2, K3	Gifts and gadgets in metal	Inputs	Other common metals – average	0.483	tonne	3 670	$kgCO_2eq$ per tonne	Bilan Carbone® tool	1.8	1.4
Scope 3	K1, K2, K3	Gifts in synthetic textile	Inputs	Synthetic textile	0.007	tonne	39 400	$kgCO_2eq$ per tonne	Factor-X calculation	0.3	0.1
Scope 3	K1, K2, K3	ECA Journal publication	Inputs	Paper	1.10	tonne	919	$kgCO_2eq$ per tonne	Bilan Carbone® tool	1.0	0.2
Scope 3	K1, K2, K3	Leaflets publication	Inputs	Paper	7.90	tonne	919	$kgCO_2eq$ per tonne	Bilan Carbone® tool	7.3	1.6
Scope 3	K1, K2, K3	Reports publication	Inputs	Paper	16.55	tonne	919	$kgCO_2eq$ per tonne	Bilan Carbone® tool	15.2	3.4
Scope 3	K1, K2, K3	Printed pages	Inputs	Recycled paper	26.29	tonne	470	$kgCO_2eq$ per tonne	Bilan Carbone® tool	12.4	2.8
Scope 3	K1, K2, K3	Printed pages	Inputs	Paper	0.81	tonne	919	$kgCO_2eq$ per tonne	Bilan Carbone® tool	0.7	0.2

Table 24: Data on gifts, giveaways and paper, assumptions, method and results

Meals

From the proportion of organic meals (15.87%) and total number of served meals (89 728) communicated by the ECA, we set the following assumptions in agreement with the project steering committee:

- ✓ Typical meals with chicken: 22%
- ✓ Typical meals with beef: 22%
- ✓ Typical meals with pork: 22%
- ✓ Fish meals: 15%
- ✓ Vegetarian meals: 3.13 %

Scope	Building	Data type	Emissions sources (items)	Type (in Bilan Carbone® tool	Data value in 2014	Data units	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 3	K1, K2, K3	Organic meals	Inputs	Organic meals	14 239	units	0.908	$kgCO_2eq$ per meal	Factor-X calculation	12.9	6.6
Scope 3	K1, K2, K3	Typical meals (with chicken)	Inputs	Typical meal (with chicken)	19 740	units	1.1	$kgCO_2eq$ per meal	Bilan Carbone® tool	21.7	11.1
Scope 3	K1, K2, K3	Typical meals (with beef)	Inputs	Typical meal (with beef)	19 740	units	4.51	$kgCO_2eq$ per meal	Bilan Carbone® tool	89.0	45.4
Scope 3	K1, K2, K3	Typical meals (with pork)	Inputs	Typical meal (with pork)	19 740	units	1.93	$kgCO_2eq$ per meal	Bilan Carbone® tool	38.0	19.4
Scope 3	K1, K2, K3	Fish meals	Inputs	Fish / Rice / Tomato meal	13 459	units	0.47	$kgCO_2eq$ per meal	Bilan Carbone® tool	6.3	3.2
Scope 3	K1, K2, K3	Vegetarian meals	Inputs	Vegetarian meals	2 808	units	0.44	$kgCO_2eq$ per meal	Bilan Carbone® tool	1.2	0.6

Table 25: Data on meals, assumptions, method and results

Other purchased goods

Without any available information on the purchased quantity of goods in terms of weight, the methodology used is based on the purchase value of the goods. Two emissions factors can be applied to estimate the amount of GHG emitted by each purchase, depending on the type of goods. These two emissions factors are:

- ✓ 917 $kgCO_2eq$ per k€ for computer and office equipment
- ✓ 367 $kgCO_2eq$ per k€ for office consumables

Services

Similarly, purchased services provided by third parties were also considered by applying the three following emission factors to each purchase value:

- ✓ 37 $kgCO_2eq$ per k€ for services with a low equipment level
- ✓ 110 $kgCO_2eq$ per k€ for services with high equipment level
- ✓ 830 $kgCO_2eq$ per k€ for insurances and pension services[14]

[14] Impacts on global warming by the insurance sector and the financial sector is high as any investment in these sectors directly finances the high carbon economy unless the pension funds or insurance funds in which the ECA invests have been selected according to criteria encouraging investment in the low carbon economy.

