ecoact

Bilan Carbone® 2017

Calculating the ECA's carbon footprint using the Bilan Carbone® method

October 2018

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Agenda

1. Context of the study
2. Overview of the Bilan Carbone® method
3. Overall results
4. Results per scope
5. Recommendations

Context of the study

- In 2013, the ECA launched the **eco-management and audit scheme**, or **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.
- In order to design measures to reduce its greenhouse gas (GHG) emissions, the Court first examined its GHG emissions in **2014, 2015 and 2016 using the Bilan Carbone® methodology.**
- This initial carbon footprint helped the ECA identify its main emission sources and appropriate reduction measures.
- **The ECA is committed to monitoring and reporting these emissions each year to track its progress in reducing GHG emissions.**

Overview of the Bilan Carbone® method

- The Bilan Carbone® method was developed in 2004 by the French Environment and Energy Management Agency, ADEME, to quantify organisations' GHG emissions. It is promoted by the Association Bilan Carbone (ABC).

- **The method considers the following gases:**
  - ✓ Kyoto Protocol gases: CO2, CH4, N2O, SF6 hydrofluorocarbons (CnHmFp), perfluorocarbons (CnF2n+2), NF3
  - ✓ Other non-Kyoto Protocol gases (CFCs)
  - ✓ Water vapour emitted by planes at the stratospheric level

Since directly measuring GHG emissions is not feasible, the Bilan Carbone® method estimates GHG emissions by multiplying data on an organisation's activity by an emission factor (EF).

Data (unit) × Emission factors (tCO_2e/unit) = GHG emissions (tCO_2e)

Bilan Carbone® : a decision-making tool

1 Collect activity data

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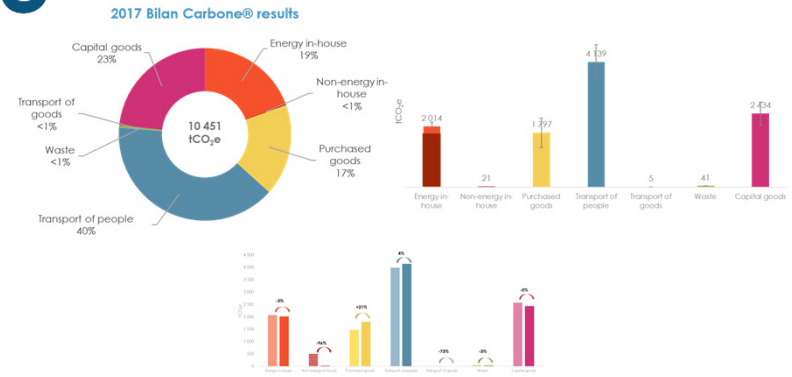
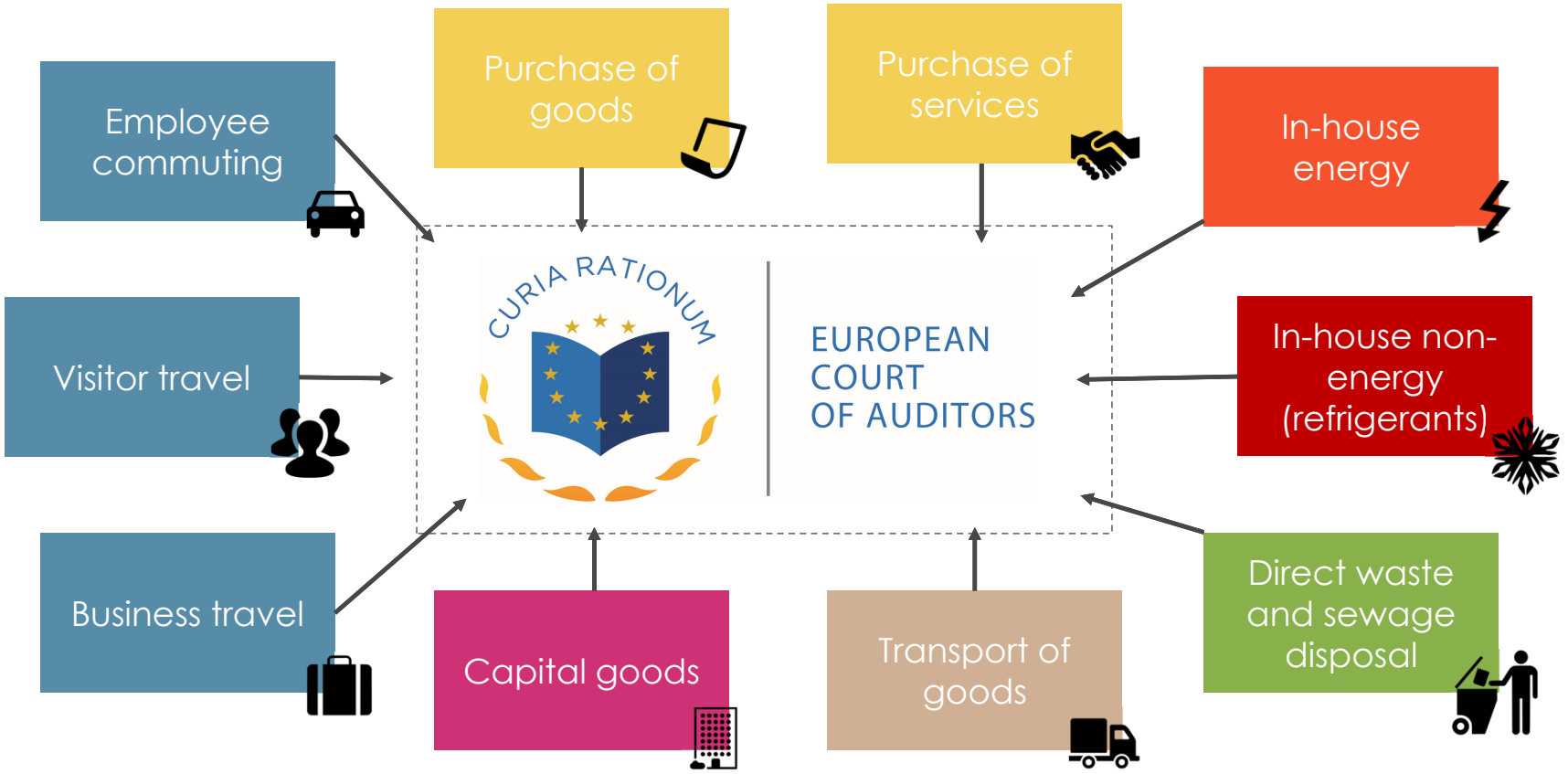
2 Apply the emission factors from the Bilan Carbone® database *(version 8)*

Data (unit) × Emission factors (tCO_2e/unit) = GHG emissions (tCO_2e)

3 Visualise and analyse the results



Operational scope of the 2017 Bilan Carbone® method



The ECA's footprint exercise includes direct and indirect GHG emissions (Bilan Carbone® scopes 1, 2 and 3).

Temporal and organisational boundaries

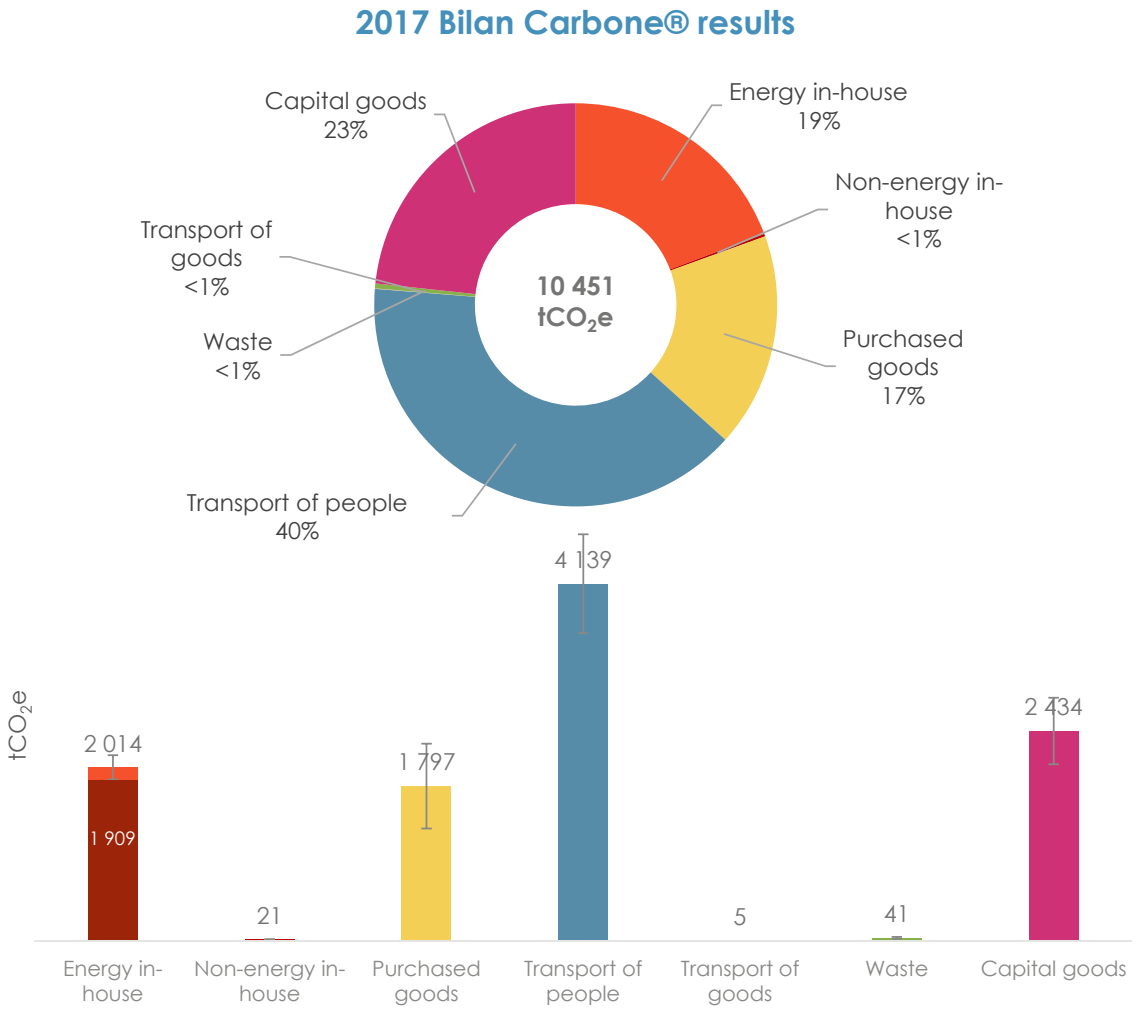
- **Bilan Carbone® approach:** operational control approach
- **Temporal scope:** ECA activities in 2017
- **Organisational scope:**
  - ✓ Three buildings in Luxembourg
    - **K1**: 23 419 m^2, 309 employees
    - **K2**: 18 618 m^2 , 245 employees
    - **K3**: 28 240 m^2 , 474 employees
    - These buildings include basements, underground car parks, two cafeterias and a canteen, archives and a library, walkways between buildings, among other amenities.
  - ✓ Activities of ECA officials and other employees
    - At the end of 2017, there were **923.75** full-time equivalent employees.

