Greenhouse Gas Emission Assessment
World Conservation Congress | Marseille

November 3rd – 11th 2021

Carbon Footprint Results

www.eco-act.com
EcoAct, an Atos Company.
Registered Office: 35 rue de Miromesnil, 75008 PARIS

The purpose of this document is to present the results of the greenhouse gas inventory of the 2020 edition of the IUCN World Conservation Congress held in Marseille in September 2021.

The inventory has been carried out according to the Bilan Carbone® Methodology from the French Agency for Ecological Transition (ADEME).

Pilot team consisted by:

- Olivier ROBIN, Sustainable Development and Legacy Advisor
- Quentin GIRARD-QUEROL, Sustainable Events Assistant (World Conservation Congress)

We would like to thank the organization team and all the contributors who made it possible to obtain quality data in the allotted time.

Study carried out at EcoAct by:

- Laurianne Ernest, project director
- Valentin Framont, project manager
- Beatriz Marques Pereira, consultant

Sumary

Synthesis

The International Union for Conservation of Nature (IUCN) is a membership Union, composed of government and civil society organisations. Its 1,400 member organisations and more than 18,000 experts makes IUCN the global authority on the status and safeguard of the natural world.

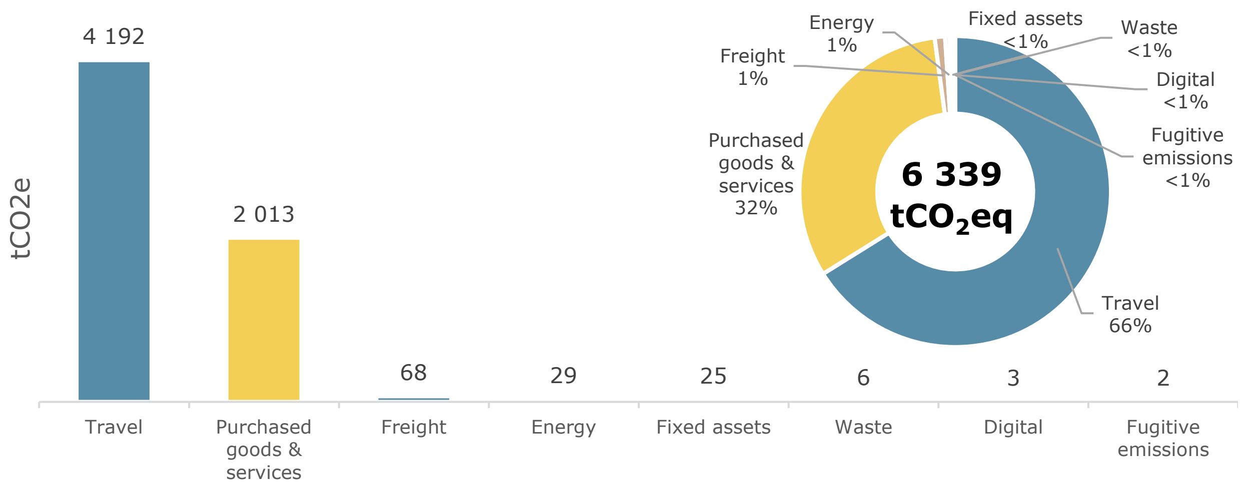
The IUCN and the French government have agreed to hold the 2020 IUCN World Conservation Congress from 3 to 11 September 2021 in Marseille. The event, originally scheduled for June 2020, was postponed due to the COVID-19 pandemic.

Held every four years, the event brings together several thousand leaders and decision-makers from government, business, academia and civil society to preserve the environment and use nature's solutions to address the world's current challenges. It put forwards the opportunity to achieve environmental governance for human, social and economic development.

Climate Change is a central matter in environmental preservation and a greenhouse gas (GHG) emissions assessment provides the basis for further initiatives in reducing climate impacts, starting with public reporting, through target setting and implementing mitigation activities.

This assessment was built in accordance with the latest version of the method for carrying out greenhouse gas emission inventory by the French Ministry of Ecological Transition, and by means of the calculation spreadsheet Bilan Carbone ® version 8.6 – made available to authorized firms by ADEME.

For its **2020 edition**, the greenhouse gas emissions of the World Conservation Congress amounted to **6 339 tCO_2eq on the selected perimeter**.



Emissions are mainly due to travels of the Congress participants, including delegates, staff and visitors (66% of emissions), followed by the purchase of goods and services (32% of emissions), in particular related to the rental of electronic products and hotel nights.

The remaining emissions sum up to less than 3% of the total footprint. Emissions due to freight activities equal to 1%, followed by energy emissions (due to the purchase of electricity) and fixed assets (equipments, offices, vehicles), both up to 1% of total emissions.

Fugitive emissions related to the use of air conditioning and emissions from waste and digital energy consumption during the Congress constitute a very small part of its emissions, respectively less of 1% of total emissions.

Some of the emissions sources are detailed in physical and emissivity here below :

		Unit	Total Emissions (kgCO2eq)	Emissivity (kgCO2eq/unit)	
Duration of the event	7	days	-	-	
Number of onsite participants	5 700	people	-	-	
Total surface from the Congress area	57 675	m^2	-	-	
Energy consumption (kWh)	482 775	kWh	28 918	0,06	kgCO2eq/kWh
Water consumption	1086	m^3	143,352	0,13	kgCO2eq/kWh
Amount of waste*	55,5	tons	6 239	112,36	kgCO2eq/kWh
Hotel nights	38 602	nights	689 294	17,86	kgCO2eq/night
Number of meals	28 225	meals	49 684	1,76	kgCO2eq/meal
Total people tansportation	32 269 517	km	4 191 555	0,13	kgCO2eq/km
Plane travel	22 442 038	km	3 849 387	0,17	kgCO2eq/km
Train travel	7 202 128	km	19 742	0,00	kgCO2eq/km
Car travel	483 603	km	93 348	0,19	kgCO2eq/km
Total freight transportation	94 303	km	68 178	0,72	kgCO2eq/km

**Only treatment of resources and waste recycled, or going through energy recovery or into landfill is considered. 56 additional tons of resources & waste were reused through donations thus avoiding any treatment and carbon emissions.*

Details of all emissions sources are discussed by the following.