13.1.4 Fixed assets: Data, methodology and assumptions

Buildings and car parks

The calculation method is based on the surface of buildings and car parks. The depreciation period taken for buildings was a period of 40 years.

IT

Regarding IT appliances, data were available on the number of IT devices broken down by category and per building. The following emission factors were applied to each type of device:

IT small accessories	30	$kgCO_2eq$. per unit
Video projector	30	$kgCO_2eq$. per unit
Central unit	513	$kgCO_2eq$. per unit
Copying equipment	2 940	$kgCO_2eq$. per unit
Desktop telephone	30	$kgCO_2eq$. per unit
Fax machine/scanner	1 470	$kgCO_2eq$. per unit
Smartphone/palmtop computer/GPS	30	$kgCO_2eq$. per unit
Monitors	767	$kgCO_2eq$. per unit
Network eq. & server	60	$kgCO_2eq$. per unit
Portable computer	1 280	$kgCO_2eq$. per unit
Printer	110	$kgCO_2eq$. per unit

Table 26: Emission factors of IT appliances

The depreciation period for IT devices is an average of 4 years.

Vehicles

From the number and estimated weight of each of the 31 vehicles, GHG emissions were calculated by applying an emission factor of 5 500 $kgCO_2eq$ per tonne of vehicle. The depreciation period was 4 years.

Kitchen assets

Data on the number and weight of the items of furniture and machines in the kitchen are available. Where missing, the weights of the furniture and machines were estimated.

For kitchen assets, the depreciation period considered was 8 years and the emission factors applied were the following:

Machine	3 670	$kgCO_2eq$ per tonne
Furniture	1 833	$kgCO_2eq$ per tonne

Building assets

Owing to the large quantity of building assets, the method used was based on the purchased (acquisition) value of assets rather than their respective number and weight.

As for kitchen assets, the depreciation period considered was also 8 years and the emission factors applied were the following:

Furniture	623	$kgCO_2eq$ per k€
IT	917	$kgCO_2eq$ per k€
Machines	1 223	$kgCO_2eq$ per k€
Tooling	734	$kgCO_2eq$ per k€

Other assets

Some other assets were also considered for the carbon footprint calculation such as:

	Depreciation period	Emission factor	
Generator	20 years	3 670	$kgCO_2eq$ per ton
Print shop machines	8 years	3 670	$kgCO_2eq$ per ton
Private fridges	8 years	3 670	$kgCO_2eq$ per ton

13.1.5 Transport of supplies: Data and assumptions

From the following data:

- ✓ Vendor's contact address (in order to obtain a certain travel distance)
- ✓ 2014 specific contracts/purchase order value (in order to estimate the quantity of supplies transported)

And by the use of the following assumptions:

- ✓ Ratio €/kg for each type of supply
- ✓ Type of transport = 7.5T truck for miscellaneous goods

We are then able, for each type of supply, to transform an order value into a certain quantity transported (in tonnes) over a certain distance (in km). The GHG calculation methodology is based on this figure (tonne*km).

Only the last travel segment has been considered due to the lack of available data. The allocation rule between each building is based on the number of occupants in each building.

