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ARTURIA

_The sound explorers

CARBON FOOTPRINT AND CLIMATE STRATEGY EVALUATION

2019-2020

A report produced by UTOPIES ©

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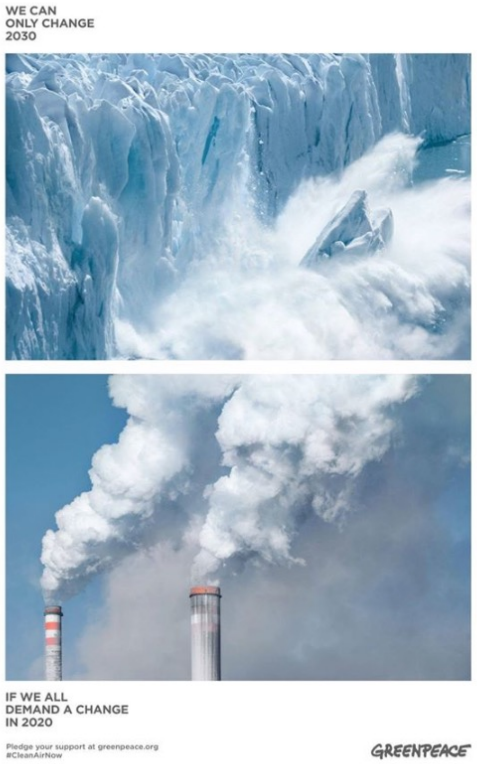


1 METHODOLOGY AND STUDY PARAMETERS

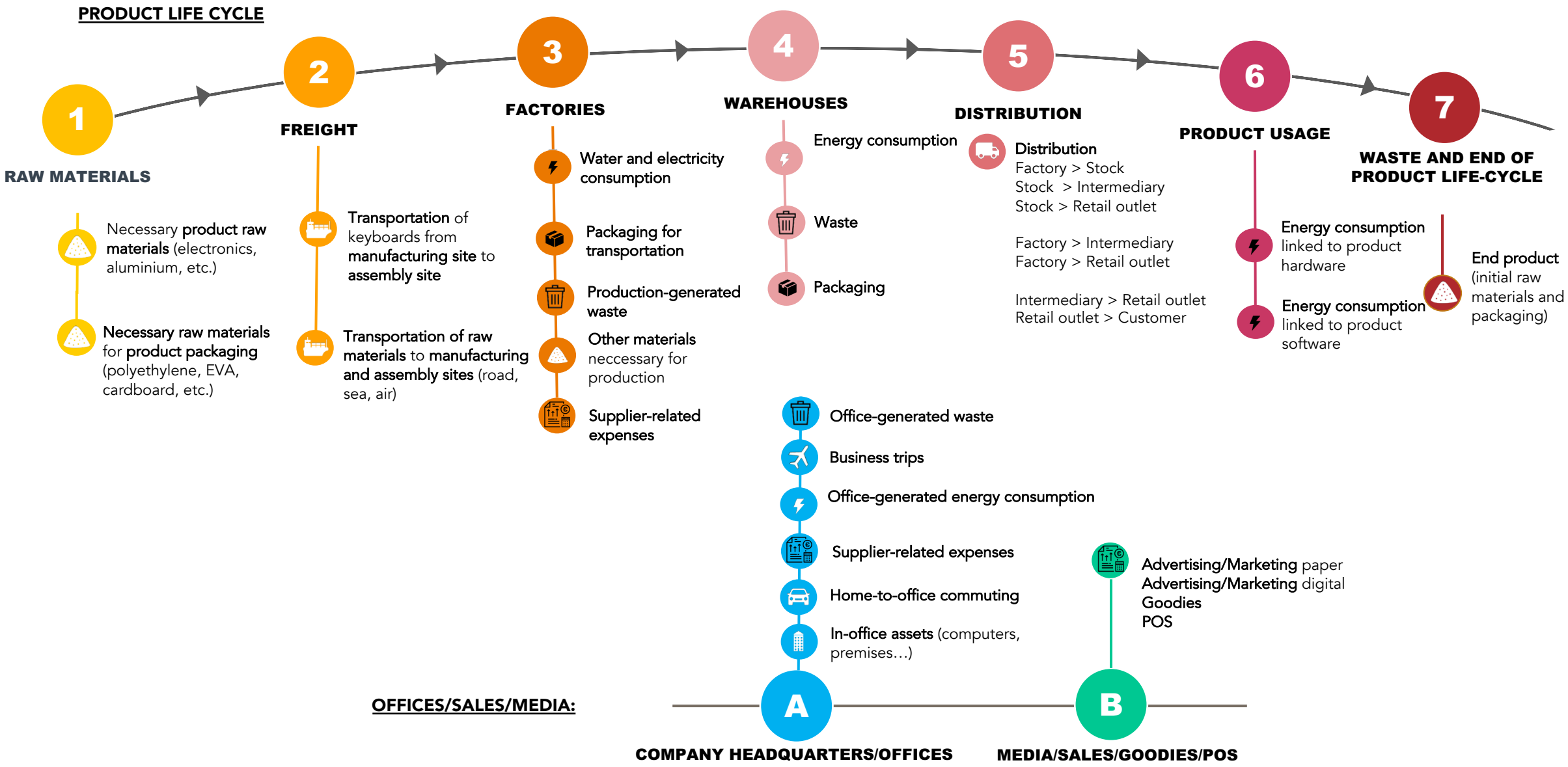
GENERAL PERIMETER OF THE STUDY

- Organisational scope: for the present study of Arturia's overall carbon footprint, the scope includes **all of the company's activities, both in France and abroad** (internal operations, media and sales) as well as product life cycles.

- Temporal scope: the study focuses on the company's **2019-2020** fiscal year extending from 01 July 2019 to 30 June 2020.

- CO_2 calculations are based on data collected by Arturia. External studies and documentation have been utilised in order to extrapolate certain calculations and thus present the most comprehensive view of the company's carbon impact.