I. The GHG emission inventory regulatory method

Being hosted in France, the regulatory greenhouse gas inventory of the World Conservation Congress was carried out for its 2020 edition (having taken place in 2021) according to the French Bilan Carbone® Method and best practices.

II.1. The different phases of a GHG emission inventory

More than a service and more than a regulatory obligation, the regulatory GHG inventory is a comprehensive approach that requires the strong involvement of its stakeholders. It is composed of the following steps:

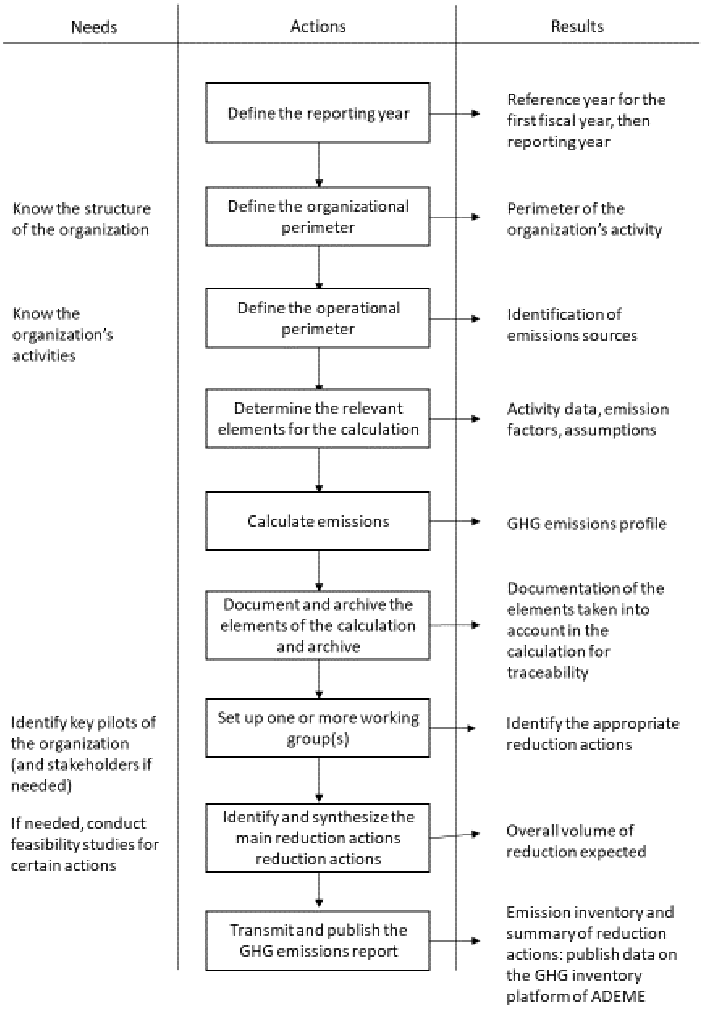


Image 1 : The key steps in carrying out a GHG emissions inventory and the associated action plan

II.2. The greenhouse gases considered by the method

The method inventories **human (or anthropogenic) GHG emissions**. The greenhouse gases accounted for are those listed in the Kyoto Protocol:

- **Carbon dioxide (CO_2),** resulting from deforestation and the use of fossil fuels (coal, oil and gas). Organic CO_2 emissions are responsible for 69% of the greenhouse effect induced by human activities.
- **Methane (CH_4),** generated by the fermentation of organic matter in the absence of oxygen (marshes, rice fields...) but also by the leaks linked to the use of fossil fuels such as natural gas or coal, or by livestock farming. It is responsible for 18% of the greenhouse effect induced by human activities.
- **Nitrous oxide (N_2O),** it results from the oxidation of nitrogen compounds in the atmosphere. 2/3 of its emissions are due to the use of manure and fertilizers. It is also used as a propellant in aerosols. It is responsible for 5% of the greenhouse effect linked to human activity.
- **Nitrogen trifluoride (NF_3),** increasingly used as a chemical etchant in microelectronics.
- **The so-called "industrial" gases (HFC, PFC, SF_6),** not existant in their natural state but produced by men. They are used for climatisation, in air conditioners, refrigerators and other industrial systems. Even if their concentration in the atmosphere is very low, some of them have a very high GWP (global warming potential).

II.3. ADEME's tool: the spreadsheet Bilan Carbone® V8.6

The GHG inventory aims to study an activity on its most exhaustive perimeter. Thus, it is not a question of considering only the flows managed by the organization but all the flows on which its activity depends. For example, an organisation does not control the movements of its employees between their place of residence and their place of work. However, without these movements, its agents would not be able to work. The administration's activity is therefore dependent on this travel, which is why it is considered. **For this GHG inventory, a larger operational perimeter has been defined including all the main sources of emissions in the Bilan Carbone® methodology as well as the digital carbon footprint** as described below**.**

Once the scope of the study has been defined, the GHG inventory usually makes it possible to identify and prioritize the items that contribute most to GHG emissions and to draw up an action plan (energy consumption, employee transport, choice of materials, clauses to be imposed on subcontractors and suppliers, etc.), **with the aim of reducing the carbon footprint** of the most significant emission categories. That is why the French Environment Ministry has decided to realize before the Congress, a predictive analysis of the GHG inventory in order to implement reduction actions. The current document presents the results after the Congress with the real data from the event.

The last update of the ADEME's (French Agency of Ecological Transition) spreadsheet at the beginning of the study was version 8.6, which was made available to organizations authorized by ADEME in 2021. It has allowed to refine many emission factors thanks to the results of the most recent studies, which then permits the improvement of the relevance of the carbon footprint measurements performed.