ECA buildings

Overall results for 2017

- Total GHG emissions were 10 451 tCO_2e.
- The largest sources of emissions for the 2017 Bilan Carbone® were:
  - ✓ Transport of people (40%)
  - ✓ Capital goods (23%)
  - ✓ In-house energy (19%)
  - ✓ Purchased goods (17%)
- In-house non-energy, waste and transport of goods made up the remaining 1%.

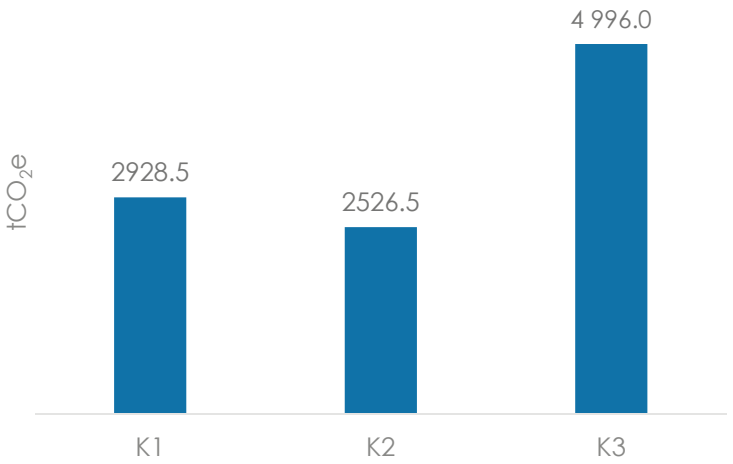
Total uncertainties
858 tCO2e (8%)



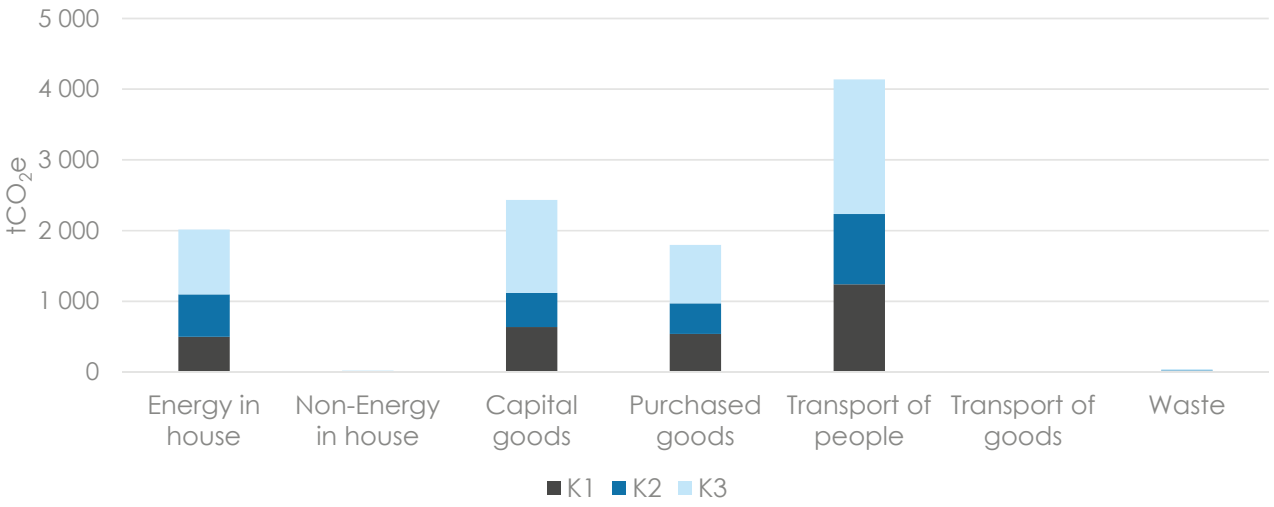
Emission results by building

- Emissions were divided between the buildings according to staff headcount in each building.
- Unsurprisingly, then, since K3 houses the most employees, it has the largest share of emissions.

Total GHG emissions by building

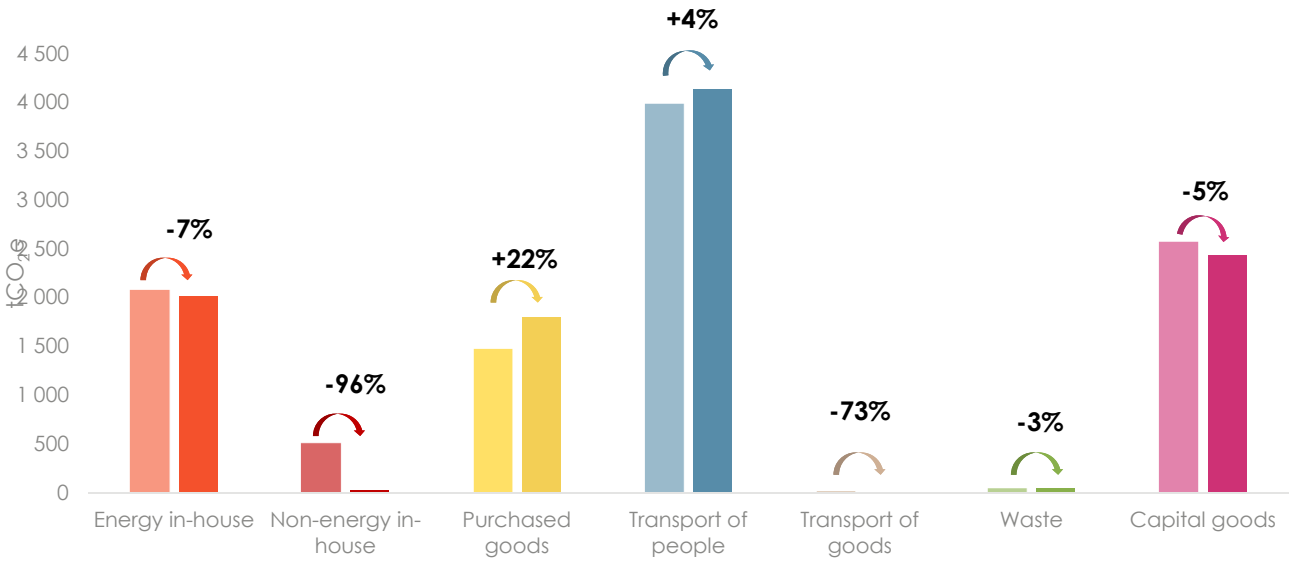


Emission categories by building



Building	# of employees	Share (%)
K1	309	30%
K2	245	24%
K3	474	46%
Total	**1 028**	**100%**

Bilan Carbone® comparison between 2016 and 2017



Overall, emissions decreased by 3% between 2016 and 2017

	2016	2017
tCO2e per FTE	11.6	11.3
FTE	923.70	923.75

Emission sources tCO2e	2016	2017	Variation 2016-2017	
In-house energy	2 165.8	2 014.2	-7%	↓
In-house non-energy	507.0	20.8	-96%	↓
Purchased goods	1 467.9	1 797.3	+22%	↑
Transport of people	3 985.0	4 138.6	+4%	↑
Transport of goods	18.5	5.0	-73%	↓
Waste	42.2	40.9	-3%	↓
Capital goods	2 569.9	2 434.3	-5%	↓
Total	**10 756**	**10 451**	**-3%**	↓

Transport of people
Data and assumptions

Emission sources

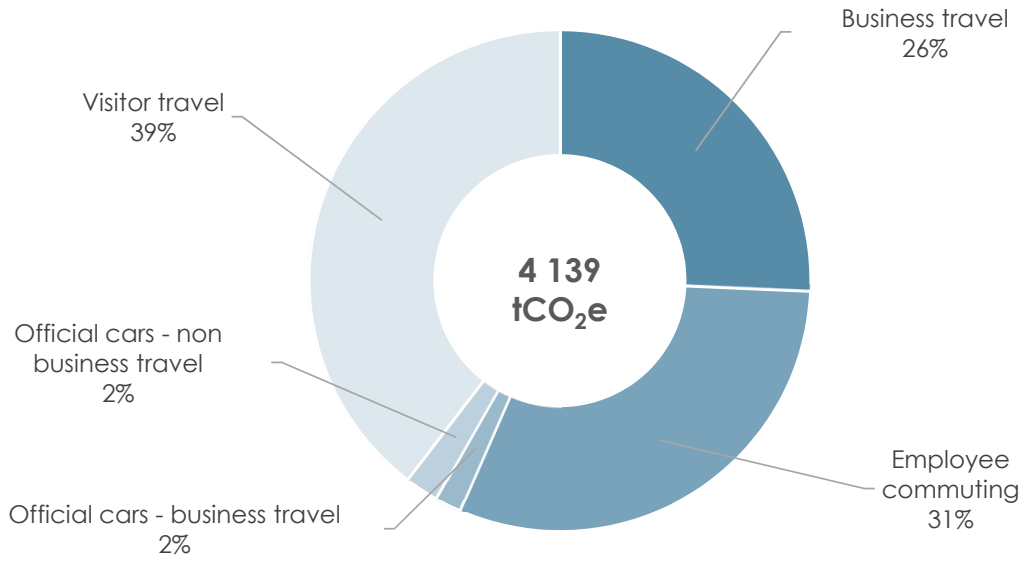
- Use of official cars (owned and leased)
- Employee commuting between home and work
- Business travel
- Visitor travel

Transport of people	tCO2e	Kilometres
Business travel	1 134	4 787 935
Employee commuting	1 366	6 054 242
Visitor travel	1 639	7 297 834
Total	**4 139**	**18 140 011**

**Litres were used for official car calculation*

Uncertainties
572 tCO_2e (14%)

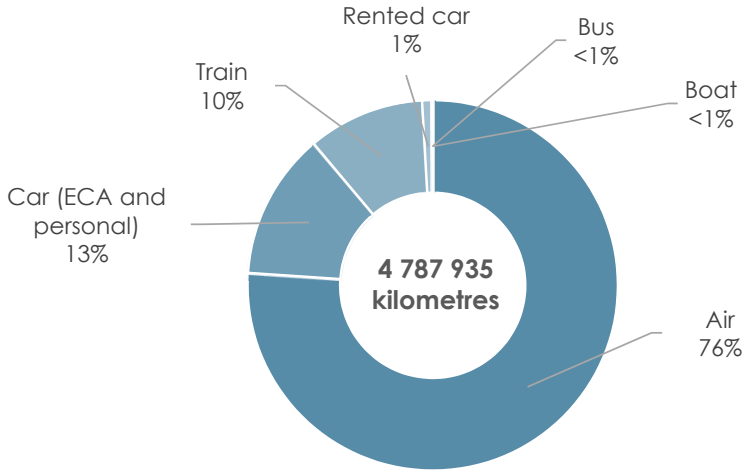
2017 GHG emissions from the transport of people by type of travel (with official cars' breakdown)