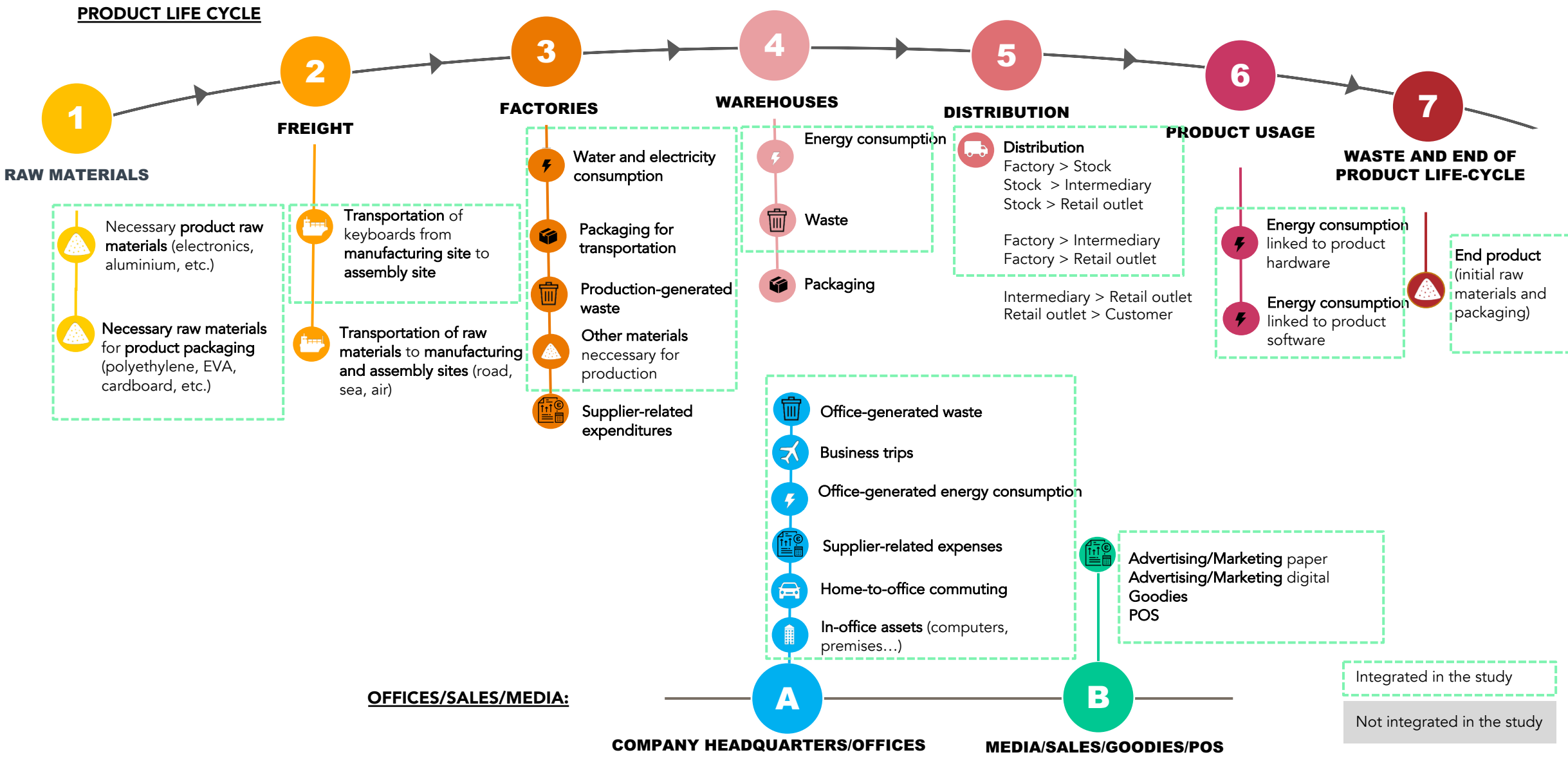
MAP OF ARTURIA'S BUSINESS FLOWS



2 RESULTS OF THE STUDY

OVERALL RESULTS
DETAILED RESULTS

MAP OF ARTURIA'S BUSINESS FLOWS



CARBON FOOTPRINT: SUMMARY OF THE RESULTS

CARBON FOOTPRINT OF COMPANY ACTIVITIES IN 2019

10,100 tCO_2e

ARTURIA
_The sound explorers

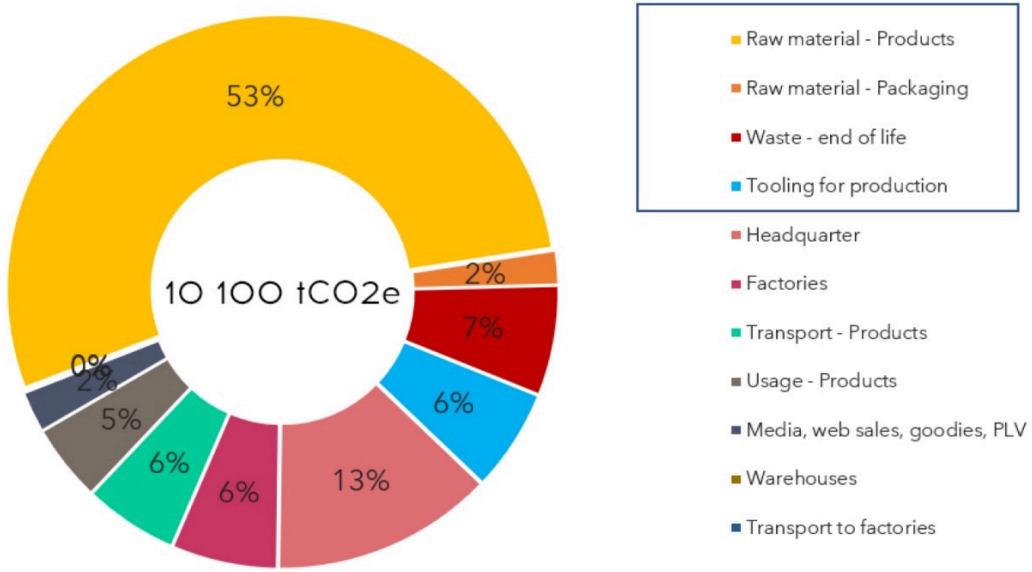
CARBON FOOTPRINT OF ACTIVITIES IN 2019 PER INDIVIDUAL EMPLOYEE

104 tCO_2e/employee*

* Data based on 97 full-time staff members. This ratio does not take into consideration factory employees.

2 10,100 TCO2E EMISSIONS GENERATED BY ARTURIA'S ACTIVITIES IN 2019, OF WHICH 55% ARE DIRECTLY LINKED TO RAW MATERIAL USE

These 10 100 tonnes of CO2eq come from the following sources of emissions:



- 78 % manufacturing and transportation of products
- 15% company headquarters/offices and marketing goods
- 7% end-of-life product waste

DETAILED PERIMETER OF THE STUDY

Elements not integrated in the study

- **Freight:** carbon emissions linked to the transportation of raw materials between their place of origin (city or country of the post-extraction site of a given raw material) and Arturia's manufacturing site.
- **Warehouse:** emissions linked to packaging if the latter differs from that used in final factory output
- **Distribution:** emissions linked to the final km travelled by product or customer

Concerning emissions emanating from 'final km travelled', it is important to relativise with respect to ADEME* recommendations on this subject:

- ❑ The considerable risk of uncertainty of such emission measurements may undermine the scientific credibility of obtained results.
- ❑ The deployment of a credible system of measurement is too costly in relation to any noticeable significance in results obtained. Companies prefer to devote resources to undertaking direct actions that aim at emissions reduction, or to dialogue with partners.

Additions to the final study

- **Raw materials:** in an effort to preserve the comparability and the homogeneity of the method employed, 'electronic materials' are considered as a whole entity during the V1 study. Given the importance of these components in Arturia's carbon analysis, a more comprehensive V2 study was conducted with the aim of identifying the various elements and the materials they are composed of. The present study has integrated this more comprehensive analysis.
- **Utilisation:** to be able to measure adequately all emissions sources, including product utilisation, Arturia implemented a customer-based survey with the goal of better understanding duration and frequency of product use. The present V3 study has included this emissions source.

*ADEME : French national Agency for the Environment and Energy Conservation

2 RESULTS OF THE STUDY

OVERALL RESULTS
DETAILED RESULTS

2 SUMMARY OF CARBON FOOTPRINT RESULTS BY SUB-SOURCE

N°	Primary emissions source	Emissions sub-source	Emissions CO2e (kgCO2e)	Emissions CO2e (%)
1	RAW MATERIALS	Raw materials (product)	5 400 620	53%
2	HEADQUARTERS/OFFICES	Supplier-linked expenditures	1 034 181	10%
3	HEADQUARTERS/OFFICES	In-office assets	875 500	9%
4	WASTE RELATED TO END OF PRODUCT LIFE	End of product life	650 523	6%
5	DISTRIBUTION	By truck	434 851	4%
6	UTILISATION	Software utilisation	420 803	4%
7	FACTORIES	Packaging for transportation	264 898	3%
8	RAW MATERIALS	Raw materials (packaging)	198 192	2%
9	DIGITAL MEDIA SALES GOODIES POS	Advertising / Digital marketing and utilisation	183 334	2%
10	FACTORIES	Production-related waste on factory premises	156 574	2%
11	FACTORIES	Energy consumption linked to production on factory premises	136 838	1%
12	DISTRIBUTION	By sea	75 464	1%
13	FACTORIES	Other materials necessary for production on factory premises	67 649	1%
14	DIGITAL MEDIA SALES GOODIES POS	Goodies	56 262	1%
15	DISTRIBUTION	By air	49 469	0%
16	UTILISATION	Hardware utilisation	38 797	0%
17	HEADQUARTERS/OFFICES	Home-to-office commuting	31 451	0%
18	HEADQUARTERS/OFFICES	Waste	10 831	0%
19	HEADQUARTERS/OFFICES	Energy and water consumption	7 807	0%
20	WAREHOUSES	Consumption in warehouses (stocking)	6 061	0%
21	DIGITAL MEDIA SALES GOODIES POS	POS	3 115	0%
22	FREIGHT	Material freight	2 423	0%
23	DIGITAL MEDIA SALES GOODIES POS	Advertising /Marketing paper	2 117	0%
24	WAREHOUSES	Waste	548	0%
25	FACTORIES	Water consumption linked to production on factory premises	511	0%
		TOTAL	10 108 822	

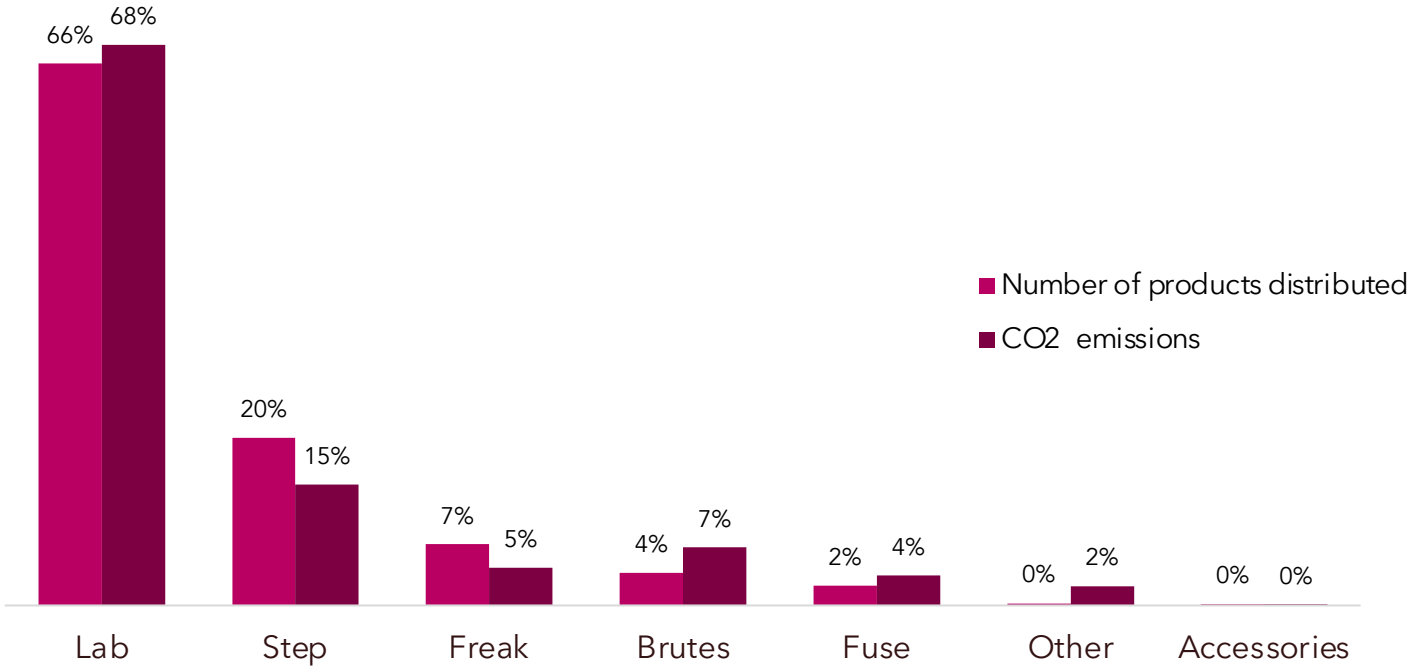
2 SUMMARY OF RESULTS BY REGULATORY EMISSIONS SOURCE