This tool was used for this study.

II.4. GHG emission calculation

In most cases, it is not possible to directly measure the greenhouse gas emissions resulting from a given action. Indeed, if the measurement of GHG concentration in the air has become a common scientific practice, it is only in exceptional cases that the emissions can be measured directly.

The only way to estimate these emissions is to calculate them, using so-called activity data: number of trucks employed plus distance covered, number of tons of steel purchased, etc. The Bilan Carbone® method was developed to convert these activity data into estimated emissions.

The figures that allow the conversion of observable data in the entity into greenhouse gas emissions, expressed in CO_2 equivalent (CO_2e), are called Emission Factors (EF). The gases, detailed above, have different global warming potentials (GWP) and atmospheric lifetime. In accordance with the methodology indicated in the IPCC reports, the GWP of the gases in CO_2 equivalent is considered over a period of 100 years.

$$\text{Data (unity)} \times \text{Emission Factor } (CO_2eq/unit) = \text{GHG Emission } (CO_2eq)$$

Image 2 : Method of calculating GHG emissions

The GHG inventory method lists **direct and indirect GHG emissions**, through emission factors, by analyzing the emission items presented below.

As most of the approach is based on average emission factors, this method is primarily intended to provide orders of magnitude and not exact results.

II.5. Uncertainty of results

Since the results are evaluated in order of magnitude, they must be displayed with their uncertainty. These uncertainties, specific to the method, are linked to two factors:

The uncertainty of the data
Some data are known with precision, such as energy consumption, liters of fuel, etc.; others are estimated or extrapolated from the results of a survey.

Uncertainty in emission factors (EFs)
The EFs provided by ADEME are average EFs resulting from various studies such as Life Cycle Analyses. These aggregated EFs in the form of a database are included in ADEME's Bilan Carbone® tool. Thus, they present variable uncertainty rates depending on the validity and the source of the study used, which can range from 5 to 50%.

Therefore, the results obtained must not have more than 2 or 3 significant figures. Consequently, the values displayed on the histograms and those in the body of the text do not overlap precisely (the latter being generally preceded by "approximately"). This is particularly true for the total values of each of the categories studied, which are rounded.

In any case, an imprecision of this order will in no way hinder the main purpose of the GHG inventory method, which is above all a springboard for actions to reduce greenhouse gas emissions. In order to initiate and then evaluate reduction actions, it will usually be sufficient to have a hierarchy of emissions and orders of magnitude.

Global incertitude from the Congress reaches 25%, mostly from travel emission factors and input data (32% incertitude) and from fugitive emissions (27%). All other incertitudes go from 10 to 20%. It represents a regular level of incertitude.As a reminder, the Bilan Carbone® method recommends to use the following assumption in order to define the level of incertitude for each calculation :

- 0% to 5% for data from direct measurement (invoices or meters);
- 15% for reliable data not measured;
- 30% for recalculated data (extrapolation);
- 50% for approximate data (statistical data);
- 80% for data known in order of magnitude.

II. Perimeter of the study

III.1. Temporal and organizational perimeter

The study focuses on data related to the activity of the 2020 edition of the IUCN's World Conservation Congress, held in Marseille, France, between the 3rd and the 11th September 2021.

The activities of the Congress concern the 5 700 on-site participants, 3 500 virtual participants and over 25 000 visitors. People from organization (national and local), service providers, suppliers, volunteers ans all exibitors related to the Nature Generation Areas were also integrated in the assessment. All the physical flows linked to the activities of the Congress and its participants were covered.

The scope of consolidation includes all the buildings used for the needs of the Congress except those which have been depreciated (> 30 years), i.e. the Parc Chanot, Palais des Arts, Grand Palais.

In addition, the IUCN held a virtual event between the 5th and the 16th April 2021, the Global Youth Summit, counting with approximately 15 000 people registered, more than 50 workshops hosted by youth-led organisations, and dozens of networking events. The emissions of this Summit were covered in the Digital category of the footprint.