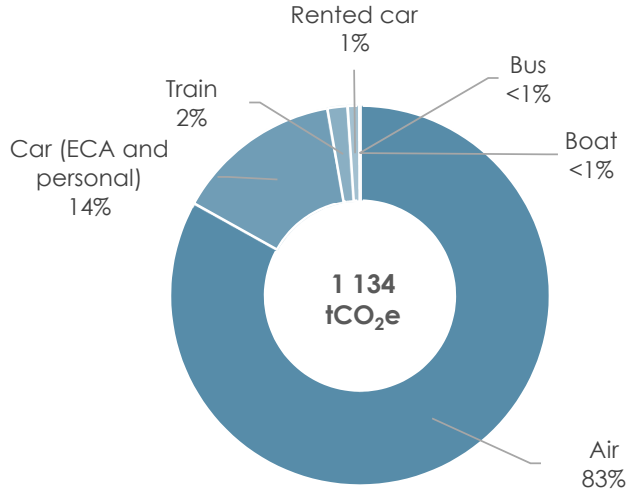


Business travel

- ✓ Data provided:
  - Total kilometres per mode of transport

Business travel	tCO2e	kilometres
Air	942	3 642 622
Car (ECA fleet and personal)	161	613 108
Train	19	488 098
Rental car	11	41 254
Bus	0	2 423
Boat	0,4	430
Total	**1 134**	**4 787 935**





The most used mode of transport (in terms of kilometres travelled) is the airplane, followed by the car, train and then the bus.

The average distance travelled on a mission is 938 kilometres

Employee commuting

- ✓ Data provided:
  - The ECA only conducts an employee commuting survey once every 1.5 years.
  - For this reason, the 2016 results and assumptions were used (although 2017 data was used for ECA fleet).
  - Number of participants: 527

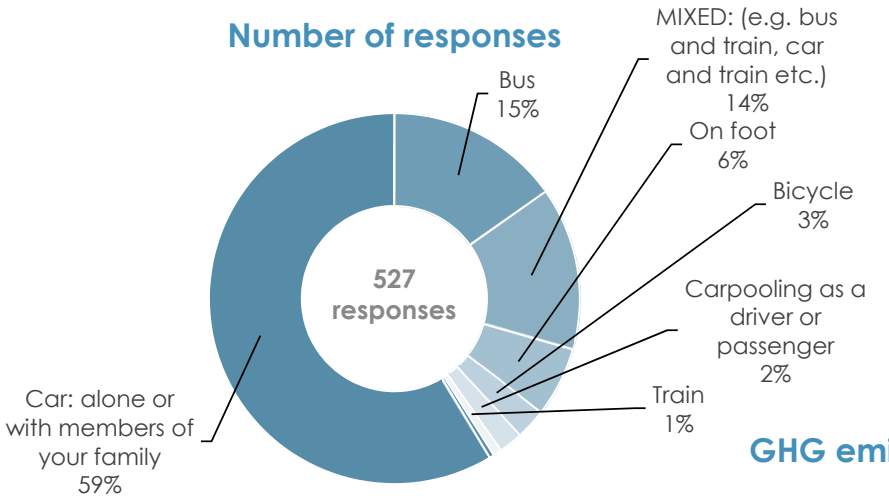
Extrapolated results

Employee commuting	tCO2e	Kilometres
Car (ECA fleet* and personal)	1 105	4 193 564
Bus	183	1 009 049
Carpooling	57	215 036
Train	18	454 508
Motorbike	3	16 646
Bicycle	0	70 877
On foot	0	94 561
	1 366	**6 054 242**

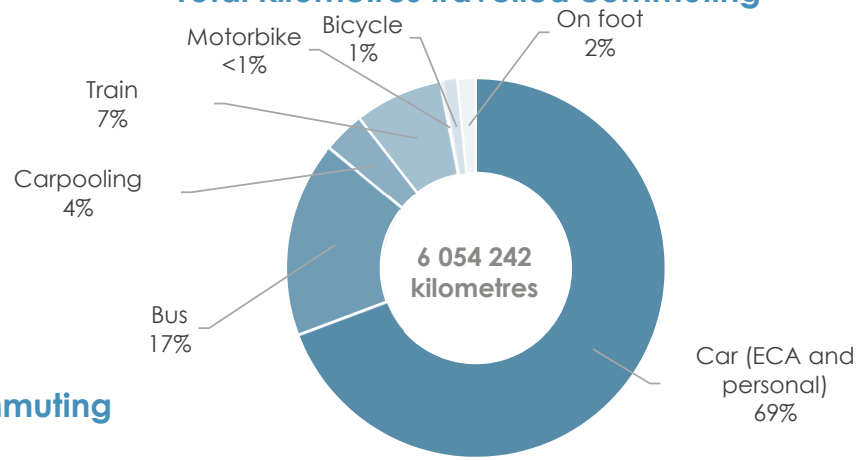
*2017 information used for ECA fleet

Transport of people
Employee commuting

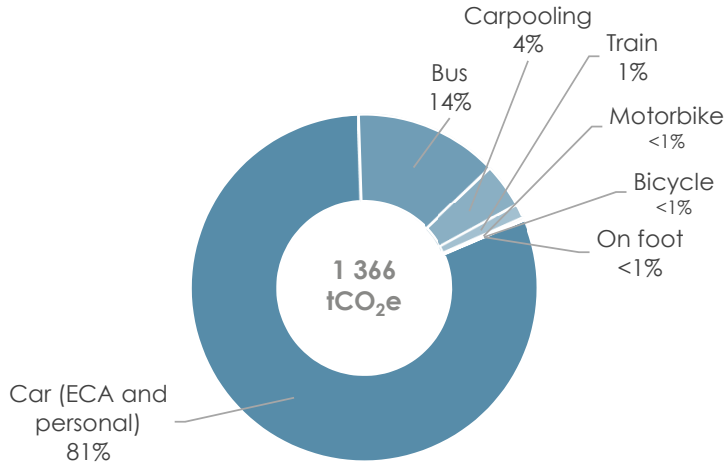
Number of responses



Total kilometres travelled commuting



GHG emissions from employee commuting



27 km travelled by employees per day

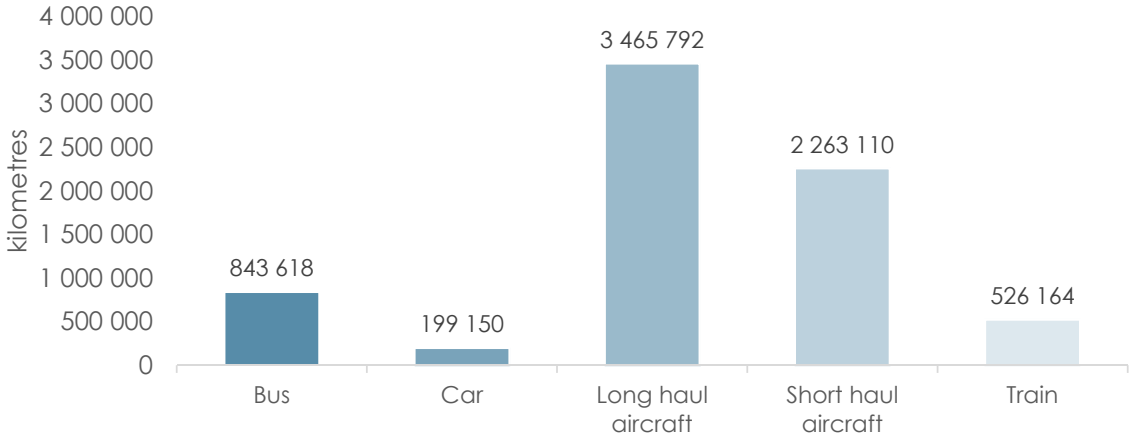
Visitor travel

- ✓ Data provided:
  - Number of visitors by country of origin in 2017
    - 120 visits
    - 3440 visitors
- ✓ Assumptions regarding mode of transport:
  - Short-haul aircraft
    - Europe: AT/BG/CZ/DK/EE/ES/FI/GR/HR/HU/IE/IT/LT/LV/MT/PL/PT/RO/SE/SI/SK/UK Albania/Belarus/Bosnia/Kosovo/Macedonia/Montenegro/Serbia/Switzerland/Turkey/Ukraine
  - Long-haul aircraft
    - Brazil/Equatorial Guinea/Guatemala/India/Kazakhstan/Norway/South Africa/Tajikistan/USA
  - Car
    - BE/LU
  - Bus
    - CZ/DE/NL
  - Train
    - FR
- ✓ EcoAct used its internal distance calculator tools to estimate the distances between origin countries and Luxembourg, and multiplied this by two to get the round-trip distance.