Categories	N°	Regulatory emissions source	Emissions CO2e (kgCO2e)	%	Source family
Direct emissions (scope 1)	1	Direct emissions from fixed combustion sources	-	0%	-
	2	Direct emissions from mobile thermal combustion engine sources	-	0%	-
	3	Direct emissions from processes not related to energy consumption	-	0%	-
	4	Direct fugitive emissions	-	0%	-
	5	Emissions emanating from biomass (soil and forest)	-	0%	-
Indirect emissions related to energy (scope 2)	6	Indirect emissions linked to electricity consumption	7 803	0%	HEADQUARTERS/OFFICES
	7	Indirect emissions linked to steam, heat or refrigeration	-	0%	-
Other GHG emissions (scope 3)	8	Emissions related to energy use not mentioned in sources 1 to 7	-	0%	-
	9	Purchasing of goods or services	6 231 893	62%	WAREHOUSES, RAW MATERIALS, FACTORIES
	10	Permanent office assets	875 500	9%	HEADQUARTERS/OFFICES
	11	Waste	10 831	0%	HEADQUARTERS/OFFICES
	12	Upstream merchandise transportation	2 423	0%	FREIGHT
	13	Employee travel expenses	-	0%	-
	14	Upstream leasing assets	-	0%	-
	15	Investments	1 034 181	10%	HEADQUARTERS/OFFICES
	16	Visitor and customer transportation	-	0%	-
	17	Upstream merchandise transportation	559 784	6%	DISTRIBUTION
	18	Utilisation of sold products	459 600	5%	USAGE
	19	End of life of sold products	650 523	6%	END OF LIFE WASTE
	20	Upstream franchising	-	0%	-
	21	Downstream leasing	-	0%	-
	22	Home-to-office commuting	31 451	0%	HEADQUARTERS/OFFICES
	23	Other indirect emissions	244 832	2%	DIGITAL MEDIA SALES GOODIES POS, HEADQUARTERS /OFFICES
		TOTAL	10 108 822		

2 SUMMARY OF CARBON FOOTPRINT RESULTS BY PRODUCT CATEGORY

10,100
tCO2e
generated by Arturia's activities in 2019

Percentage of emissions (kgCO2e) by category and sales volume (unit)



- Carbon emissions are more pronounced with product cateogories Lab, Brutes et Fuse as the amount of CO2e emitted is higher than the quantity distributed. Conversely, product categories Step and Freak exhibit a markedly lower rate of carbon emissions.
- Thus, Lab products represented nearly **66%** of company output in 2019-2020 corresponding to **68%** of carbon emissions.

*Emissions comprise the following sources: raw materials, freight, factories, distribution, end of product life cycle

2 RESULTS OF THE STUDY

OVERALL RESULTS
DETAILED RESULTS

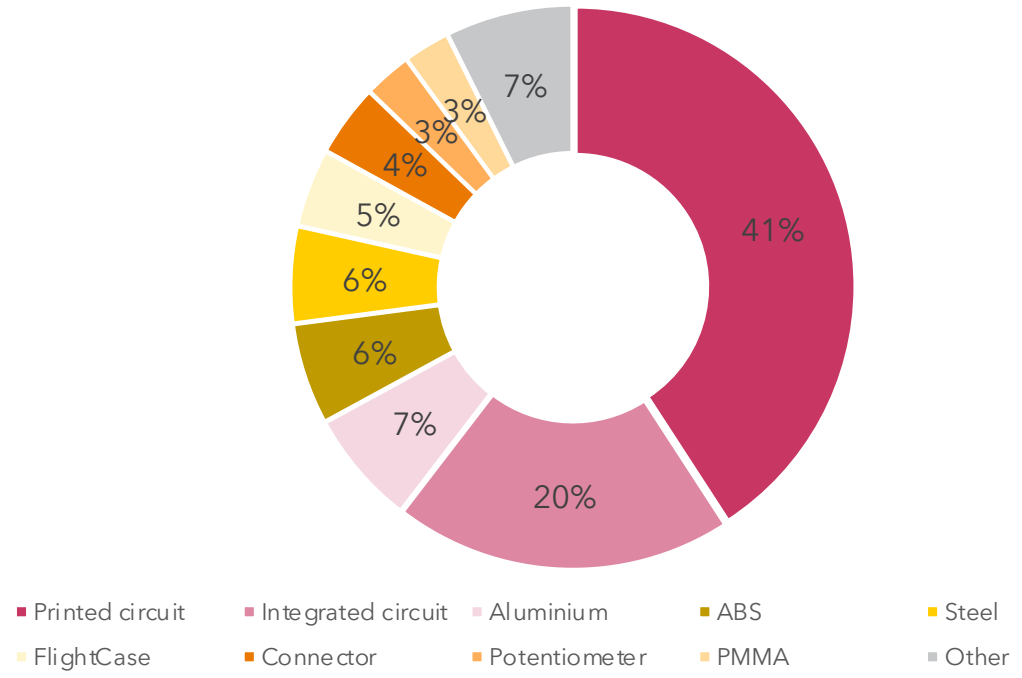
DETAILED RESULTS 1/2

Detailed view of raw materials

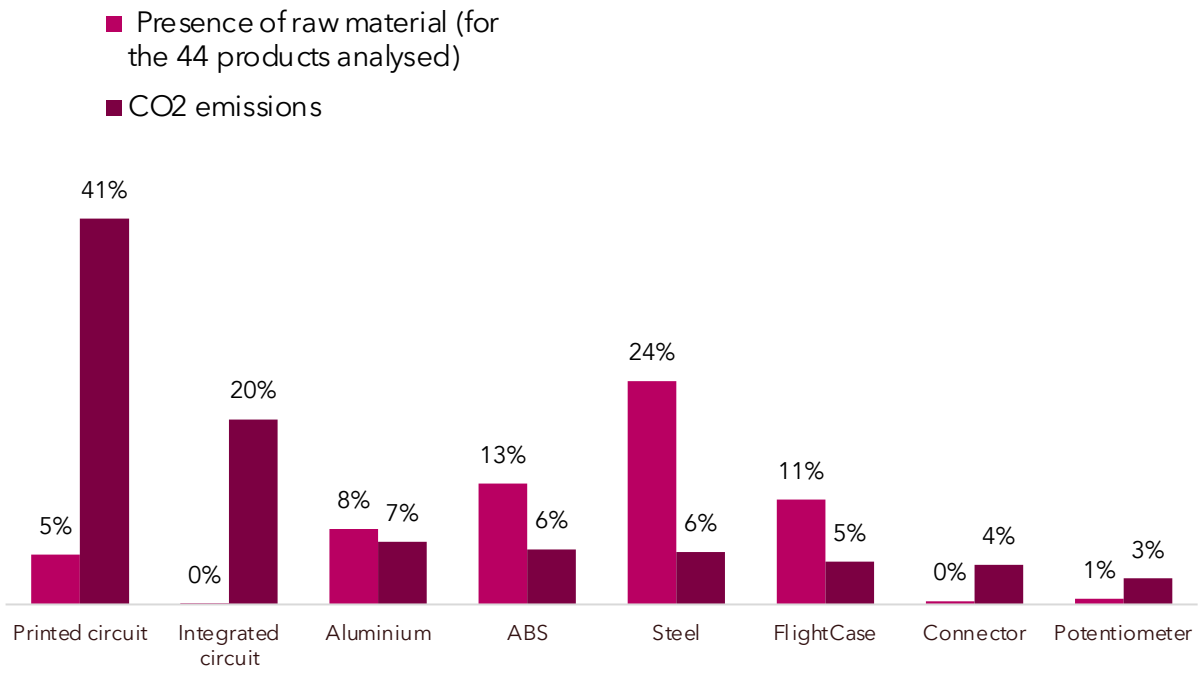
Raw materials (product components and packaging) account for 5,600 tCO2e, or 55% of the overall carbon assessment

These materials represent 84% of generated emissions (excluding distribution and usage)

Share of emissions linked to product-based raw materials* (%)



CO2e emissions rate by product composition (%)



- « Printed circuit » components are responsible for the largest share (**41%**) of CO2 emissions. The second most notable source is « integrated circuit », followed by « Aluminium », ABS (Acrylonitrile Butadiene Styrene) and Steel.
- Even if « Printed circuit» accounts for only **5%** of the emissions generated by the 44 products analysed, this component represents 42% of all emissions, due to its carbon intensity. By comparison:
  - Steel : 2,2 kgCO2e/kg
  - ABS : 4,3 kgCO2e/kg
  - Aluminium : 7,8 kgCO2e/kg
  - Printed circuit: 357 kgCO2e/m2
  - Electronique : 1084 kgCO2e/kg
  - Integrated circuit: 1 585 kgCO2e/kg