III.2. Operational perimeter

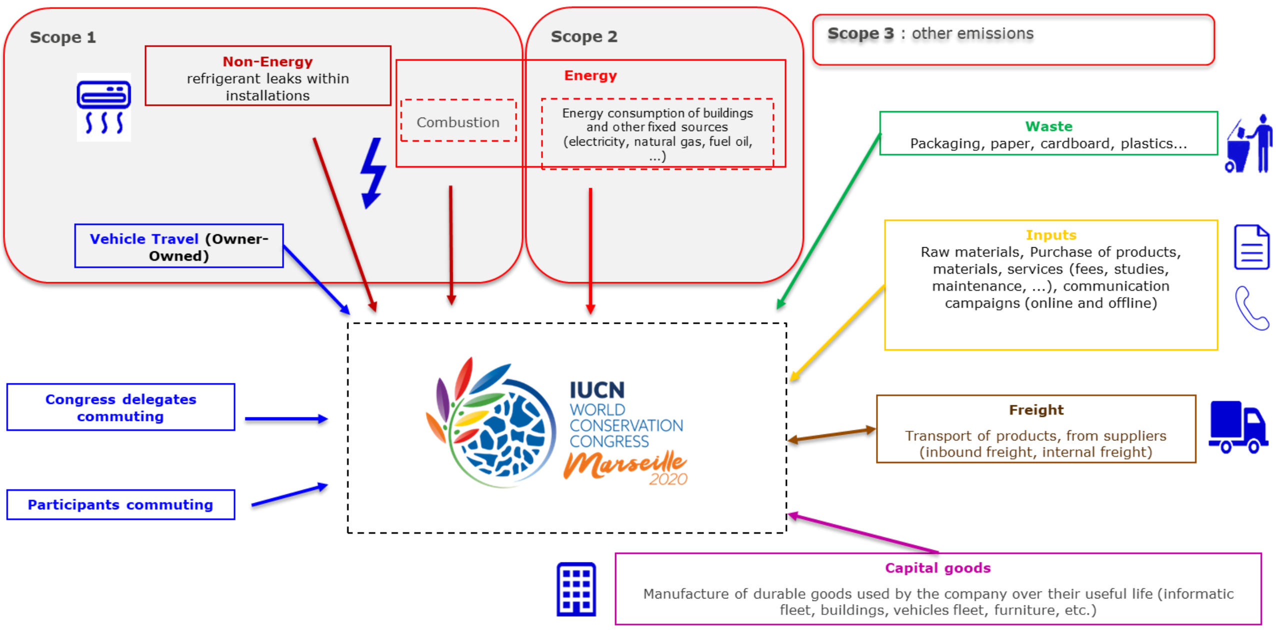


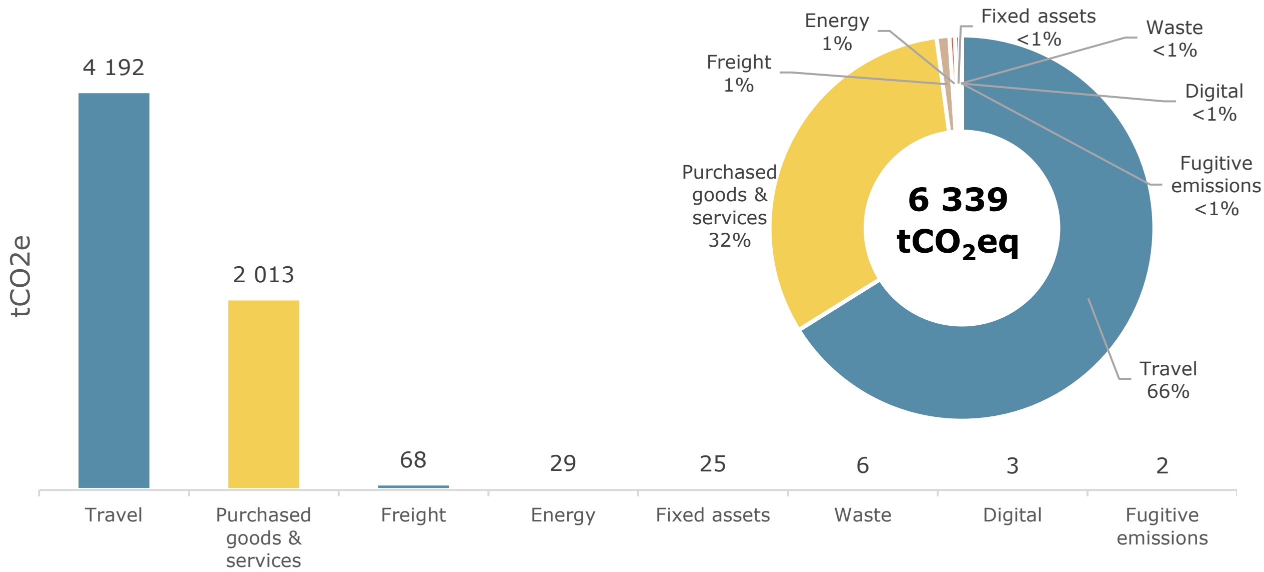
Image 3 : Perimeter of World Conservation Congress GHG inventory

As shown in the figure, all the data were collected by the Congress' organisation and transmitted to EcoAct for the calculation of the footprint. However, some data assumptions and hypothesis had to be estimated by EcoAct. They are all detailed in the following section.

III. IUCN World Conservation Congress Greenhouse Gas Emission Inventory

IV.1. Global results

For its **2020 edition**, the greenhouse gas emissions of the IUCN World Conservation Congress amounted to **6 339 tCO_2eq on the selected perimeter**, with a total uncertainty of 25% (1 602 tCO_2eq).



Emissions are mainly due to the **travels** of the Congress participants (66% of emissions), followed by the **purchase of goods and services** (32% of emissions).

In third place, **freight** activities are responsible for 1% of the Congress emissions. This is followed by emissions related to the Congress' electricity consumption for the **energy** category.

The Congress' **fixed assets**, **waste** generation, **digital** energy consumption and **fugitive emissions** constitute a very small part its emissions, less than 1% or less of the total.

IV.2. Detailed results by emission category

IV.2.1. Travel (4 192 tCO_2e or 66% of emissions)

Perimeter:

This item includes the GHG emissions generated by the upstream travel (to and from Marseille) and on-site commuting, for all Congress participants, general public visitors ans schools. It includes all the participants' travels including conference delegates, organizers and visitors.

Methodology and assumptions :

Total kilometers traveled by mode (plane, car, bus, public transport) were provided, broken down into participant categories, then multiplied by the various emission factors available, in $kgCO_2eq$/passenger-kilometers.

All data from the Congress were used directly in passenger-kilometers (i.e., 1 passenger traveling a distance of 1 km, e.g., a one-way ticket from Paris to Marseille represents about 775 passenger.km). More specifically for air travel, a distinction is made between short, medium and long-haul flights (according to the number of seats). In accordance with ADEME recommendations, the emission factors include the radiative forcing caused by condensation trails. Emissions decrease with the increase in plane size (in passenger.km). Thus, an emission factor for a long-haul flight is less emitter at the level of one passenger, than that of a medium or short haul. Emission factors for short haul planes are the most emitter ones (as shown in the table below).

ADEME conducted in April 2021 a **state of the art of scientific research on the climate impact of aircraft condensation trails** in which it confirms its recommendation to take a multiplier factor of 2 for condensation trails, as listed in the Base Carbone®, included in all emissions factors for air travel employed for this study. This respects the framework of a Global Warming Potential (GWP) of 100 years, used for the calculation of all GHG emissions of the Congress footprint. Considering the level of intrinsic uncertainties related to the real effects of gases emitted during air flights and in order to be as conservative as possible, IUCN has chosen to retain the most emissive emission factors of the categories concerned.