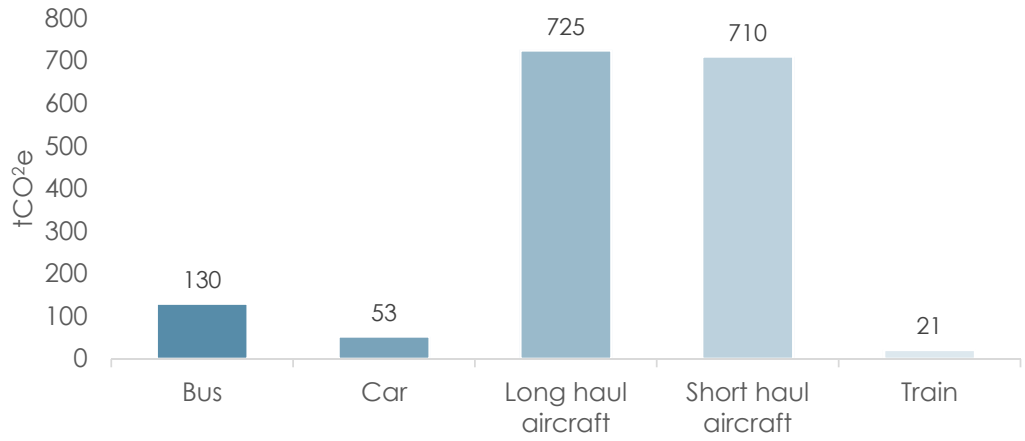
Visitor travel

1 639 tCO2e

Total kilometres by mode of transport



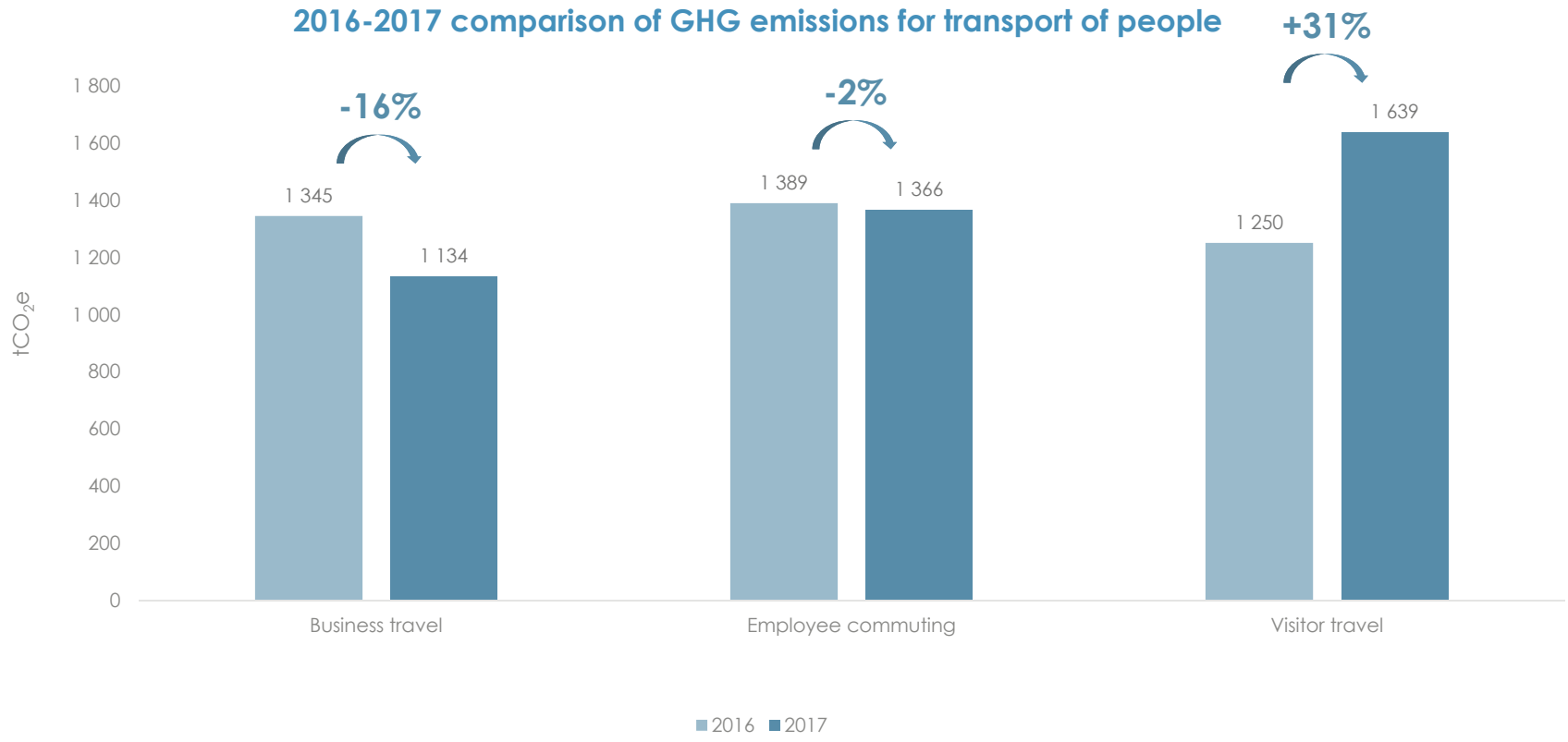
Total GHG emissions by mode of transport



Visitor travel	tCO2e	Kilometres
Bus	130	843 618
Car	53	199 150
Long-haul aircraft	725	3 465 792
Short-haul aircraft	710	2 263 110
Train	21	526 164
Total	**1 639**	**7 297 834**

Transport of people
Comparison between 2016 and 2017

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total transportation	3 985	4 139	+4%



Capital goods
Data and assumptions

Emission sources

- ✓ Buildings, car parks, vehicles, IT equipment, office furniture and supplies, machines, tools, building assets and kitchen assets (K3 building)

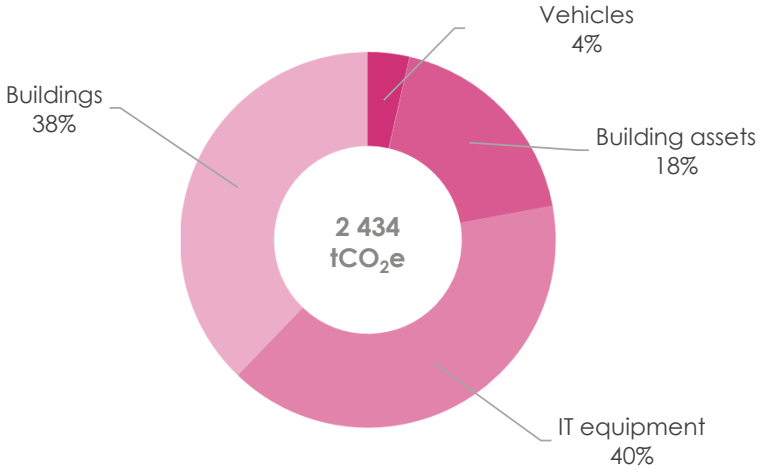
- Buildings and car parks
  - ✓ Data provided: m2 of parking and office space
  - ✓ Depreciation: 40 years
- Vehicles
  - ✓ Data provided: model of leased and owned vehicles across all three buildings
  - ✓ Depreciation: 4 years
- IT
  - ✓ Data provided: IT inventory by type of good
  - ✓ Depreciation: 4 years
- Building assets
  - ✓ Data provided:
    - **Building assets**
      - **Generators, refrigerators, air conditioning units, etc.,** in units per building (K1, K2 and K3)
      - **Furniture, equipment, machines, tools** were quoted per building in terms of purchase price
  - ✓ Depreciation: 8 years

Capital goods
Results

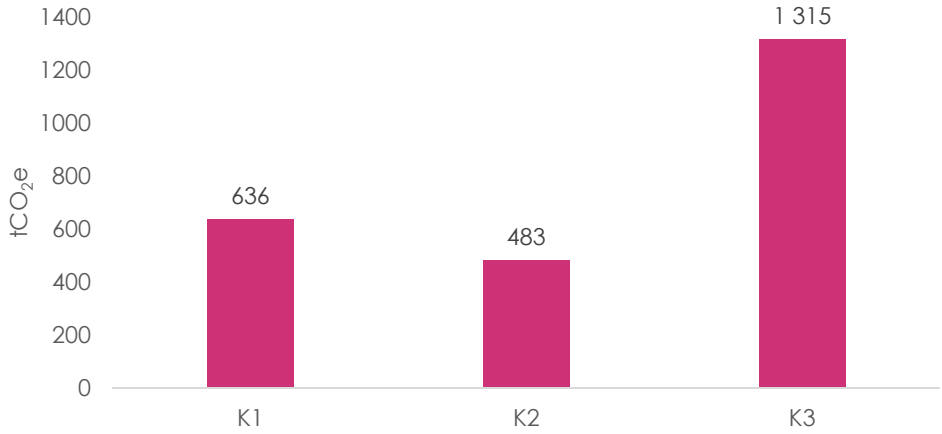
Uncertainties
384 tCO_2e (16%)

Type of capital good	tCO2e
Vehicles	87
Building assets	450
IT equipment	976
Buildings	921

GHG emissions from capital goods



Capital goods GHG emissions per building



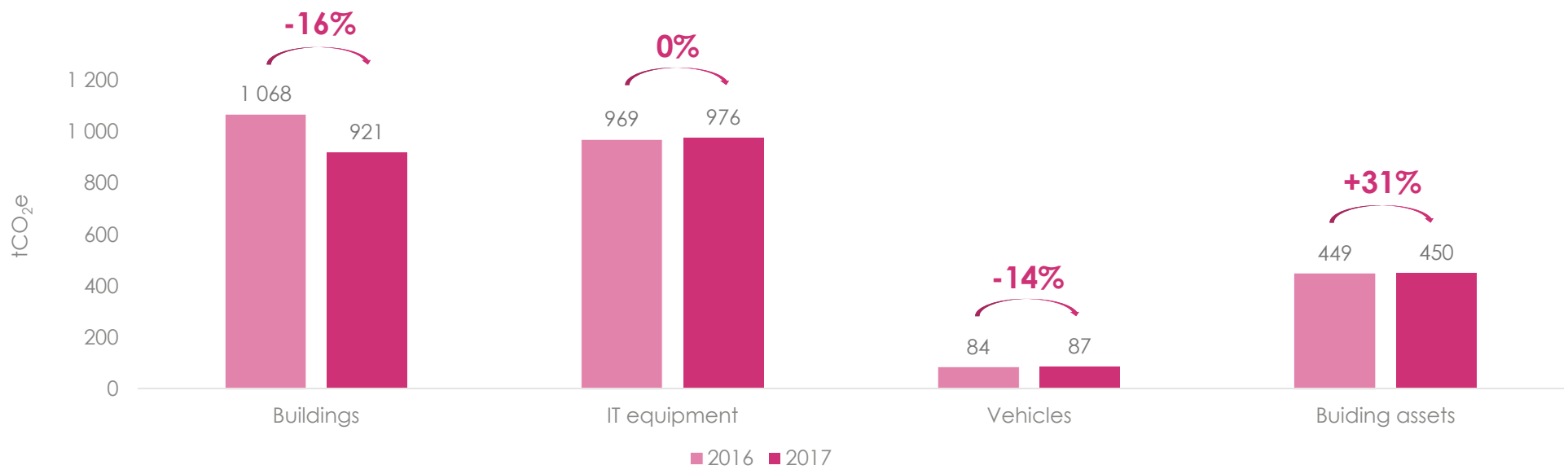
Most emissions come from IT equipment (40%). Buildings (car parks and office space) take second place, accounting for 38% of capital goods.

Capital goods
Comparison between 2016 and 2017

GHG emissions from capital goods decreased by 5% from 2016 to 2017. This was mainly the result of a reduction in building surfaces following a complete review of the buildings' surfaces conducted in 2017.

A complete review of the buildings' surfaces was done in 2017

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total capital goods	2 570	2 434	-5%



In-house energy
Data and assumptions

Emission sources

- Electricity consumption and losses, heating and fuel use

Electricity consumption and losses

- ✓ Data provided: 2017 consumption for each building
  - Electricity losses: 8.54%
  - The ECA purchases "guarantees of origin". The Bilan Carbone ® method, however, considers the real electricity used from the national grid.