*Data based on 45 product description sheets

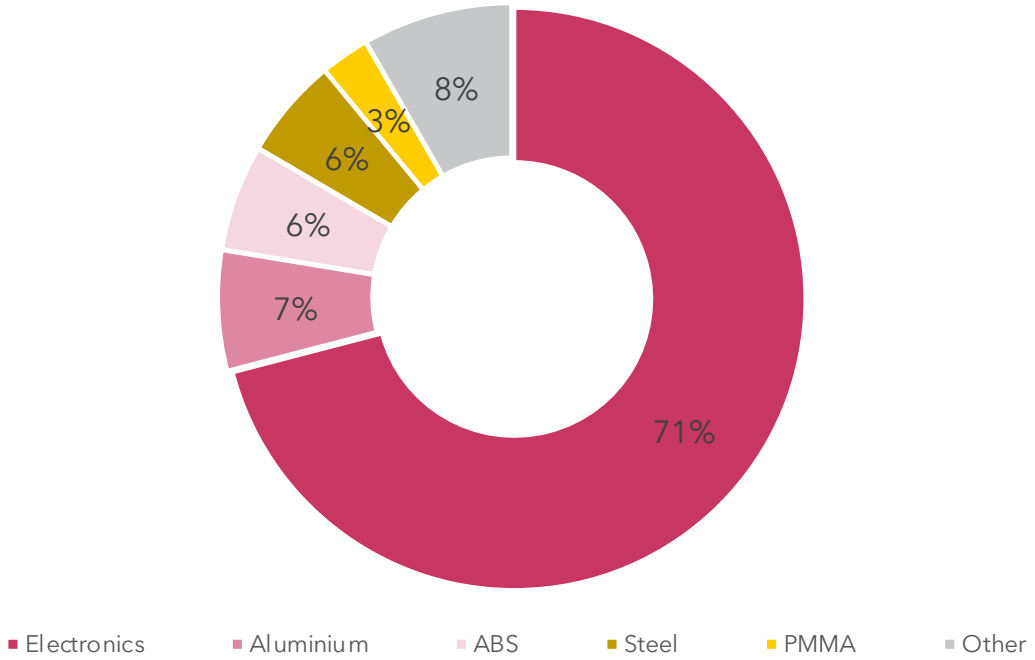
DETAILED RESULTS 2/2

Aggregated view of raw materials

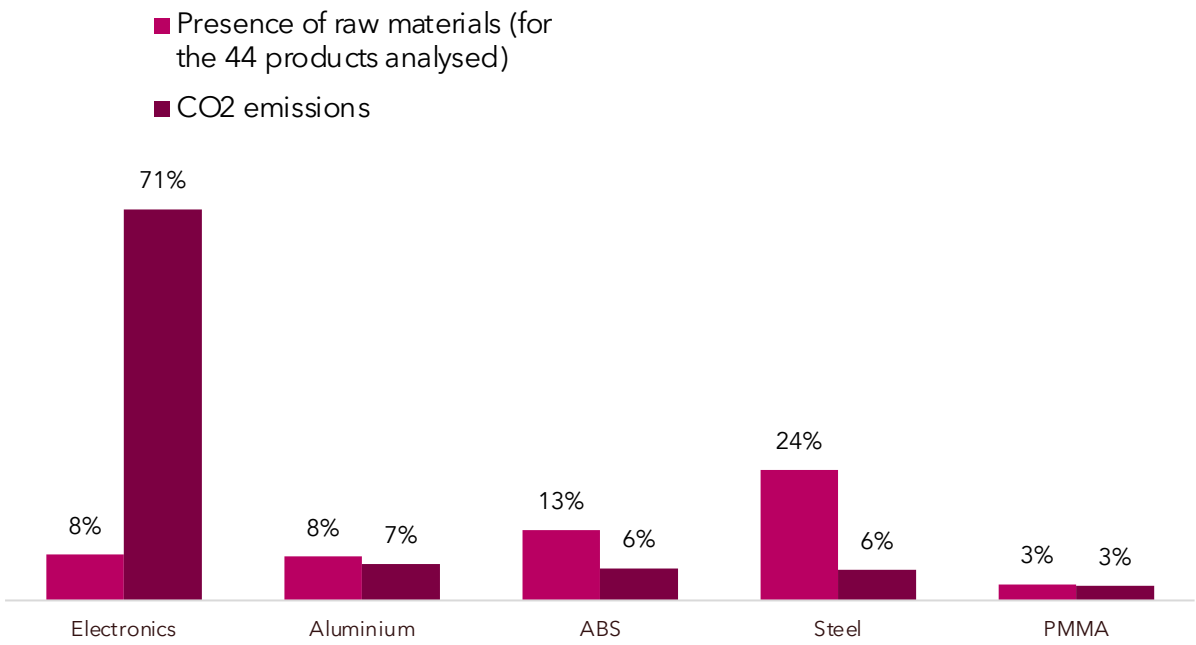
Raw materials (product components and packaging) account for 5,600 tCO2e, or 55% of the overall carbon assessment

These materials represent 84% of generated emissions (excluding distribution and utilisation)

Share of emissions linked to product-based raw materials* (%)



CO2e emissions rate by product composition (%)



- Electronic components account for 71% of the emissions generated by the 44 products analysed, followed by Aluminium and finally ABS plastic.
- The top three ranked raw materials account for 29% of the emissions linked to the 44 products studied; these three raw materials represent 84% of all emissions.

Data relative to precision tooling (Other materials, energy/water consumption, waste resulting from factory prodution, packaging for transportation) were available for only 3 unitary products.

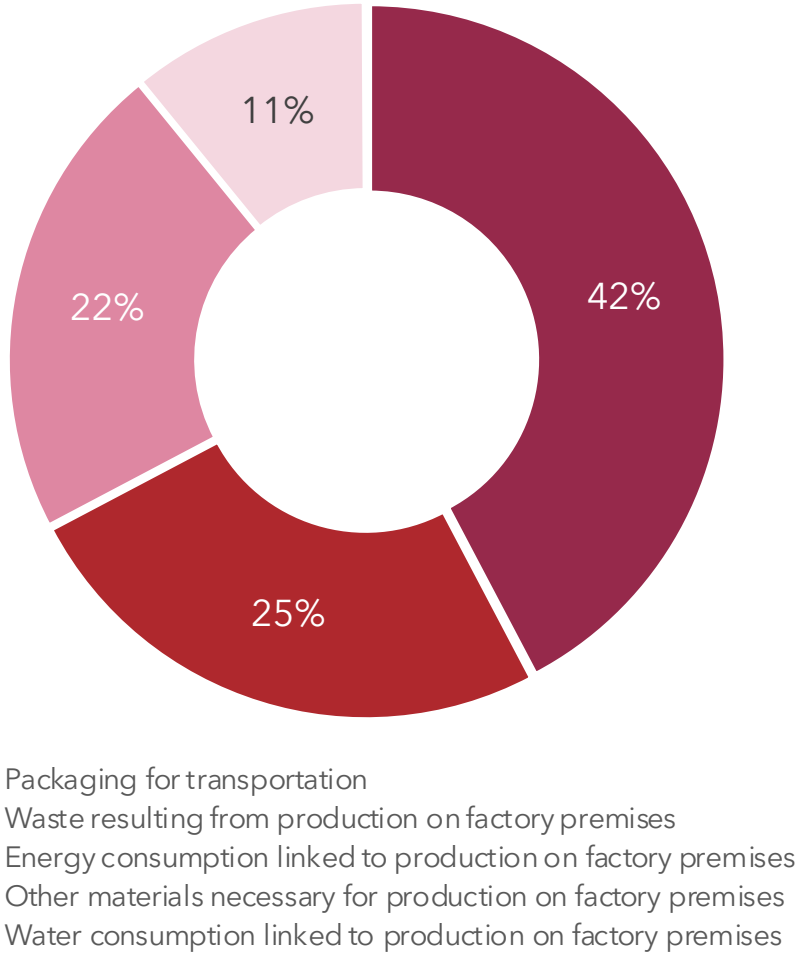
The averages of these ratios for the 3 products and 5 emissions sub-sources were calculated so as to apply them to the full range of products.

Emissions related to packaging for transportation are the first significant sub-source and account for **42%** of total emissions. This can be explained in particular by the fact that the protective foam used exhibits a high carbon intensity (in comparison to cardboard or PET).

The energy consuption required for the manufacturing and assembly of products emits as much CO2e as waste resulting from production.
Finally, the other materials utilised account for **11%** of total emissions from this source.

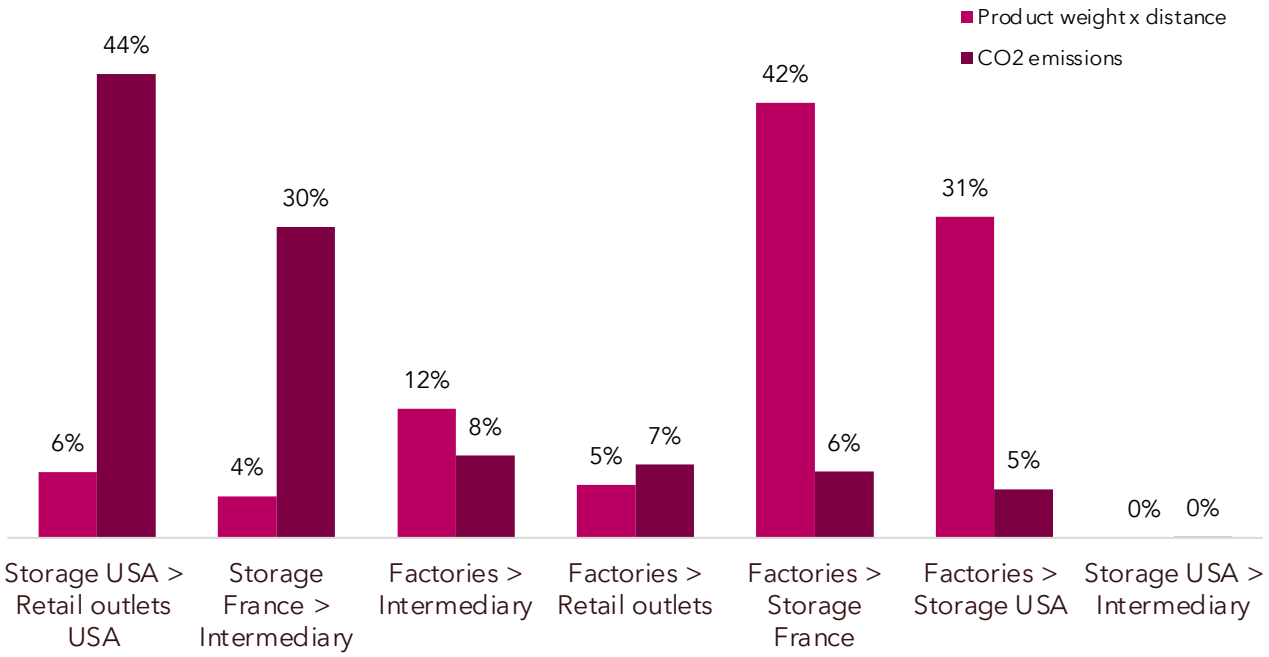
Factory production represents 635 tCO2e or 6% of the overall carbon assessment