For car travelling, in absence of precision, an average motorization was considered.

Air travel methodoly

According to the distance of the travel, the emission factors employed were the following :

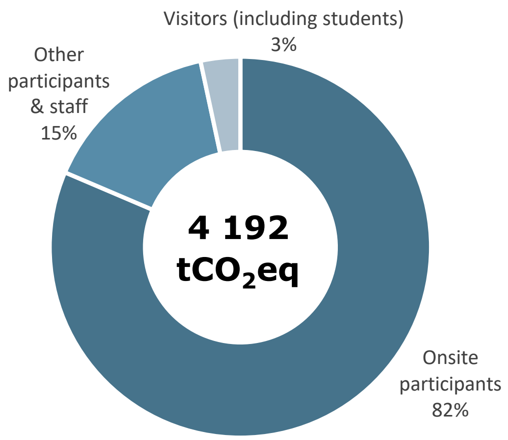
Distance (km)	Emission Factor	$kgCO_2e$/ passenger.km
< 500	Passenger plane, short haul, 20 -50 seats, < 500 km jet	0,527
500 - 3500	Passenger aircraft, medium haul, 51 -100 seats, 1000 - 3500 km	0,265
> 3500	Passenger plane, long haul, > 220 seats, > 3500 km	0,151

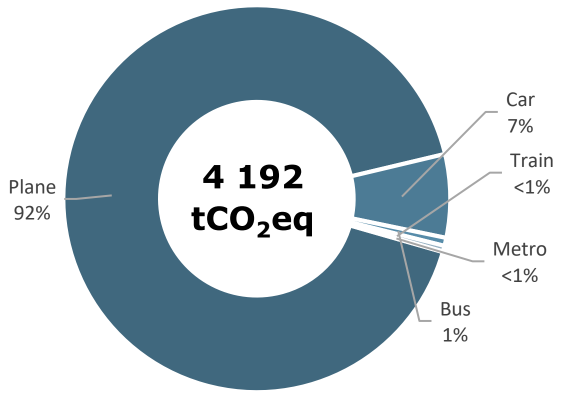
The total distances traveled by category of participants are :

Participants	Number of people	Total distance (km)
Onsite participants[1]	4 833 (14%)	25 101 777 (78%)
Other participants & Staff[2]	5 416 (15%)	6 007 336 (18%)
Visitors	24 828 (71%)	1 196 176 (4%)

Results :

All travels result in a GHG footprint of 4 192 tCO_2eq. It is the most emmiting source of the Congress footprint. Most emissions come from participants commuting (82%, or 3 413 tCO_2eq) and by plane travel (92%, or 3 849 tCO_2eq).

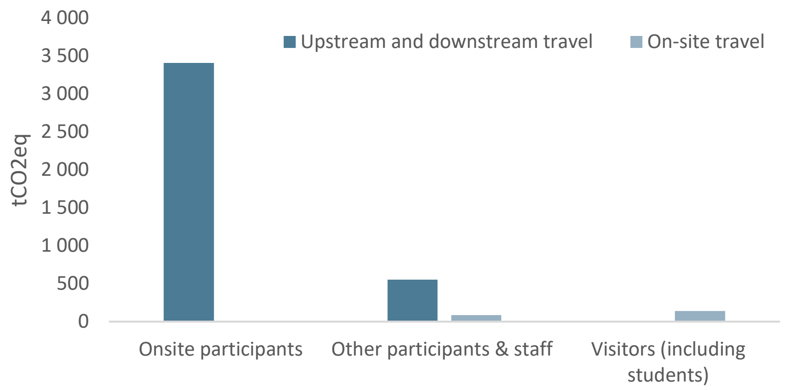




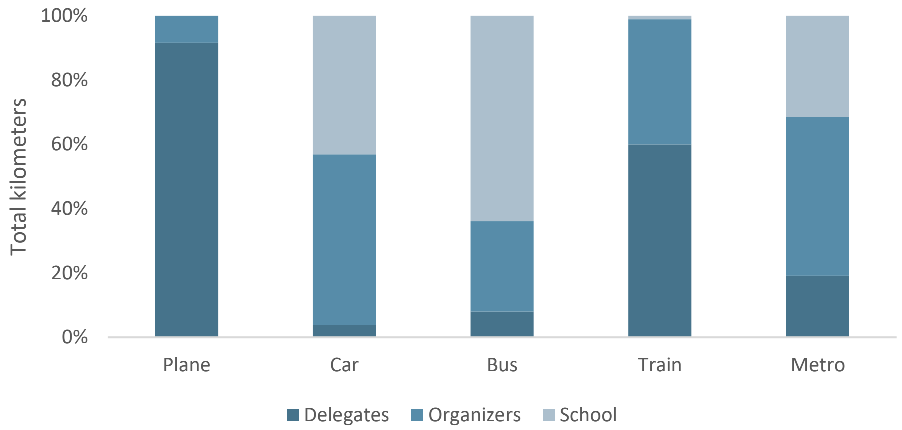
[1]People from Media, French Delegation and Local Territory were calculated apart as the country distribution pattern only applied to IUCN specific participants and exhibitors

[2]Includes people from French delegation, French government, Local territories, service providers, volunteers, and Nature Generations Areas

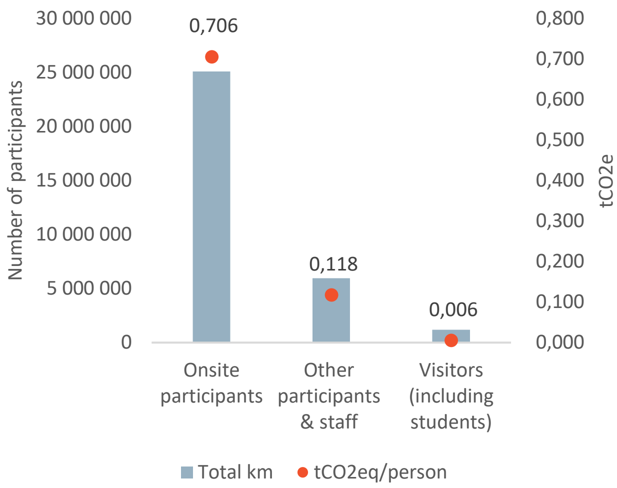
The emissions for upstream and dowstream travel (coming to and leaving the Congress) are much more representative than the on-site travels, as shown in the graphic below.