13.1.6 Transport of persons: Data, methodology and assumptions

Scope	Building	Data type	Type (in Bilan Carbone® tool) / Emissions factors	Data value in 2014	Data units	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 3	K1,K2,K3	Business travel - other mean	Bus, >250 000 inhabitants district	109 922	person.km	0.154	$kgCO_2eq$ per person.km	Bilan Carbone® tool	16.9	8.4
Scope 3	K1,K2,K3	Business travel - plane	Plane, 180-250 seats, 2 000-3 000 km	4 332 818	person.km	0.209			906.1	293.3
Scope 3	K1,K2,K3	Business travel – boat	Ferry by day, France	1 397	person.km	0.979			1.4	0.7
Scope 3	K1,K2,K3	Business travel - train	Train, Luxembourg	748 937	person.km	0.0397			29.7	6.0
Scope 3	K1,K2,K3	Business travel - rented cars	Car, City-highway driving	101 178	person.km	0.325			32.9	3.6
Scope 3	K1	Business travel - official cars	Car, Diesel fuel	56 418	litres	3.166	$kgCO_2eq$ per litre		178.6	7.9
Scope 3	K1,K2,K3	Business travel - private cars	Car, City-highway driving	385 828	person.km	0.325	$kgCO_2eq$ per person.km		125.6	13.6
Scope 3	K1,K2,K3	Visitors – bus	Bus, >250 000 inhabitants district	952 383	person.km	0.154			146.8	81.1
Scope 3	K1,K2,K3	Visitors – car	Car, City-highway driving	273 335	vehicles.km	0.325			89.0	23.0
Scope 3	K1,K2,K3	Visitors - short haul aircraft	Plane, 180-250 seats, 2 000-3 000 km	788 506	person.km	0.209			164.9	62.2
Scope 3	K1,K2,K3	Visitors - long haul aircraft	Plane, >250 seats, >11 000 km	1 818 000	person.km	0.223			405.9	153.1
Scope 3	K1,K2,K3	Visitors - train	Train, Luxembourg	416 144	person.km	0.0397			16.5	6.0
Scope 3	K1,K2,K3	Occupants Commuting - official car	Car, Diesel fuel	4 508	litre	3.166	$kgCO_2eq$ per litre		14.3	3.6
Scope 3	K1,K2,K3	Occupants Commuting - car (from survey)	Car, urban suburb	5 225 515	vehicles.km	0.325			1 700.6	439.9
Scope 3	K1,K2,K3	Occupants Commuting - car pooling (from survey)	Car, urban suburb	183 057	vehicles.km	0.325			59.6	15.4
Scope 3	K1,K2,K3	Occupants Commuting – train (from survey)	Train, Luxembourg	548 537	person.km	0.0397	$kgCO_2eq$ per person.km		21.8	7.9
Scope 3	K1,K2,K3	Occupants Commuting - bus (from survey)	Bus, >250 000 inhabitants district	1 118 475	person.km	0.154			172.4	95.3
Scope 3	K1,K2,K3	Occupants Commuting - motorbike (from survey)	Motorcycle, power >750 cm^3	18 962	vehicles.km	0.476			4.5	2.2

Table 27: Data on transport of persons, assumptions, method and results

Official cars

The GHG emissions calculation for official car fuel consumption is based on the consumed quantity of diesel (60 927 litres for 31 cars in 2014).

The average consumption is 7.5 l/100 km, while the average distance travelled by car is 25 958 km.

Business travel

With respect to business travel, the calculation is based on travelled kilometres as shown in the statistics for the trip. An assumption has been on the basis of the "other" category, which has been associated with bus transport.

Transport means	Km
Other	109 922
Plane	4 332 818
Boat	1 397
Train	748 937
Rented cars	101 178
Official cars	745 166
Private cars	385 828
TOTAL	**6 425 246**

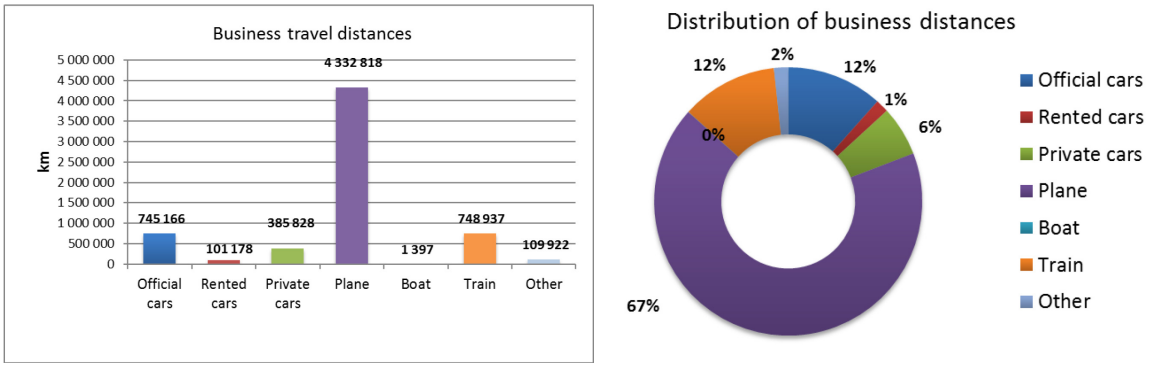

Figure 25: Distribution of travelled distances for business travel

Most of the business travel distances are by plane (67%) amounting to 4 332 818 kilometres travelled.