Share of emissions linked to manufacturing sub-sources

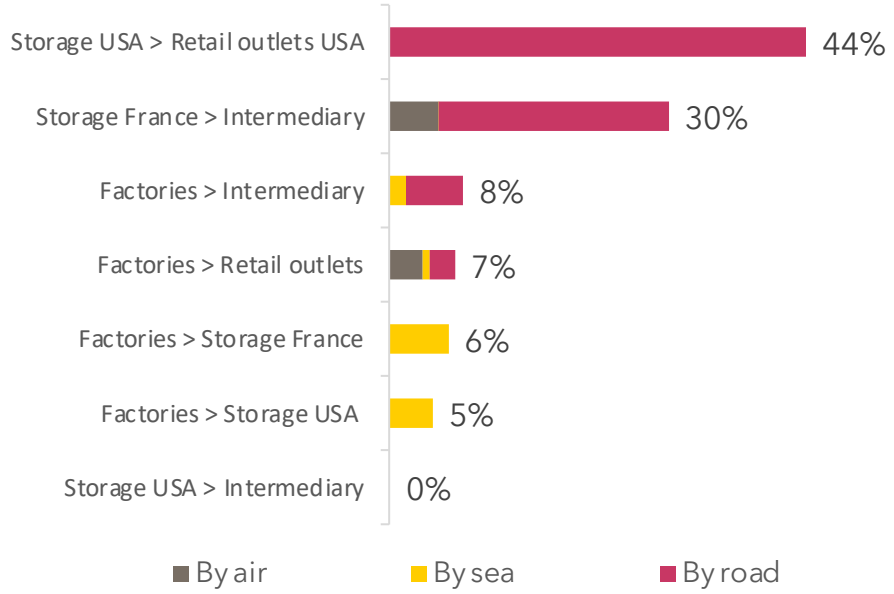


Distribution of finished Arturia products (to storage facilities, intermediaries, retail outlets) accounts for 560 tCO2e or 6% of the carbon assessment

Share of emissions by distribution phase (%)



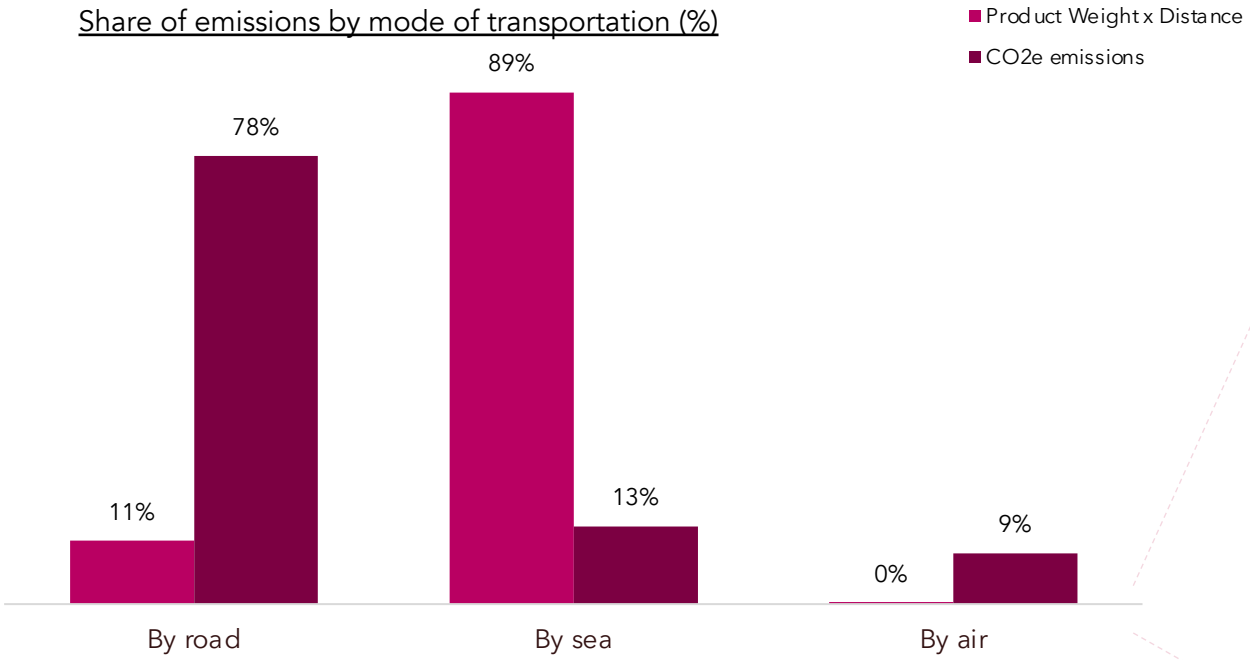
Share of emissions by distribution phase and by mode of transportation (%)



- Distribution (USA or France) to retail outlets, intermediaries which represent a 'Weight x Distance total' of **10%,** accounts for **74%** of the CO2e emissions. This is due to the privileging of transportation by road which generates more emissions than by sea, for example.
- Conversely, the transportation of goods between factories and storage depots, done exclusively by sea, generates a lower level of emissions, merely **11%** of total emissions for a 'Weight x Distance' ratio, accounting for **73 %** of overall emissions.

Distribution of finished Arturia products (to storage facilities, intermediaries, retail outlets) accounts for 560 tCO2e or 6% of the carbon assessment

Share of emissions by mode of transportation (%)



Routes of products transiting by air

Origin	Destination	Weight x Distance	Weight x Distance (km)	CO2e emissions (KgCO2e)	CO2e emissions (%)
China	Bolivia	8071	28%	14 043	28%
China	Indonesia	3 446	12%	5 996	12%
France	Iceland	870	3%	1 514	3%
France	Israel	7 801	27%	13 574	27%
France	Lebanon	7	0%	13	0%
France	Malta	108	0%	188	0%
France	United Arab Emirates	8 126	29%	14 140	29%

- Arturia rarely has recourse to air transportation. Nonethless, **if the 'Weight x Distance' ratio for the latter represents less than 1% of the total**, emissions resulting from air freight still account for **9%** of overall emissions, or 50 tCO2e.

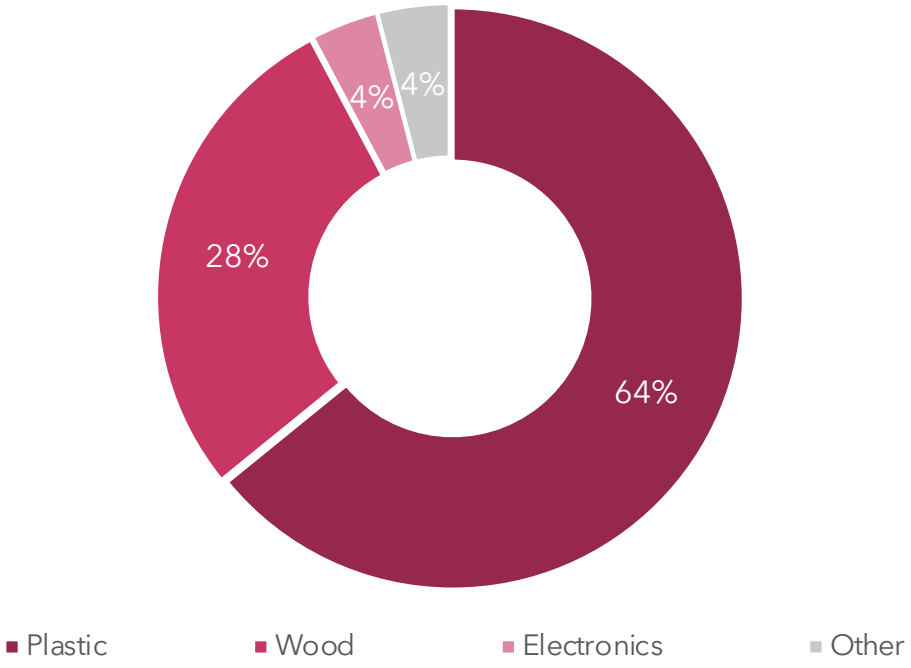
Product usage by customers accounts for 460 tCO2e or 5% of the carbon assessment

Utilisation	Number of products sold taken into account	Usage consumption (Wh/unit)	Usage duration (h/yr)	Emissions factors	Usage consumption for all products sold in 2019-2020 (KWh/yr)	Carbon emissions in kg CO2e
Hardware	190 042	Product consumption is measured in accordance with SKU	Duration of usage based on customer survey for 18 macro-products	Energy mix proportionate to each country where an article is sold	137 000 kWh	39 000 KgCO2e
Software	78 481	Product consumption is measured in accordance with SKU	Duration of usage based on customer survey for 18 macro-products	One single emissions factor was taken into account on the basis of a weighted average between sales volumes and energy mixes for each country	1 005 800 kWh	420 800 KgCO2e