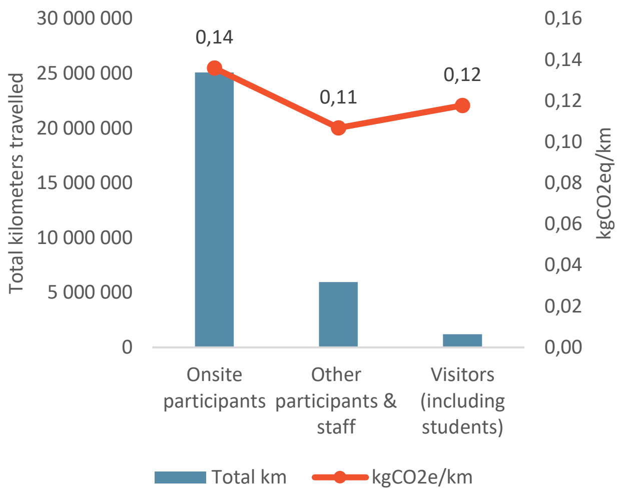


Onsite participants commuting represent 82% des emissions, whereas they are only 14% of total individuals attending, for a total of 78% of the total distance traveled. Other participants and staff represent 15% of emissions, 15% of total individuals attending the Congress and 18% of total distance.

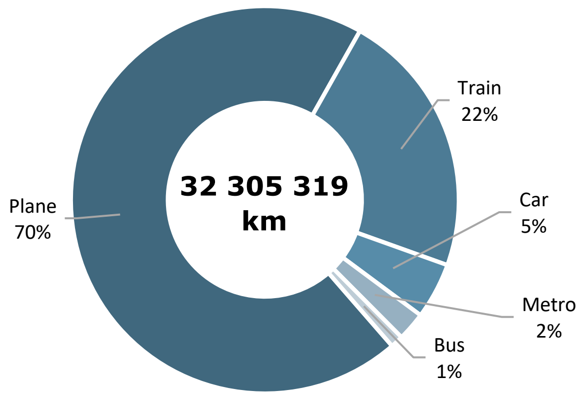


Even though the total distance traveled by plane is almost dominated by onsite participants commuting (graphique above), they have also traveled the longest. That leads to an emissity per kilometer not quite different between each category of participants :





Reasonably, most distances were travelled by plane. This, added to the fact of it being the most emitter mode, justifies the majority of emissions coming from plane travel.



IV.2.2. Purchased goods and services (2 013 CO_2eq or 32% of emissions)

Perimeter:

This item includes the GHG emissions generated by the manufacture of all goods and materials bought or rented for the Congress. It also includes the emissions related to the services required for the event.

Methodology and assumptions :

Services category

The amount of expenses in services hired for the event was provided by the organisation and broken down into major categories of purchases corresponding to the different emission factors available ($kgCO_2eq$/k€ expended,excluding tax).

A 20% tax rate for the expenses was considered when the amount of expenses included taxes.

Hotel nights were considered based on the number of nights booked via the registration platform and estimated for the rest of roomnights based on participants and staff length of stay, plus the survey of the service providers for their staff. Average emission factors for the different hotel categories were applied (one to 5 stars).

Emissions due to water purchases have been calculated from the consumption in m^3, measured precisely at the beginning of the build up phase and after the event. An emission factor for network water was applied (kgCO2eq/service of m^3 of water).

<u>Rental of goods and materials category</u>

For rented physical inputs (such as IT materials), the emission factors used were also in monetary ratio. This because, unlike purchased equipment, for which 100% of the GHG emissions related to production must be attributed to the event, rented equipment may have already been used at other events and will be used on several other occasions afterwards. By modeling based on financial flows, the lower GHG emissions of rented equipment are implicitly taken into account, since renting equipment is probably less expensive than buying it.

Emissions due to the rental of machinery (in particular, the access control equipment) have been accounted for in monetary data using the corresponding monetary emission factor.

Expenses in personnel were excluded when the monetary data included them. A breakdown in 30% personnel and 70% material/services was assumed.

<u>Purchase of goods and materials category</u>

The purchase of goods includes the purchase of paper, physical materials, and meals.

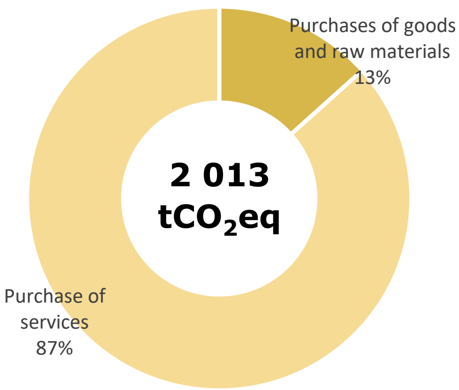
The GHG emissions generated by the event's catering were accounted for by the number of meals and drinks served, declared by the restaurants and catering services operating during the congress.