Commuting

For commuting by ECA staff between home and the ECA's HQ in Luxembourg, the distances travelled were extrapolated from a 2015 survey of nearly half the staff (506 participants). The following assumptions were used:

- ✓ 200 working days
- ✓ 2 persons per car when carpooling

The survey's results were:

- ✓ More than 7 millions km were covered in one year
- ✓ 70% of the overall distance were travelled by car
- ✓ Buses accounted for 15% of the distance travelled
- ✓ Trains accounted for 7% of the distance travelled
- ✓ Car-poolers accounted for only 5% of the overall distance covered

	One year return trip			
Transportation means	Km	persons.km	vehicles.km	
Car	5 225 515	5 225 515	5 225 515	70%
Carpooling	366 114	366 114	183 057	5%
Train	548 537	548 537		7%
Bus	1 118 475	1 118 475		15%
Motorbike	18 962	18 962	18 962	0%
Bicycle	72 269	72 269		1%
Foot	92 309	92 309		1%
TOTAL	**7 442 181**	**7 442 181**		

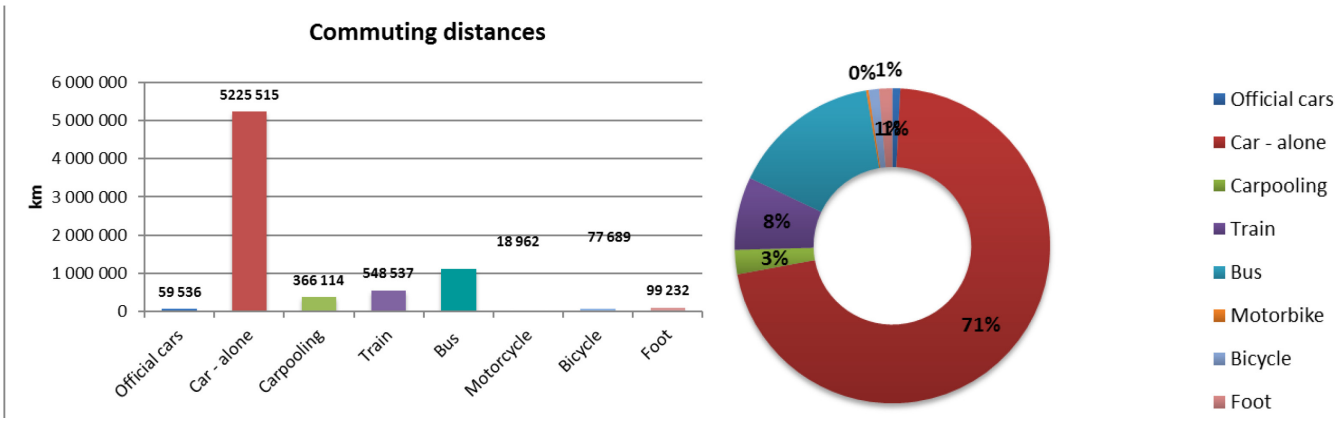

Figure 26: Distribution of travelled distances for commuting

Visitors travel

In 2014, the ECA received 2 617 official visitors with known countries of origin. Based on their countries of origin, assumptions are made on their mode of transport:

- ✓ Short-haul aircraft for visitors from AT / EL / ES / FI / HU / IT / LT / PL / SL / SV / UK / Serbia;
- ✓ Long-haul aircraft for visitors from BRAZIL / CHINA / US / SOUTH KOREA / INDONESIA / RUSSIA;
- ✓ Car for visitors from BE / LU;
- ✓ Bus for visitors from CZ / DE / NL;
- ✓ Train for visitors from FR.

The distance between the countries of origin and Luxembourg was assessed by considering the distance between the centre of the foreign country and Luxembourg.