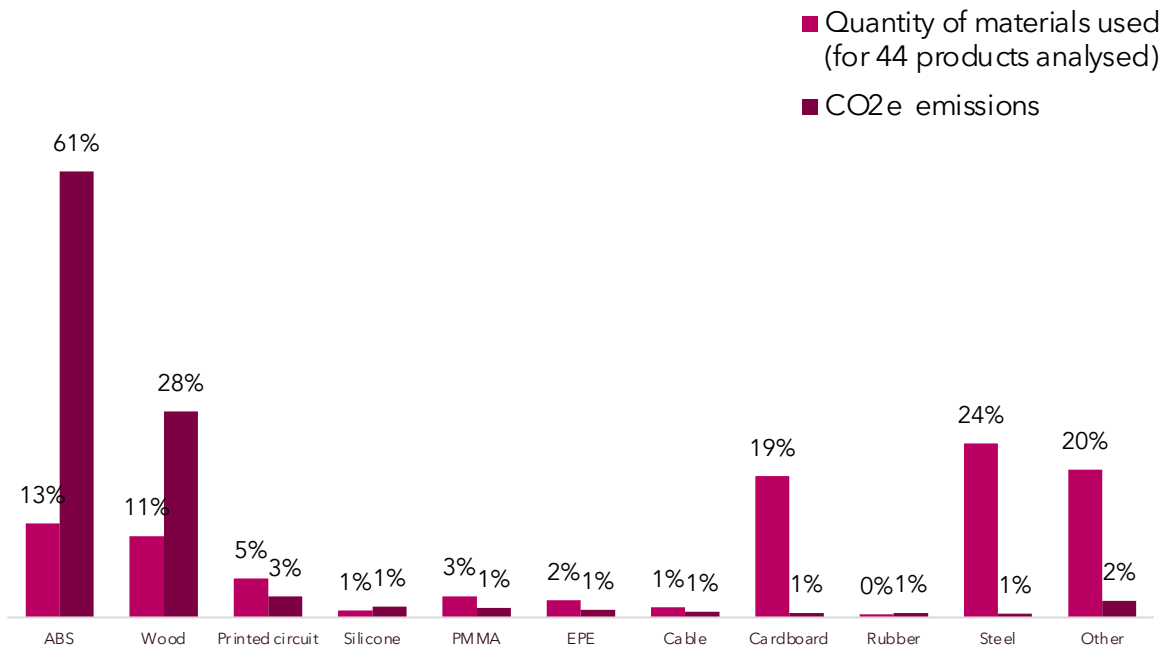
- **Computer energy consumption required for software/hardware utilisation was not taken into account. In fact, this value represents 250 *kWh*** (ex : consumption of a desk-top computer)
- Average consumption of Arturia hardware devices is **4,36 *kWh* (weighted average 1,2 *kWh*)**
- Average consumption of Arturia software devices is **15,3 *kWh* (weighted average 19,3 *kWh*)**
- **The correlation is 16 between the two weighted averages corresponding to hard- and software product energy consumption**
- **Duration of usage also has an impact, albeit marginal, since software products are used for an average of 664 hrs/yr, compared to an average of 544hrs/yr for hardware devices (weighted averages)**

Waste resulting from product end of life accounts for 650 tCO2e or 6% of the carbon assessment

Share of emissions linked to product-based raw materials* (%)



CO2 emissions rate by product composition (%)



- Plastic is the material with the hightest concentration (64%) of CO2 emissions for this sub-source, with 61% imparted to ABS. The second highest concentration is that of wood, while the third is electronics. If electronics are characterised as a highly emissive material, they are less carbon intensive that other materials during final phase of product life cycle.
- By comparison, note below the cargon intensities associated with the end-of-life of the most utilised materials:
  - Steel : 0,043 kgCO2e/kg
  - Cardboard : 0,067 kgCO2e/kg
  - Plastic : 0,8 kgCO2e/kg
  - Electronics : 1,1 kgCO2e/kg
  - Wood : 5,11 kgCO2e/kg

* Based on 45 product description sheets.

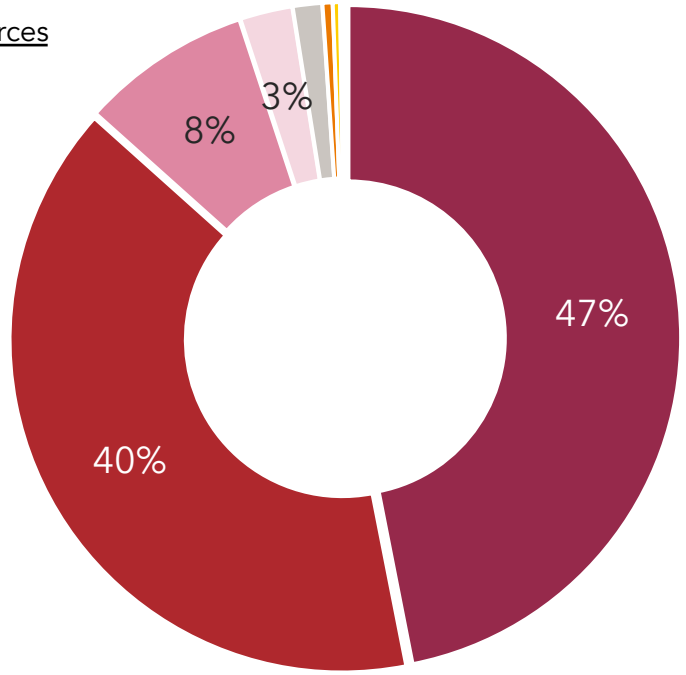
Emissions related to supplier-related expenses account for **47 %** of all emissions, **40%** for in-office assets and **8%** for advertising.

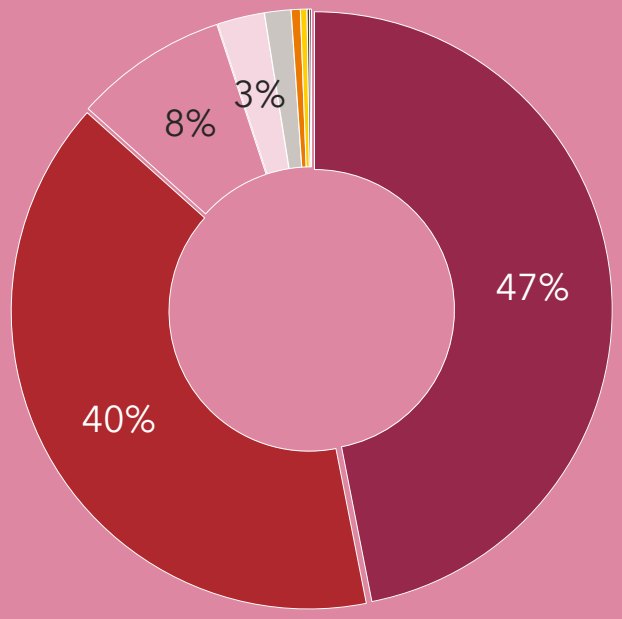
All in all, these 3 sub-souces represent **95%** of emissions related to Headquarters/Office & Media/Sales/Goodies/POS. *The 3 afore-mentioned sources will be the object of a specific slide below.*

The 6 following sub-sources: goodies, employee home–to-work commuting, office-generated waste, energy/water consumption, POS and Advertising/Marketing paper, together account for **110 tCO2e**.

Emissions related to headquarters/offices & media/sales/goodies/POS account for 2,205 tCO2e or 21% of the carbon assessment