Fuel consumption (by electricity generator)

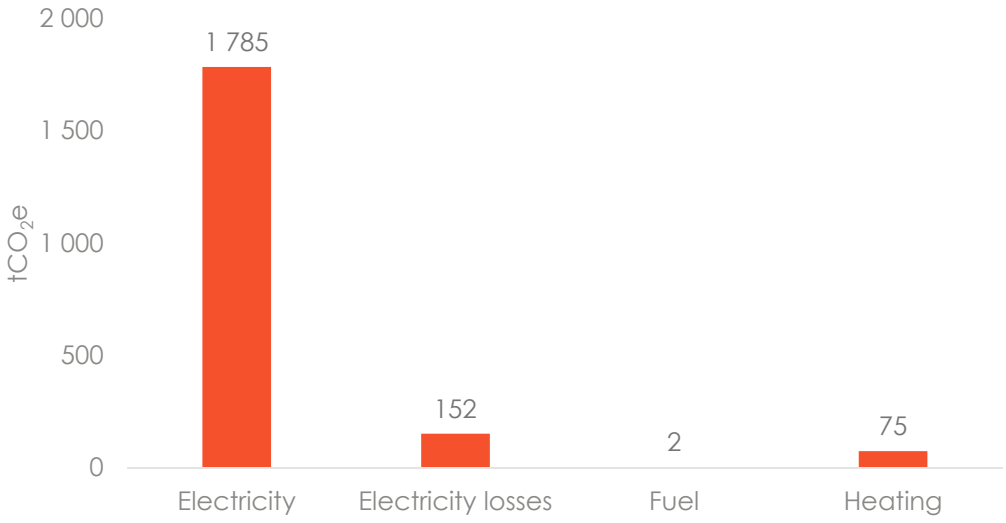
- ✓ Data provided: litres purchased

Heat consumption

- ✓ Data provided: 2017 consumption for each building
- ✓ Note: In 2017, the Luxembourg heating district changed its fuel sources, with 54% of biomass then in the heating fuel mix. To adjust for this change, the 2016 emission factor was multiplied by 46% to account for the 0 kgCO2e associated with biomass. Biomass can be given a factor of 0 kgCO2e as indicated in the JRC's 2017 technical report "Covenant of Mayors for Climate and Energy: Default emission factors for local emission inventories". 0.0198 $kgCO_2e/kWh$ was used in 2017 versus 0.043 in 2016. It should be noted that this emission factor is not in line with the Bilan Carbone ® method and was not recommended by EcoAct, yet it was adopted nonetheless to stay in line with the European Court of Justice for comparability purposes.

In-house energy
Results

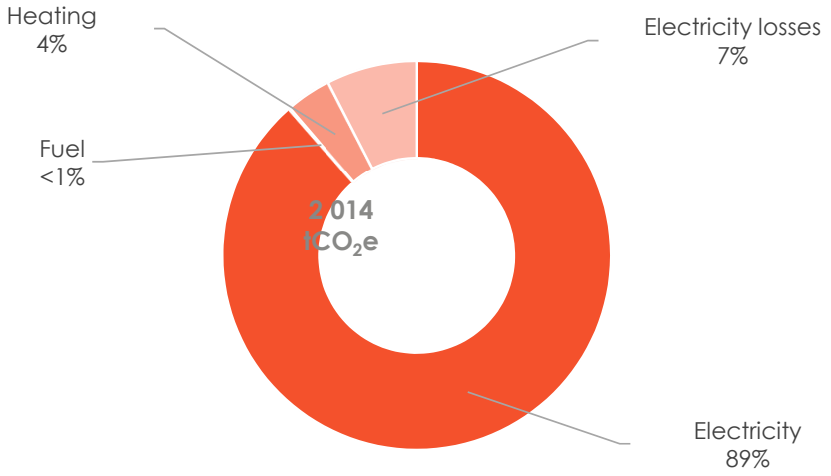
Total GHG emissions per energy source



- 4% of emissions come from heating (the emission factor used was 0.0198 $kgCO_2e/kWh$ in 2017 versus 0.043 in 2016)
- 89% of emissions come from electricity use
- 7% from electricity losses
- <1% from fuel
- The ECA has decreased its energy consumption between 2017 and 2016

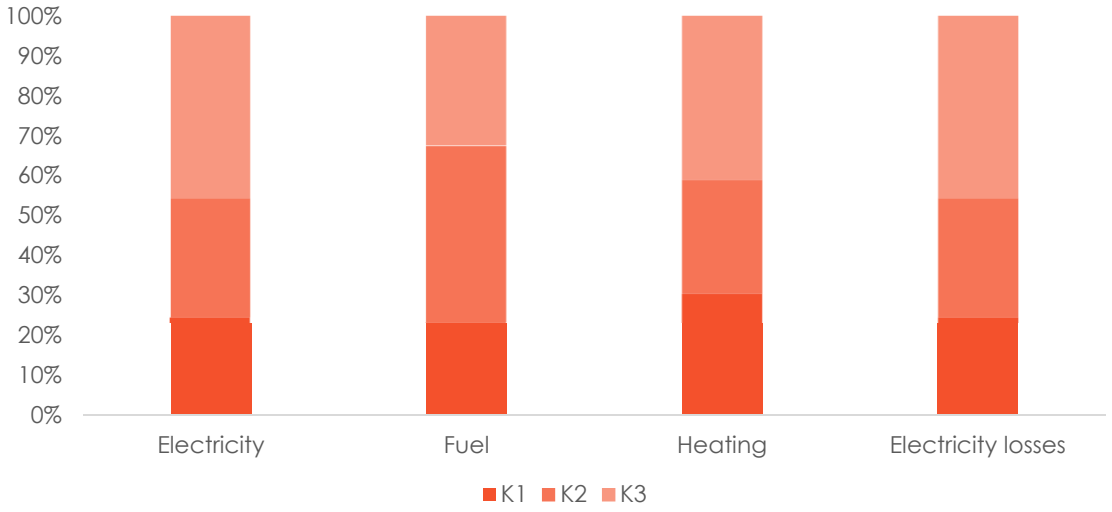
Uncertainties
140 tCO_2e (7%)

Total GHG emissions per energy source

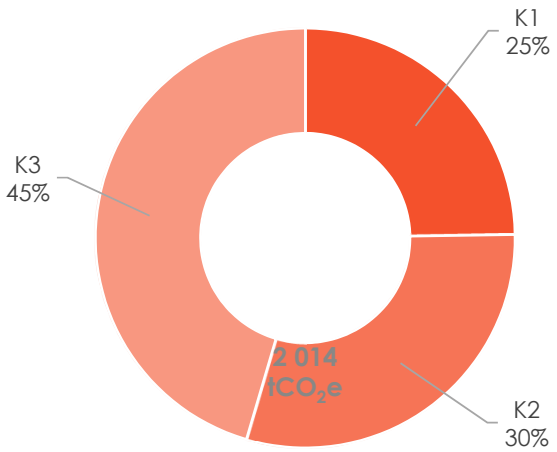


In-house energy
Results

Relative GHG emissions per building by energy source



Energy-related GHG emissions per building

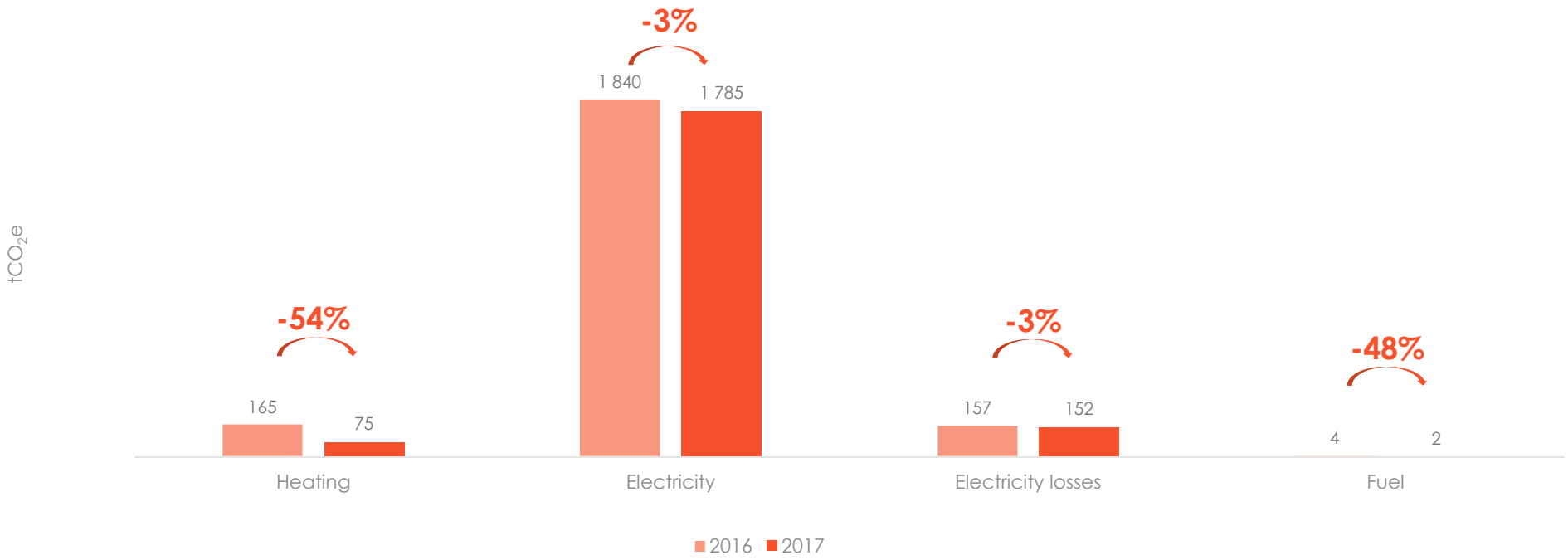


45% of emissions from energy consumption come from K3

Energy
Comparison between 2016 and 2017

The fall in GHG emissions reflects the ECA's decreased energy consumption between 2016 and 2017. The decline from heating comes mainly from an improvement in the related distribution emission factor.

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total energy	2 166	2 014	-7%



Emission sources

- ✓ Refrigerant gases

Uncertainties
5 tCO_2e (22%)

Refrigerant gases

- ✓ Data provided: cooling installations refilled with refrigerant gases (R134a and R407c) throughout 2017. Refills were considered leaks.
- ✓ Only K2 and K3 are concerned.

Year	Building	Leaks	tCO2e
2017	K2	6 kg of R134a	8
2017	K3	8 kg of R407C	13

Note: GHG emissions from refrigerant leaks decreased by 73% in 2017 compared with 2016. In 2017, cooling installations were refilled with 6 kg of R134a refrigerant and 8 kg of R407c refrigerant, compared with 507 kg of R134a refrigerant in 2016.

One tonne of R134a and R407c is equivalent to 1300 and 1620 tonnes of carbon respectively. This has a large impact.