According to these data, most kilometres were travelled by air (62% for short and long-haul aircraft combined).

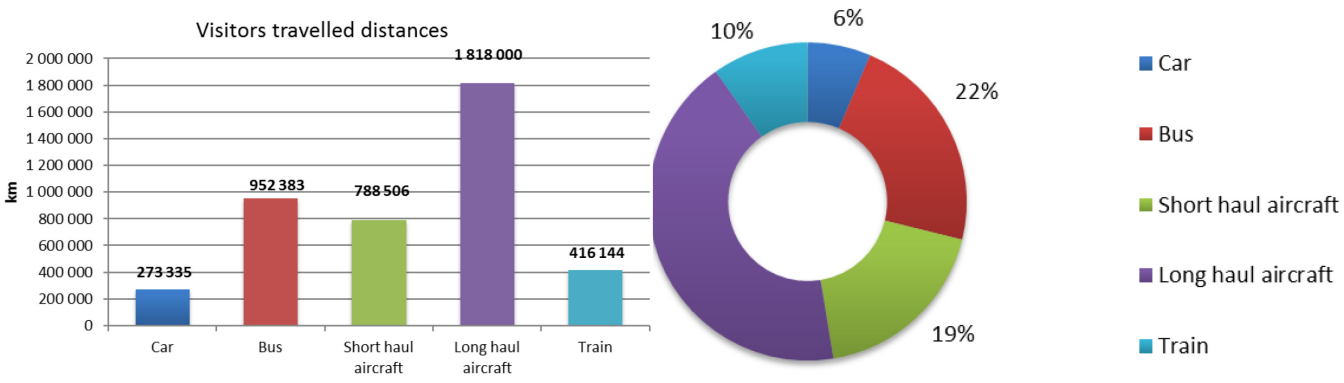

Figure 27: Distribution of travelled distances for visitors

13.1.7 Direct waste and sewage disposal: Data, methodology and assumptions

Scope	Building	Data type	Emissions sources (items)	Type (in Bilan Carbone® tool) / Emissions factors	Data value in 2014	Data units	Emission factor	Emission factor unit	Emission factor source	CO_2 emissions (in $tCO_2eq.$)	Results uncertainties (in $tCO_2eq.$)
Scope 3	K1, K2, K3	Batteries and accumulators	Direct waste	Other common metals - average	0.068	tonne	33			0.002	0.0
Scope 3	K1, K2, K3	Paper and cardboard	Direct waste	Paper	68	tonne	33			2.2	1.1
Scope 3	K1, K2, K3	Food waste	Direct waste	Organic / food waste	18	tonne	48			0.9	0.4
Scope 3	K1, K2, K3	Household and similar waste	Direct waste	Average household waste	40	tonne	363			14.6	5.8
Scope 3	K1, K2, K3	Scrap	Direct waste	Other common metals - average	0.03	tonne	33			0.001	0.0
Scope 3	K1, K2, K3	Light and fluorescent tube	Direct waste	Special Industrial Waste - Stabilization and storage	0.18	tonne	128			0.02	0.0
Scope 3	K1, K2, K3	Plastics waste (including packaging)	Direct waste	Plastic – average	0.34	tonne	33	$kgCO_2e$ per ton		0.01	0.0
Scope 3	K1, K2, K3	Glass packaging waste	Direct waste	Flask glass – average	3.2	tonne	33		Bilan Carbone ® tool	0.1	0.1
Scope 3	K1, K2, K3	Packaging waste with harmful products	Direct waste	Special Industrial Waste – Incineration	0.10	tonne	711			0.1	0.0
Scope 3	K1, K2, K3	Various packaging waste	Direct waste	Plastic – average	4.36	tonne	33			0.1	0.1
Scope 3	K1, K2, K3	Waste electrical and electronic equipment	Direct waste	Special Industrial Waste - Stabilization and storage	0.09	tonne	128			0.01	0.0
Scope 3	K1, K2, K3	Food fats and oils	Direct waste	Special Industrial Waste – Incineration	18	tonne	711			12.8	6.5
Scope 3	K1	Waste water	Direct waste	Sewage discharged in the network (without infrastructure)	1 815	m3	0.26			0.5	0.2
Scope 3	K2	Waste water	Direct waste	Sewage discharged in the network (without infrastructure)	2 774	m3	0.26	$kgCO_2e$/ m3		0.7	0.3
Scope 3	K3	Waste water	Direct waste	Sewage discharged in the network (without infrastructure)	5 008	m3	0.26			1.3	0.5