Share of emissions linked to sub-sources

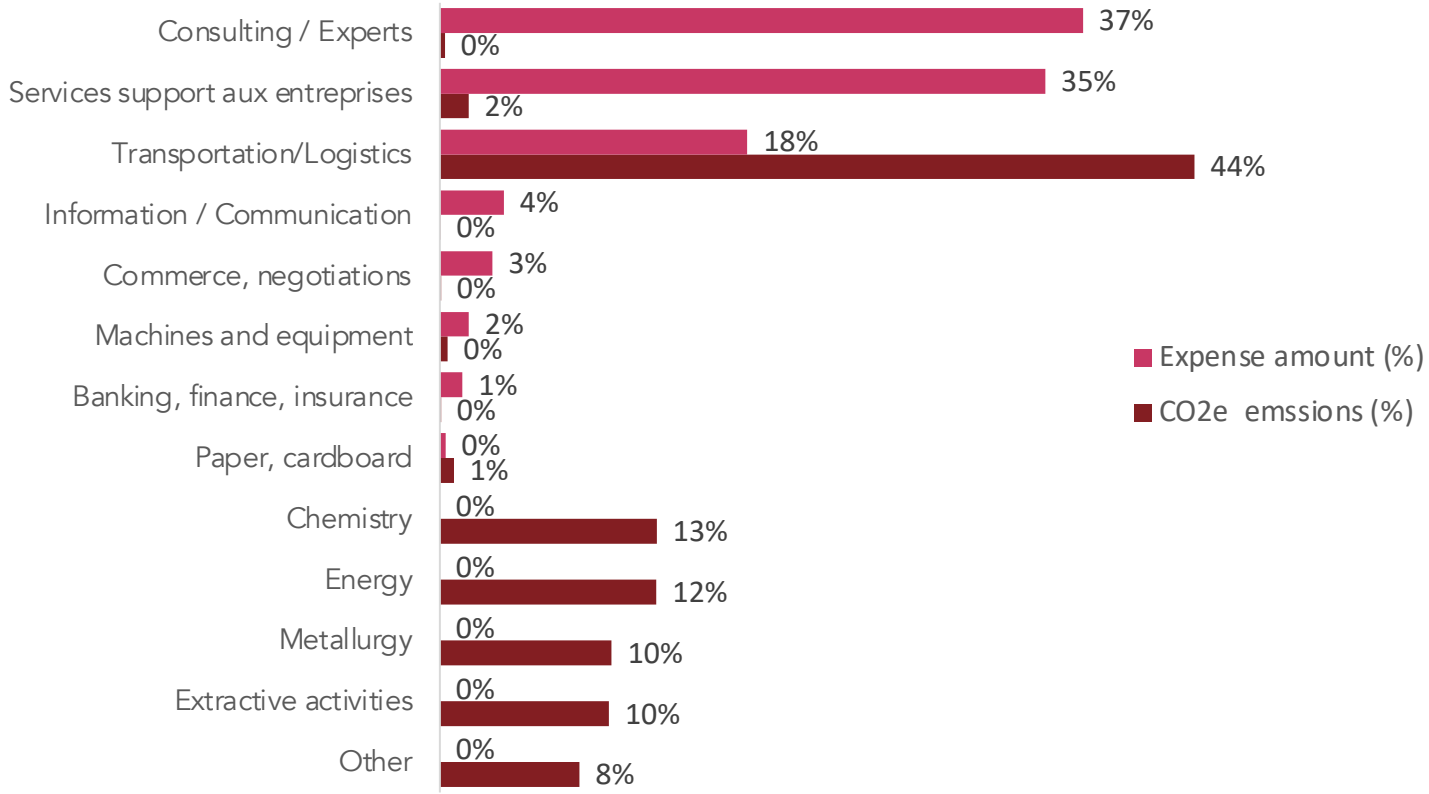


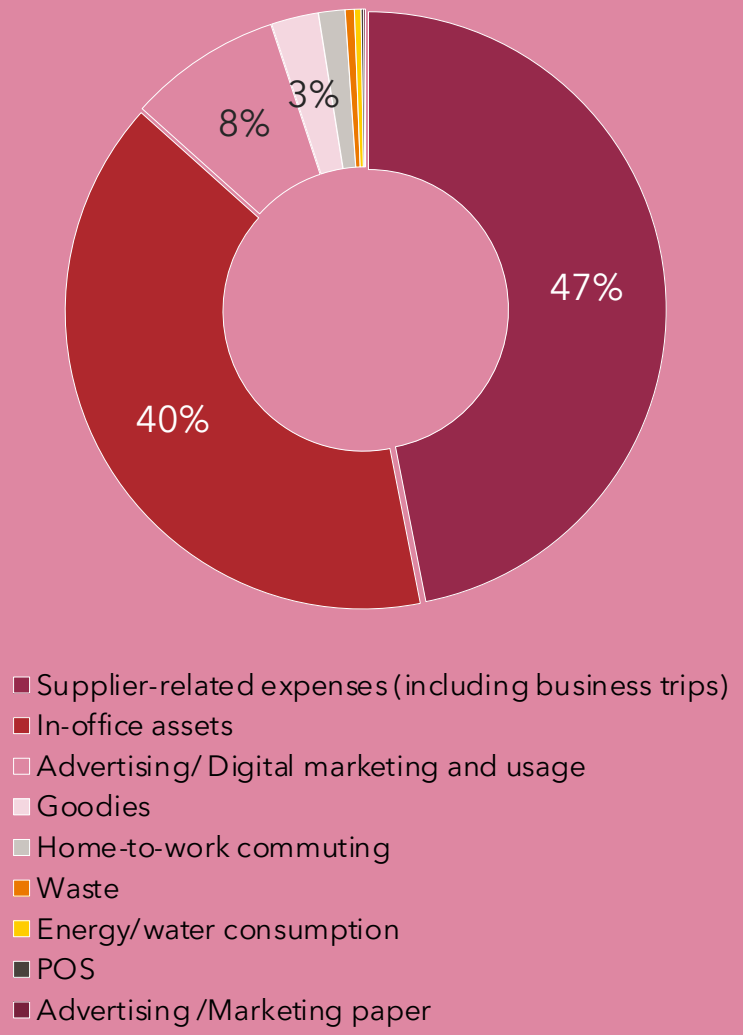


- Supplier-related expenses (including business trips)
- In-office assets
- Advertising/Digital marketing and usage
- Goodies
- Home-to-office commuting
- Waster
- Energy/water consumption
- POS
- Advertising/Marketing paper

FOCUS ON SUPPLIER-RELATED EXPENSES

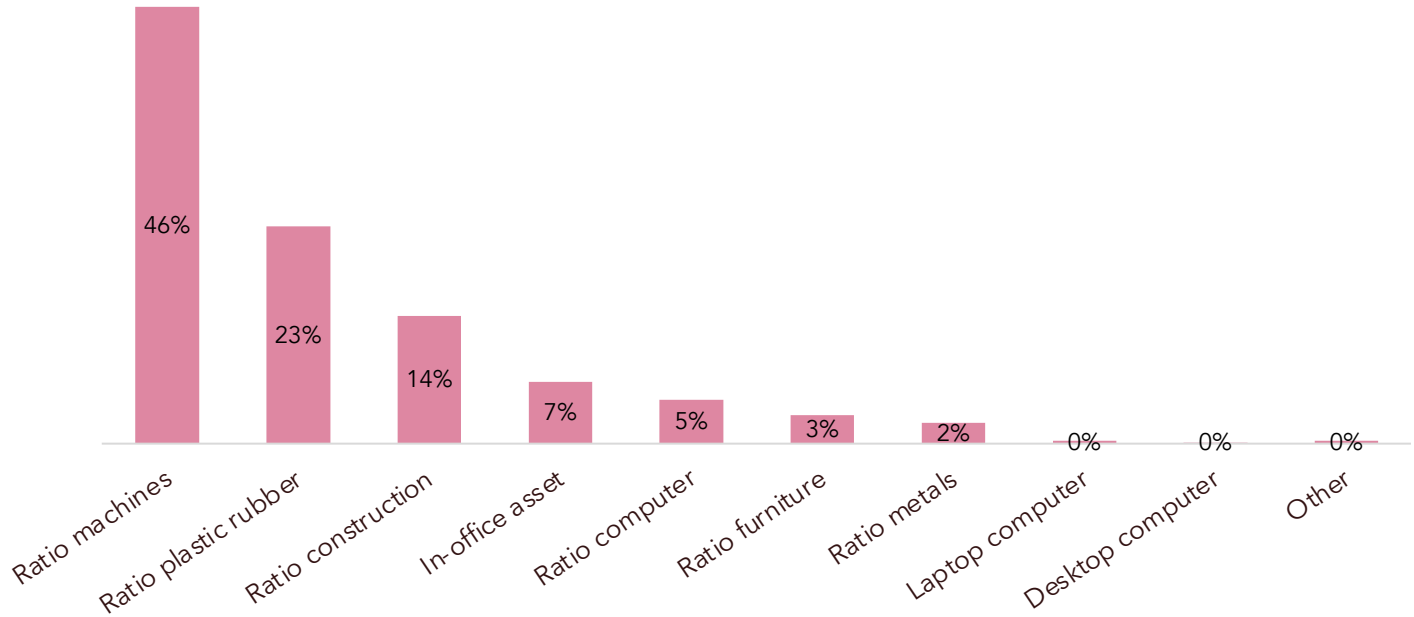
These expenses mainly concern the following sectors: Consulting/Expertise, Business Support programs and Transportation/Logistics whether the latter involve sampling or customer service (not taken into account in the Distribution data addressed above) or business trips. Even if expenses do concern Distribution (beyond Transportation/Logistics which accounts for 44% of emissions) the other impacted sectors are located within the downstream supply chain of Arturia's own suppliers. For this reason, we can note impacted sectors such as Energy or Chemistry among others mentioned below.

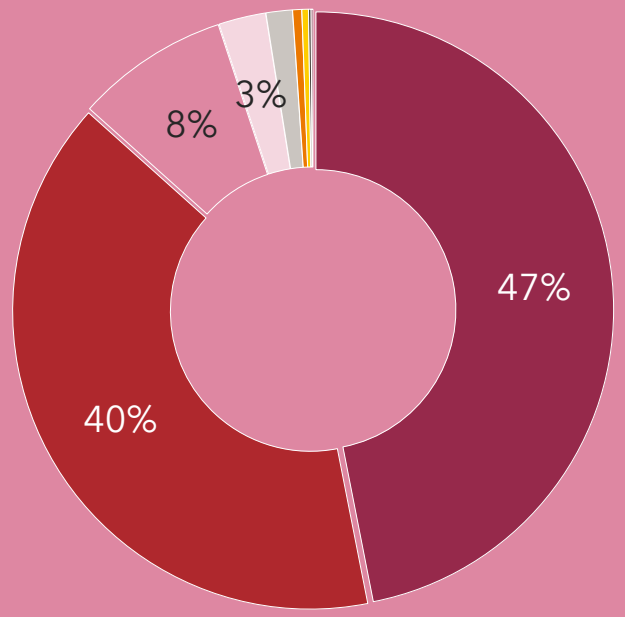




FOCUS ON IN-OFFICE ASSETS

The calculation of emissions linked to in-office assets take into account the depreciation period for these apparati. Thus, for a computer purchased during the year-long study and for which the depreciation period is estimated at 3 years, the emissions level of its entire life cycle will be divided by 3. Each year, a portion of these emissions must be accounted for in Arturia's Carbon Assessment until the asset cost has been absorbed. Whenever possible, physical data were measured, in the absence of data relative to cost (indicated by a ratio in front of the product label). Machines, rubber and plastic materials et construction are the three types of object or material that emit the most in this emissions source.