Purchased goods and services
Data and assumptions

Emission sources:

- Paper, water, meals, gifts, goods, services purchased from third parties

Paper

- ✓ Data provided for the ECA Journal/reports in number of pages
  - Assumption, all documents are printed on double-sided A4 paper
- ✓ Data provided for internal printing in number of pages
  - Assumption: 80% double sided, 90% A4, 10% A3
  - Assumption: 97% recycled paper
- ✓ Method: transformed into weight

Water

- ✓ Data provided: total purchased water used in 2017

Meals

- ✓ Data provided: number of meals, purchased quantities of meat (fish, pork, beef, chicken), organic versus non-organic
  - Assumptions: 7% organic meals, 11% vegetarian meals and the remainder distributed according to proportion of the purchased quantities of meat (22% chicken, 16% beef, 17% pork, 27% fish)

Gifts

- ✓ Data provided: number and types of gifts purchased in 2017
- ✓ Method: gifts transformed into weight and type of materials

Purchased goods and services

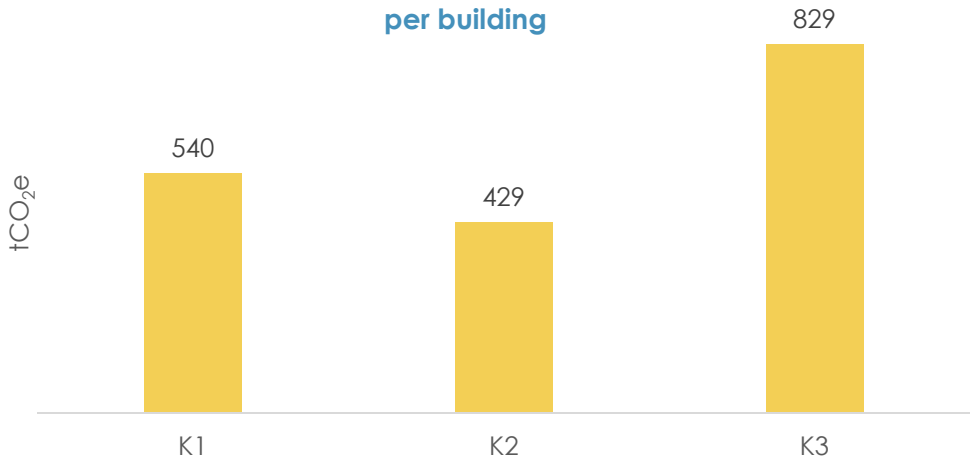
- ✓ Data provided: purchased goods and services by category and euros spent

Purchased goods and services Results

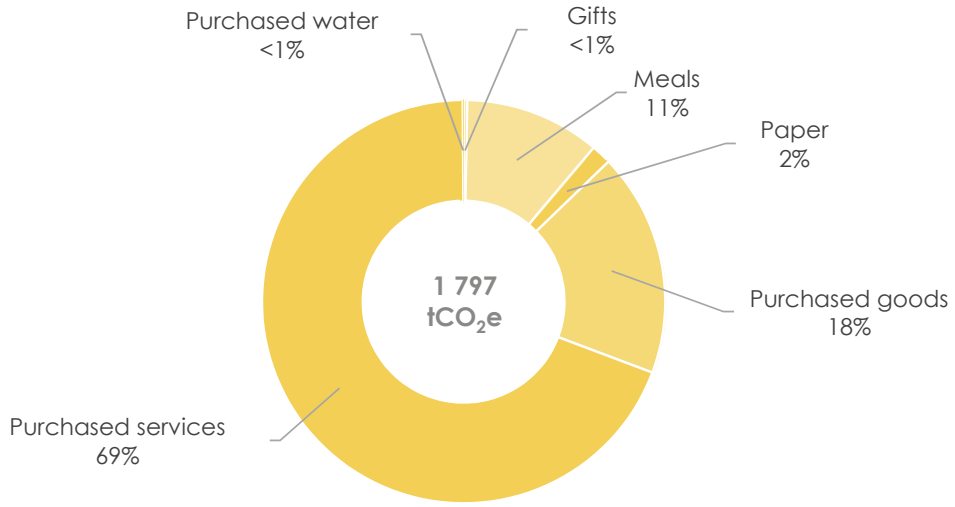
Type	tCO2eq
Water	1.6
Gifts	5.3
Paper	28.8
Goods (books, clothing, consumables…)	322.6
Meals	195.5
Services purchased from third parties	1 243.6

Uncertainties: 491 tCO2e (27%)

Total GHG emissions from purchased goods and services per building



Total GHG emissions from purchased goods and services

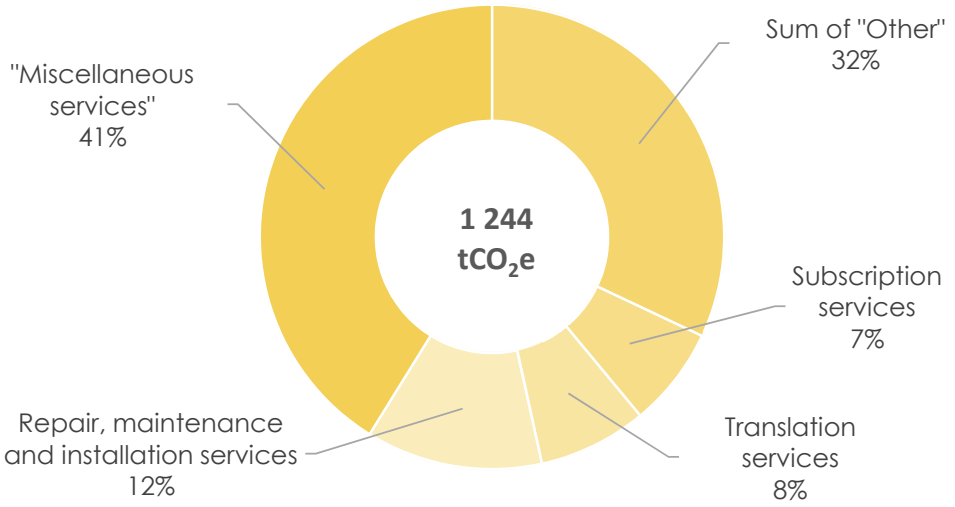


Purchased goods and services
Spotlight on purchased services

Over 60% of purchased services emissions come from:

- miscellaneous services (41%);
- repair and installation services (12%);
- translation services (8%);
- subscription services (7%).

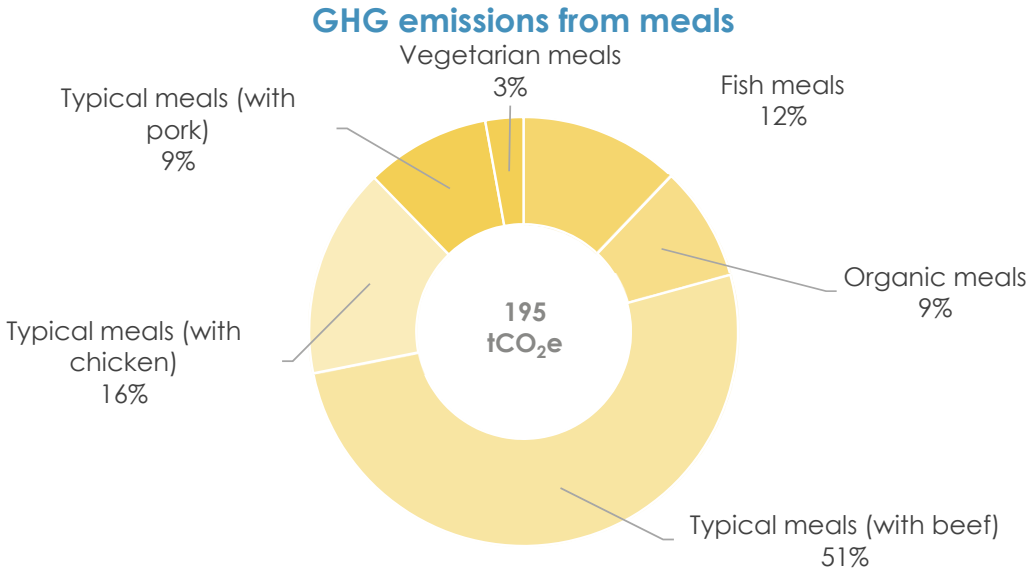
Other services include: legal and accounting, telecommunications, interpretation services, news agency, etc.



Miscellaneous services were attributed an average services emission factor from the Bilan Carbone ® database. These services ranged from renting material, training (language classes, etc), painting, document destruction, etc.

Purchased goods and services
Spotlight on meals

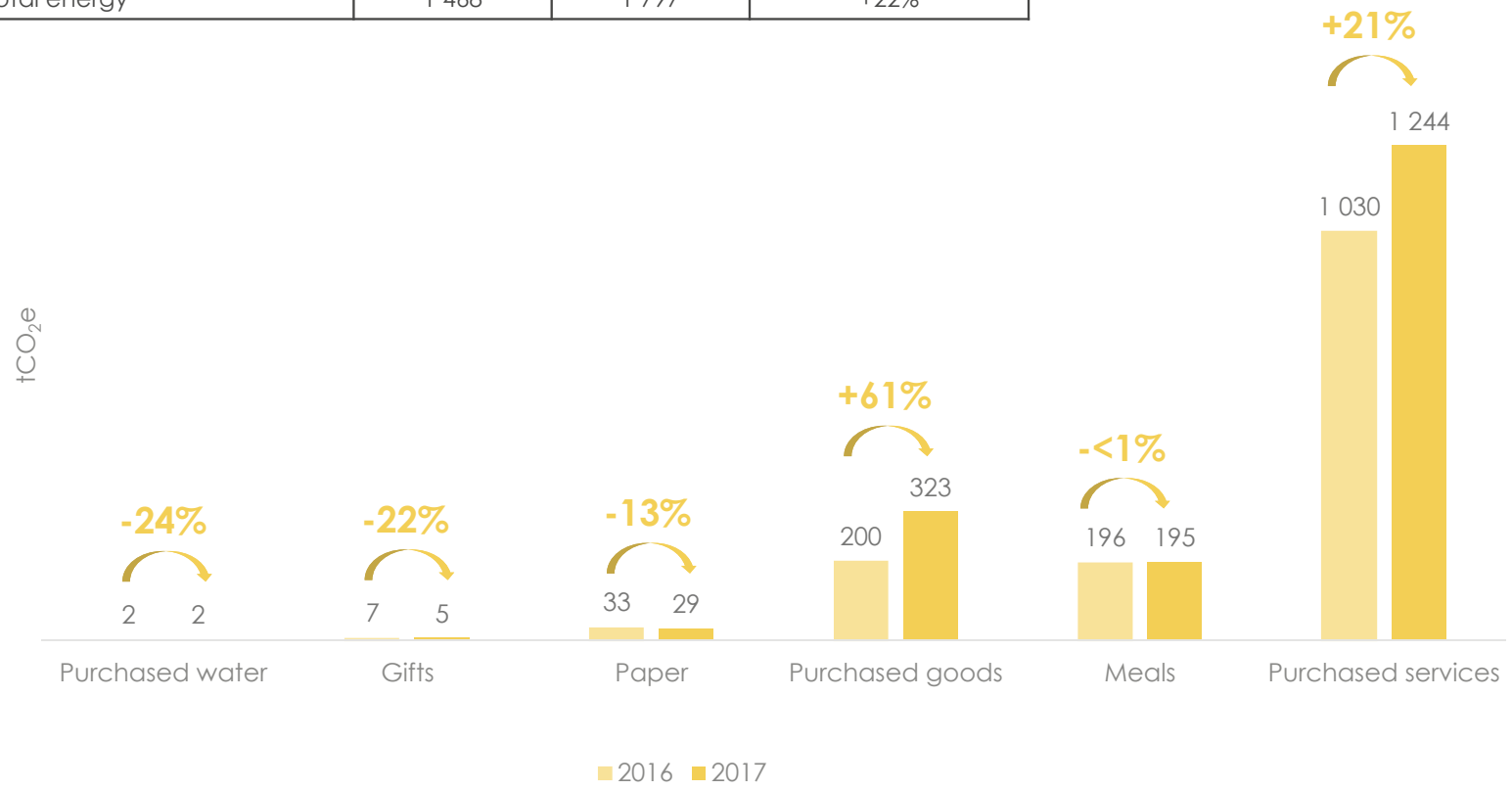
- 51% of the meals served at the ECA contain beef.
  - ✓ Replacing beef with chicken would reduce a dish's carbon impact by **76%**.
  - ✓ Replacing a pork dish with a vegetarian dish would **half** the meal's carbon impact.
- Organic meals were given the emission factor of an "average meal", as the determinants of a dish's emissions are its ingredients (meat, vegetarian) and whether the ingredients were produced locally or not. There is no conclusive evidence that the average organic meal is less emissive, since each dish can only be considered on a plate-by-plate basis.