Table 28: Data on waste, assumptions, method and results

Waste

Emission factors applied to each type of waste are as follows:

✓	Recycled material	33	$kgCO_2eq$ per tonne
✓	Incinerated food waste	48	$kgCO_2eq$ per tonne
✓	Stored electrical and electronic equipment	128	$kgCO_2eq$ per tonne
✓	Incinerated household waste	363	$kgCO_2eq$ per tonne
✓	Incinerated waste with harmful products/food fats and oil	711	$kgCO_2eq$ per tonne
✓	Wastewater	0.263	$kgCO_2eq$ per m^3

13.2 Benchmark analysis with other EU institutions

This benchmark originates from the ECA special report published in 2014 entitled: “How do the EU institutions and bodies calculate, reduce and offset their greenhouse gas emissions?”

Below, you will find some of the conclusions from this special report:

- ✓ *Six of the 15 EU institutions and bodies audited did not report their emissions in 2012 and those doing so did not calculate or disclose the full extent of these emissions.*
- ✓ *Evidence that emissions caused by EU institutions and bodies as a whole have been falling exists only for energy consumption in buildings. Data available on other emissions, notably those caused by mobility, do not allow a clear trend to be identified.*
- ✓ *The overall reductions achieved so far are largely attributable to the purchase of electricity generated from renewable sources.*
- ✓ *Green procurement is treated as an option rather than an obligation and only a few institutions and bodies used it systematically.*

CO2e emissions reporting related to 2012

Legend:
● Covered
(●) Covered by an estimate
○ Partly covered
x Not covered
N/A Not available

	European Parliament	Court of Justice	European Investment Bank	European Central Bank	Office for Harmonization in the Internal Market	European Environment Agency	European Commission	The Committees (EESC and CoR)	European Council and Council of the EU	European Court of Auditors 2014	European External Action Service	European Aviation Safety Agency	European Medicines Agency
Emissions in 2012 (tonnes of CO_2e)	91 893	18 801	16 441	17 793	2 145	704	42 911	1 066	N/A	8 930	N/A	N/A	N/A
REPORTING SCOPE includes emissions from:													
Energy consumed in buildings	●	●	●	●	●	○[1]	○[2]	○[2]	x	●	x	x	x
Leakage of refrigerant gases	●	●	x	●	x	x	x	x	x	●	x	x	x
Transport of goods	●	(●)	x	x	x	x	x	x	x	○	x	x	x
Transport of persons													
Commuting	●	●	●	x	x	x	x	x	x	●	x	x	x
Business travel	○[3]	●	●	●	●	●	○[4]	x	x	●	x	x	x
Visitors	●	●	x	●	x	●	x	x	x	●	x	x	x
Purchase of supplies and services	●	(●)	○[5]	○[5]	x	x	x	x	x	●	x	x	x
Waste	●	●	●	x	x	x	x	x	x	●	x	x	x
Fixed assets[6]													
Construction of buildings	●	(●)	x	x	x	x	x	x	x	●	x	x	x
Office furniture	●	(●)	x	x	x	x	x	x	x	●	x	x	x
IT equipment	●	(●)	x	x	x	x	x	x	x	●	x	x	x
Other equipment	●	(●)	x	x	x	x	x	x	x	●	x	x	x
tCO2eq. emissions per staff	13.7	9.6	7.5	12.3	2.8	5.2	1.7	0.8		8.8			44

Table 29: Benchmark analysis with other EU institutions

It is essential to bear in mind that a comparison of GHG emissions among different institutions is a complex analysis as the scope, methodology and assumptions differ. Nevertheless, in comparison with the European Parliament and Court of Justice, GHG emissions per employee appear to be lower (8.8 tCO2eq per staff member as compared with 13.7 and 9.6 respectively).