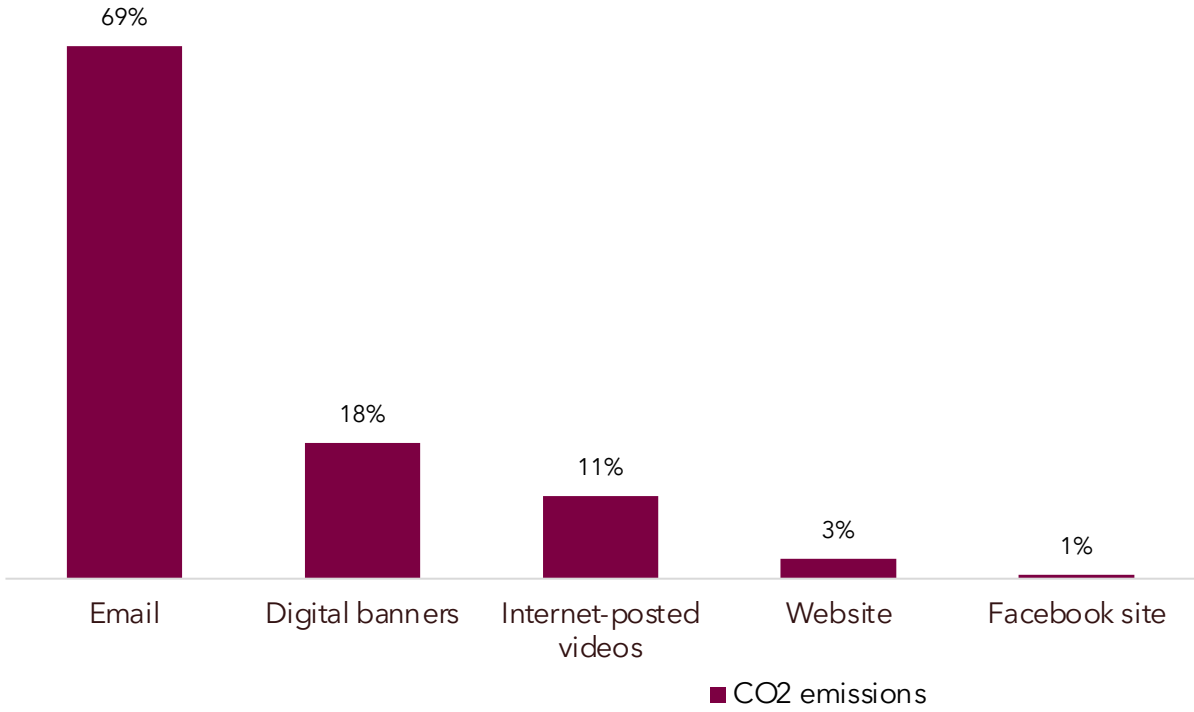




FOCUS ON ADVERTISING/DIGITAL MARKETING AND DIGITAL USAGE

Emails dispatched to cliens and customers are the first emssions factor in this sub-source, followed by digital banners and online videos.

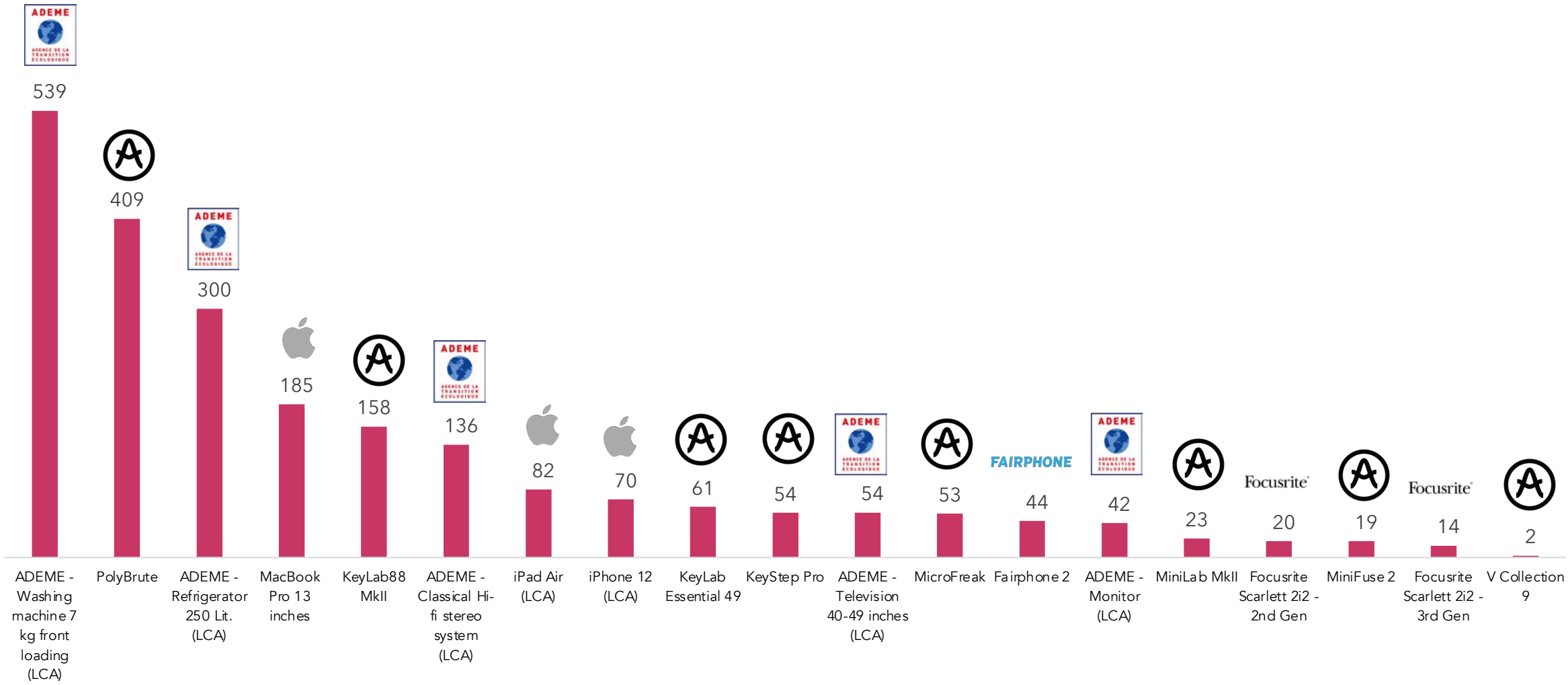
All in all, more than 31 M emails were sent, amounting to an emissions total of **126 tCO2e**. Surprisingly, this represents the yearly carbon footprints of 12 French people.



3 BENCHMARK DATA

BENCHMARK OF CARBON FOOTPRINTS OF ELECTRONIC DEVICES

Comparative emissions by product (kgCO2e), Not including Arturia product use or end of life



4 APPENDICES

GLOSSARY

Scope 1: direct emissions produced by stationary and mobile sources (ex: natural gas utilised in thermal power stations, heaters installed on company premises or petrol used for company vehicles.

Scope 2: Indirect emissions linked to electricity consumption, or to heating or cooling systems (ex : electricity or heating purchases)

Scope 3: other indirect emissions (ex: emissions linked to purchased products or services, emissions associated with upstream or downstream merchandise shipping, emissions linked to the utilisation of purchased products, etc).

Emissions factor (EF): refers to the ratio between the quantity of GHG emitted by an object or a material, as well as the characteristic value attributed to the latter measured in the most convenient unit (weight, cost, etc.)

Carbon Assessment: A 'carbon assessment' aims to analyse the impact perimeter of a given activity in the most exhaustive manner possible. Therefore, it is not sufficient to measure merely the flows generated by an entity, but rather to encompass the totality of the flows and effects upon which its activity depends (ex : concerning home-to-office commuting, the company cannot restrict such mobility. Indeed, without these trajectories, employees and collaborators would not be able to work. Company activity is therefore dependent upon these movements, which in turn justifies their being taken into consideration. Carbon assessment methodology was initiated in 2004.

The most recent update of the ADEME configuration is the 8.5.1. version which was used for the present study.

What is the difference between a carbon assessment and a LCA (life-cycle analysis)?

- An LCA establishes an inventory of flows from the 'cradle to the grave': from the extraction of energy-rich (or not) raw materials necessary for product manufacuring, distribution, utilisation, recycling and elimination toward end-of-life channels. This process includes all phases of transportation.
- In addition, an LCA calculates impact on other categories such as potential toxicity for humans and the environment, resource depletion, use of land/space, acidification, etc.
- Following ISO 14040 norms, and LCA is the « compilation and evaluation of inputs, outputs, and of the potential environmental impacts caused by product systems in the course of their life cycle. »

Why is the study of scope 3 indirect emissions so crucial?

- Indirect emissions upstream and downstream from the company's value chain (scope 3) are often not considered in impact evaluations.
- However, in most sectors, such emissions actually constitute the most substantial part of a company's inventory (Ex : 90% of Sanofi's carbon footprint in 2018).
- A global view of the impact of such emssions on the supply chain enables a company to:
  - → Evaluate where the emissions 'hot spots' are located in its supply chain;
  - → Identify the most efficient suppliers in terms of emissions management and control;
  - → Engage and assist suppliers in the implementation of emissions reduction strategies.

4 LIMITATIONS

The limitations of the present study

This study aims to analyse the magnitude of Arturia's overall CO2 emissions, and is based on data provided by the company.

As with any carbon footprint evaluation, the calculations proposed here contain a margin of error which itself is dependent upon the inherent margins of error among the various emissions conversion factors mentioned in data bases (ADEME, Ecoinvent, Codde…), but also upon fluctuations resulting from the necessity to associate different products for data collecting purposes.
Finally, a margin of error may be attributable to hypotheses used for emissions estimates.

This said, the methodology employed here has enabled Arturia to provide its first comprehensive carbon assessment.

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