Type of meal	kgCO2e/unit
Vegetarian	0.45
Fish	0.80
Pork-based	1.01
Chicken-based	1.32
Organic	2.25
Beef-based	5.66

Purchased goods and services
Comparison between 2016 and 2017

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total energy	1 468	1 797	+22%



GHG emissions from **purchased goods and services** increased by 22% between 2016 and 2017.

GHG emissions from **meals** decreased slightly, while the number of meals served increased by 9%. The number of meals served with beef and chicken decreased, whereas fish and pork-based meals rose. Vegetarian meals increased by 55%. The changing eating habits of ECA staff neutralised the effect of the increased number of meals.

GHG emissions from **purchased services** increased, due to a 20% increase in money spent on services, notably on miscellaneous and subscription services. GHG emissions from **purchased goods** increased, due to an increase in money spent on office equipment and supplies.

Waste
Data and assumptions

Emission sources

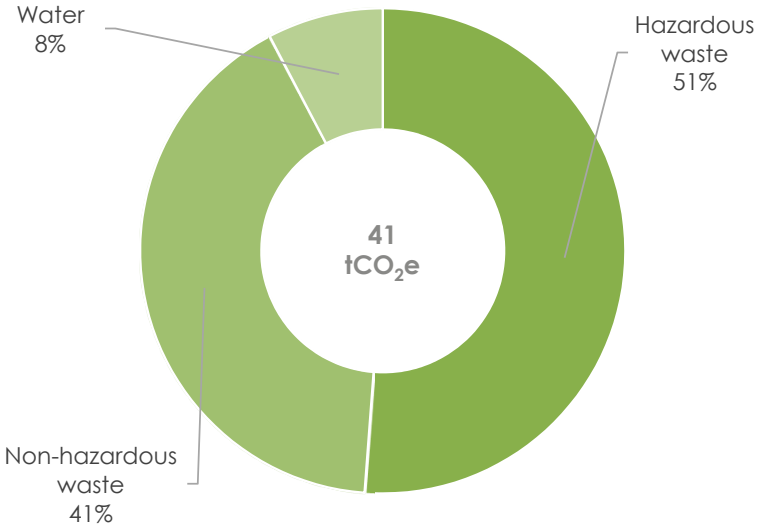
- ✓ Waste and water use (sewage)

- Waste
  - ✓ Data: waste by type (non-hazardous, hazardous) and tonnage
    - ✓ Non-hazardous: food waste, household waste, plastics, paper and cardboard, glass packaging
    - ✓ Hazardous: mud and sewage water, light and fluorescent tubes, packaging paste with harmful products, scrap metal, batteries and accumulators, electronic waste
  - ✓ Assumptions: waste treatment largely based on 2016 treatment with slight modifications

- Water use (sewage)
  - ✓ Data: based on water consumption, allocated to buildings on the basis of building occupancy

Uncertainties
12 tCO_2e (29%)

GHG emissions from waste by type

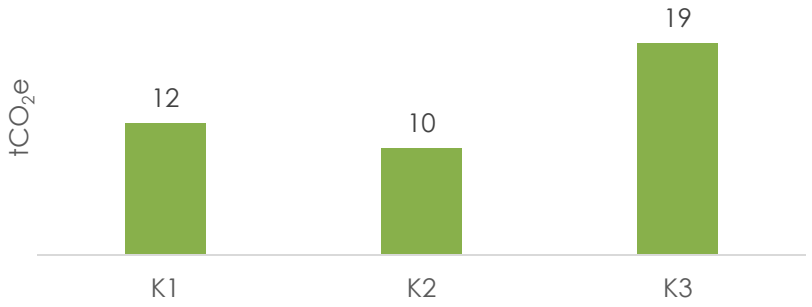


200 kg of waste per FTE in 2017
versus 209 kg in 2016

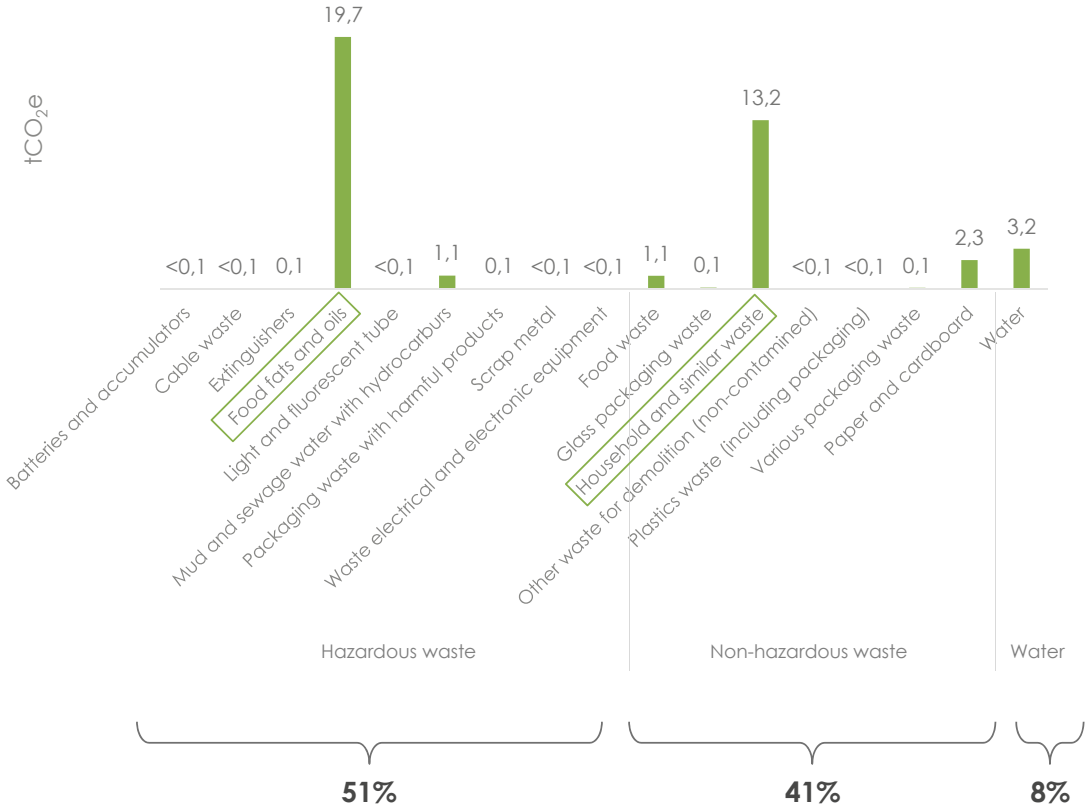
Waste Results

Hazardous waste	**tonnes**	**tCO_2e**
Batteries and accumulators	0.08	0.010
Cable waste	0.08	0.010
Extinguishers	0.50	0.063
Food fats and oils	54.38	19.686
Light and fluorescent tube	0.19	0.024
Mud and sewage water with hydrocarburs	8.32	1.065
Packaging waste with harmful products	0.13	0.091
Scrap metal	0.28	0.009
Waste electrical and electronic equipment	0.02	0.003
Non-hazardous waste	**tonnes**	**tCO_2e**
Food waste	22.57	1.052
Glass packaging waste	4	0.132
Household and similar waste	36.24	13.191
Other waste for demolition	0.06	0.002
Paper and cardboard	53.07	2.286
Plastics waste (including packaging)	0.95	0.031
Various packaging waste	3.74	0.123
Water	**m³**	**tCO_2e**
Water	12 071	3.2

GHG emissions from waste per building



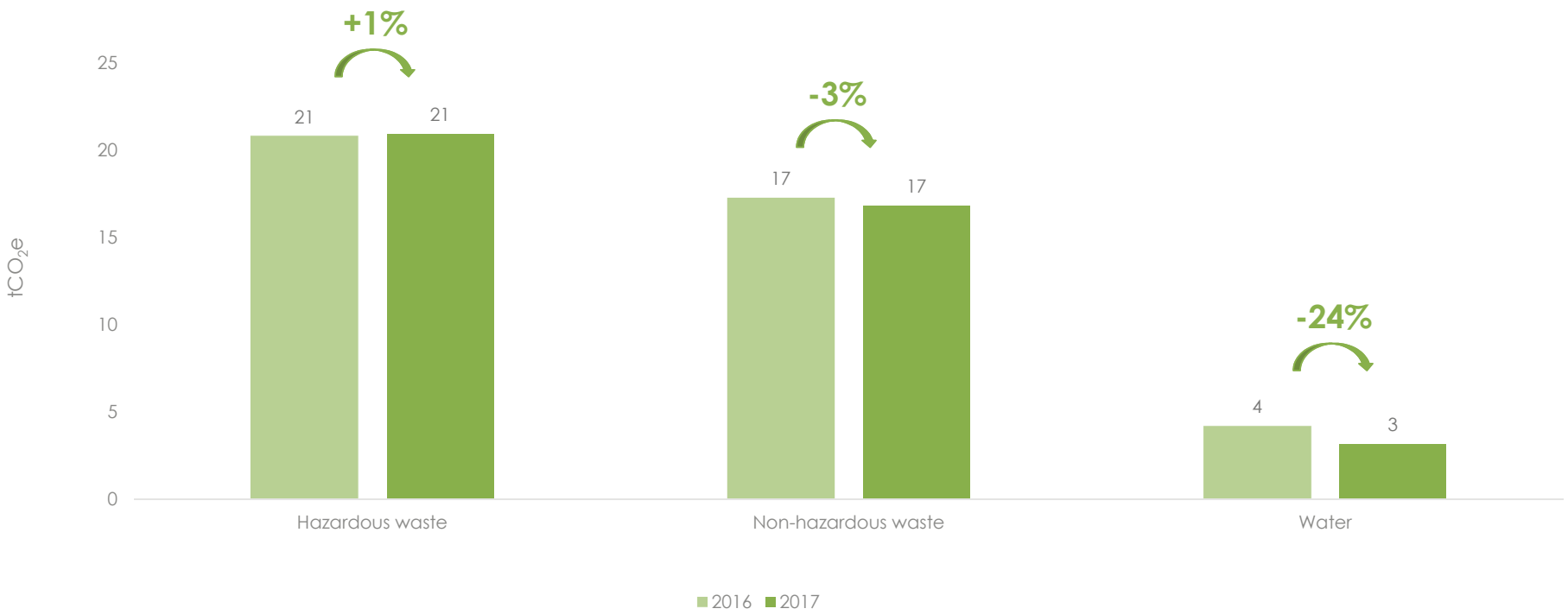
Total emissions of waste by category



Food fats, oils and household waste make up **80% of GHG emissions derived from waste**

Waste
Comparison between 2016 and 2017

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total	42	41	-3%



GHG emissions from waste decreased by 3%. GHG emissions from hazardous waste increased by 1%. GHG emissions from non-hazardous waste decreased by 3%. GHG emissions from wastewater decreased by 24%.