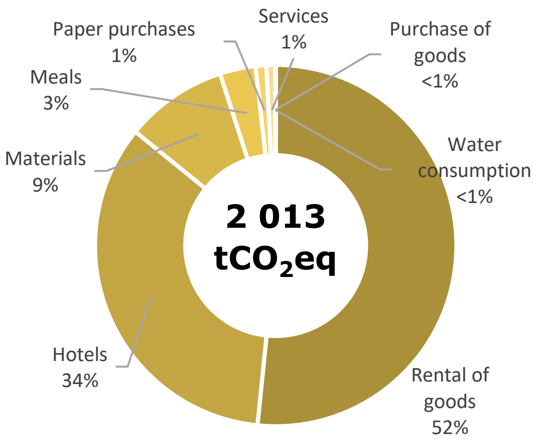
Emissions of reused materials (especially metal, wood and furniture) have been calculated pro rata to the duration of the Congress (versus their usual depreciation period).

A depreciation period of 15 years was assumed for the metal and glass wool ; of 30 years for the concrete ; of 10 years for the wood materials ; and of 8 years for the furniture.

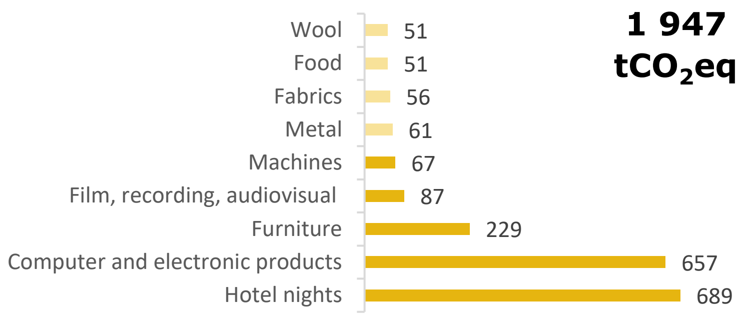
Results:

The Purchased Goods & Services (PG&S) category is the second most emitting source. As shown in the following graph, it is mainly dominated by emissions from the purchase of services (87%, or 1 947 tCO_2eq). If divided into more specific categories, the emissions from the rental of goods (part of the services purchased) represent de majority of CO_2eq emissions (52%, or 1 032 tCO_2eq), followed by the hotel nights (34%).

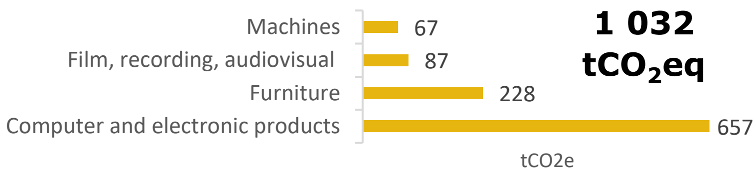




Zooming in all goods and services, purchased or rented, here below are the 9 greatest emissive items, representing a total of 97% of the PG&S category. Hotel nights represent the biggest emitting source, with 689 tCO_2eq (35% of emissions of purchased services), followed by electronic products.



Detailling only the goods rented (52% of PG&S, or 1 032 tCO_2eq), computers and other electronic and audiovisual equipements take over most emissions (64%, or 657 tCO_2e), followed by furniture rental (22%, or 228 tCO_2eq).



IV.2.3. Freight (68 CO_2e or 1% of emissions)

Perimeter:

This item includes the GHG emissions generated by the upstream freight of the Congress and all its parcels (sent and received).

Methodology and assumptions :

Upstream freight category

When the freight vehicle was operated or at least dedicated, the data was processed in kilometers, with a corresponding emission factor in $kgCO_2eq$/vehicle-kilometer.

When the vehicule was not operated and shared, the total weight transported was also taken into account other than the distance, with an emission factor in $kgCO_2eq$/tons-kilometer.

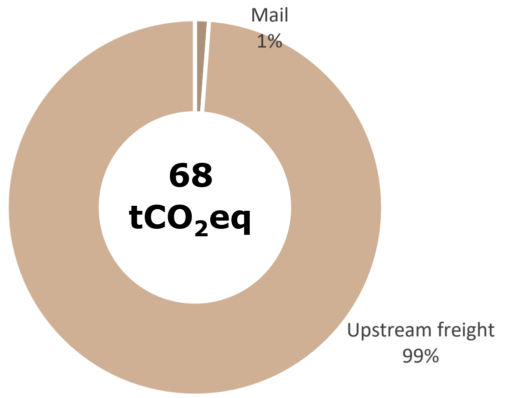
Mail category

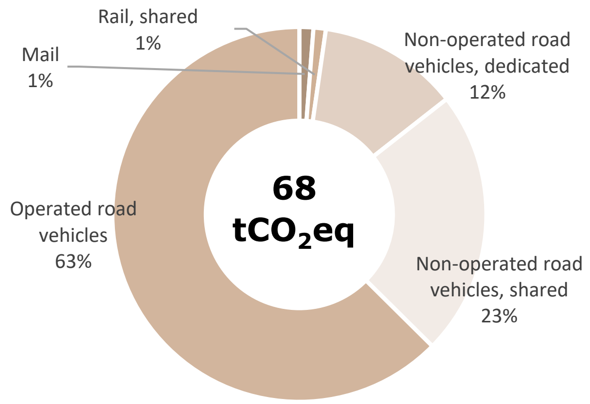
For all parcels, GHG information available from the supplier was reported in the calculation.

Results:

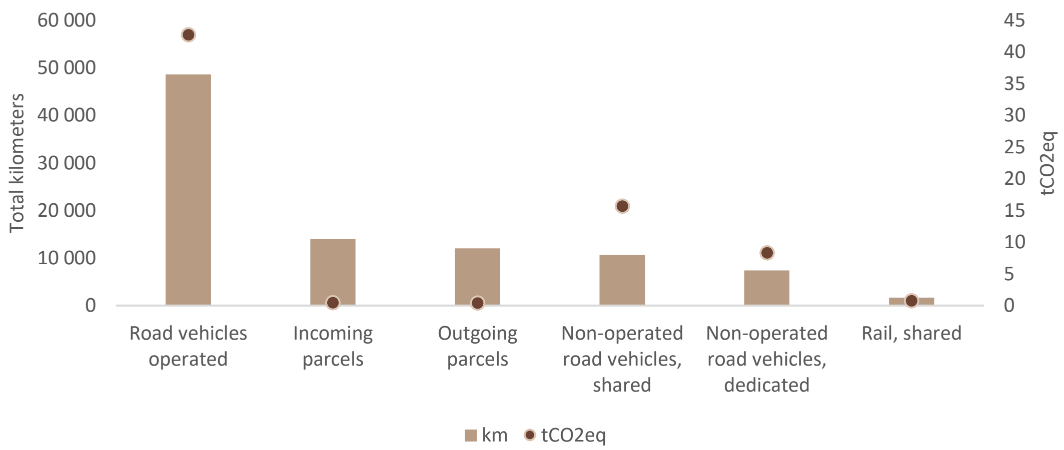
The Freight category is the third most emitting source with considerable difference in comparaison with the first two. It equals to 68 tCO_2eq and 4% of the Congress total footprint.