Transport of goods

Emission sources

- ✓ Transport from suppliers

Uncertainties
1 tCO_2e (20%)

Data provided

- ✓ Distance (km), number of delivery days per supplier, average delivery weight and type of vehicle
- ✓ 21 suppliers in total

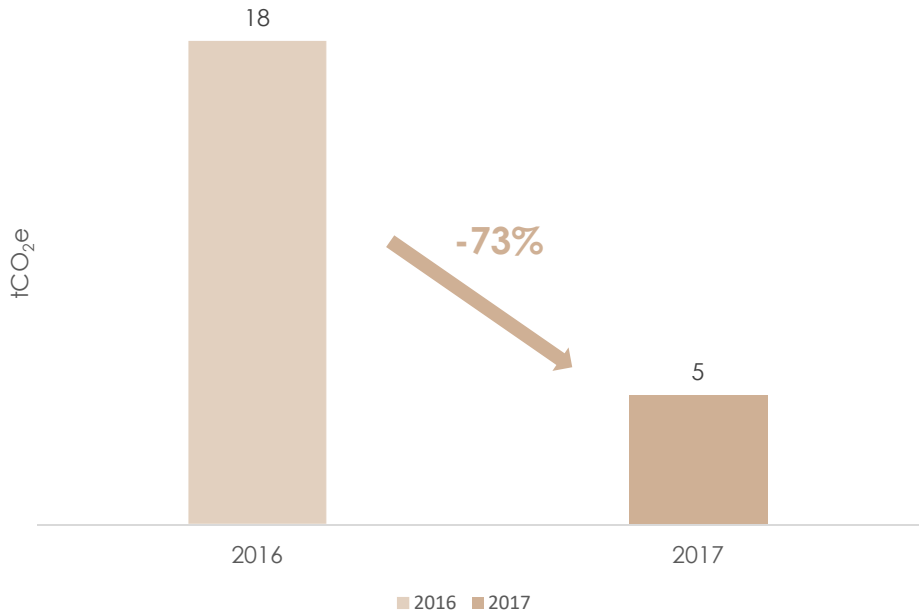
Average distance driven by each supplier per year: **2 513 km**

This is equivalent to driving from Luxembourg to Rome and back.

Emission source	Total kilometres	tCO2eq
Transport of goods	**52 767**	**5**

Transport of goods
Comparison between 2016 and 2017

GHG emissions tCO_2e	2016	2017	2016-2017 variation
Total	18	5	-73%



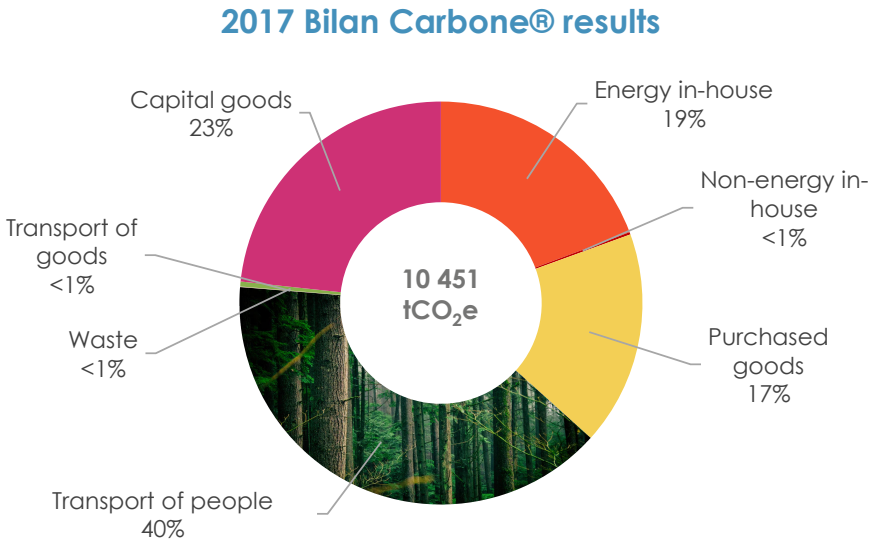
In 2017, data on transporting goods was better documented. As a result, GHG emissions from the transportation of goods decreased by 73% due to improved reporting.

Carbon neutrality

- Today there is an urgent need to act! If we are to stay well below the 2º threshold, **emissions must peak by 2020, and the world economy needs to be carbon neutral by 2050**, as stated in the landmark Paris Agreement in 2015.
- Carbon neutrality is a term used to refer to organisations' efforts to **offset the residual emissions that they are unable to reduce** or are in the process of reducing. Carbon offsets is a mechanism whereby an organisation purchases carbon "credits" from projects proven to mitigate or sequester carbon.

Recommendations - Carbon neutrality

- A first step for the ECA could be to offset the **largest sources of emissions** – transportation of people (visitor travel, employee commuting and business trips), covering 40% of its emissions. These emissions may be especially difficult to reduce in the short term, given the difficulties airlines face in cutting the carbon impact of travel.
- Each year, the ECA could consider increasing its offsets to supplement its reduction efforts.

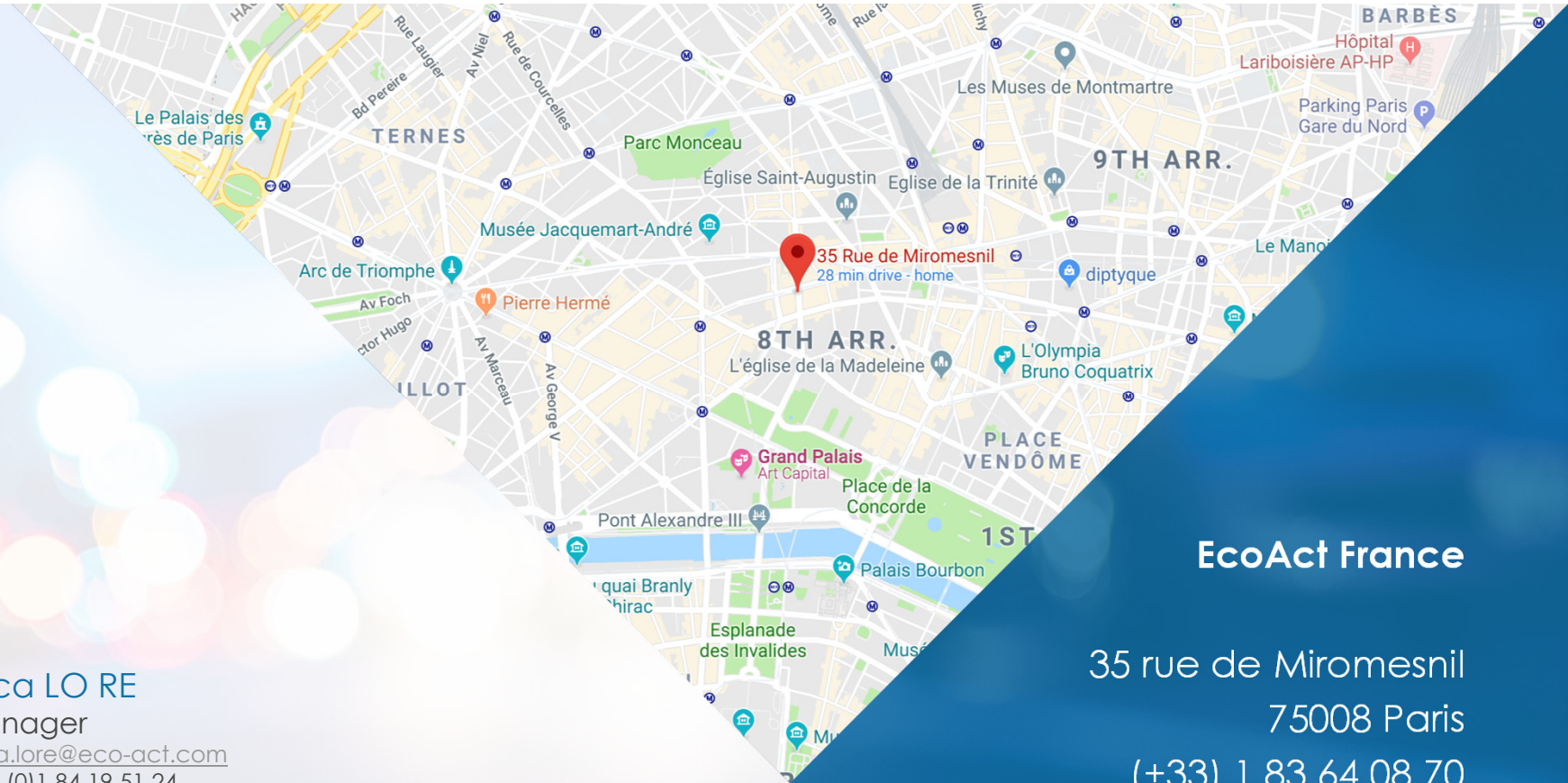


Got a question?

Contact us !

Luca LO RE
Manager
Luca.lore@eco-act.com
+ 33 (0)1 84 19 51 24

Valerie MORGAN
Senior Consultant
Valerie.morgan@eco-act.com
+ 33 (0)1 83 64 12 56



EcoAct France

35 rue de Miromesnil
75008 Paris
(+33) 1 83 64 08 70
contact@eco-act.com
www.eco-act.com