This category of emissions is mainly dominated by emissions from the upstream freight (99%). The operated road vehicules used for the freight emit 63% of total emissions in the category, or 42 tCO_2eq.





Road vehicles for the upstream freight represent 98% of the emissions of the entire category, for only 71% of the distance traveled. The parcels sent and received is the category with the best proportion emissions per kilometers, as shown in the graphique below.



IV.2.5. Energy (29 CO_2eq or <1% of emissions)

Perimeter:

Energy consumption (only electricity, including transmission losses) of Congress sites, for the duration of the event.

Methodology and assumptions :

Energy consumption is provided on actual electricity consumption collected from energy meter reading, in kWh.

The renewable energy mix of the green electricity contract was hydraulic one, with an emission factor equal to 0,006 kgCO_2eq/kWh.

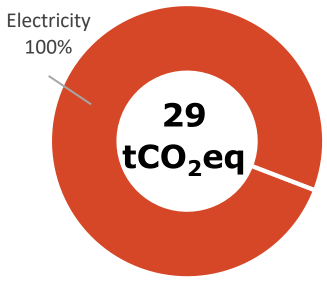
The electricity losses of the network were considered at an 8,93% rate.

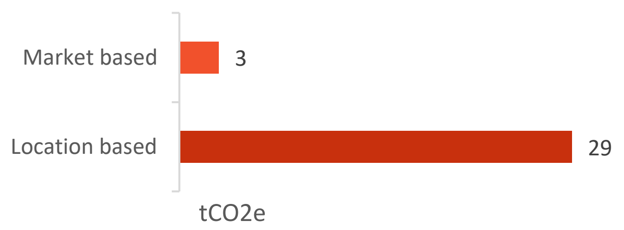
The Bilan Carbone ® methodology does not take into account the purchase of certificates of origin for electricity contracts (*market-based approach*). The associated emissions calculated are those of the French energy mix, equal to 0,060 kgCO_2eq/kWh (*location-based approach*).

For this Congress, the UICN has decided to purchase certificates of origin for 100% ofits electricity. Hence, the emissions according to the *market-based approach* have also been calculated using an emission factor of the hydraulic production.

Results:

The Energy category emits the equivilant to 29 tCO_2eq under a *location-based approach* and 3 tCO_2eq according to a *market-based approach*. The purchase of certificates of origin leads to emissions 10 times inferior. This category of emissions is nevertheless of a minor impact, representing less of 1% of the Congress footprint.





IV.2.6. Capital goods (25 CO_2eq or <1% of emissions)

Perimeter:

This item includes the GHG emissions generated by the manufacture of all capital assets detained by the Congress on a long-term basis. It includes all the buildings, material and equipment used by the organisation (from both the French Ministry and the IUCN) as well as those used that were already installed at the venue of the Congress, for the entire preparation of the project as well as for the duration of the Congress itself. These emissions are amortized over the depreciation period of the asset (from 5 to 30 years).

Methodology and assumptions :

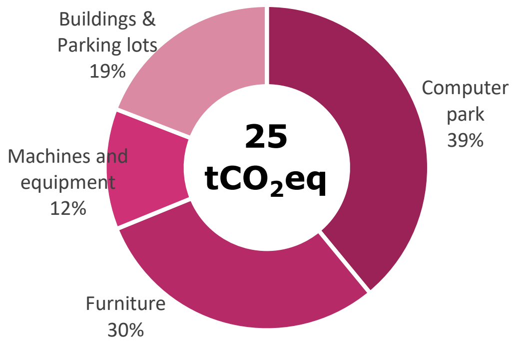
For buildings (offices), the usable surfaces are provided in m^2. Buildings are depreciated over a period of 30 years. For buildings built more than 30 years ago and which have not undergone any major renovation work (external areas of Parc Chanot, Palais des Arts, Grands Palais and other Halls), manufacturing emissions are considered depreciated and are not taken into account.

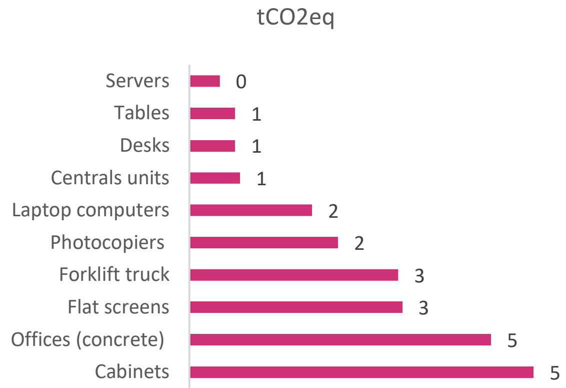
For IT assets and furniture, data is provided in units per type of asset. For both of them, a depreciation period of 2,5 years is considered. An ADEME emission factor is attributed by type of asset based on data from the Base Carbone®.

Finally, concerning the vehicle fleet, an average weight assumption per vehicle type is given: 3 tons ; with a depreciation period of 5 years. Emissions are thus deducted from the weight of the vehicle according to the emission factors of the Base Carbone ®.

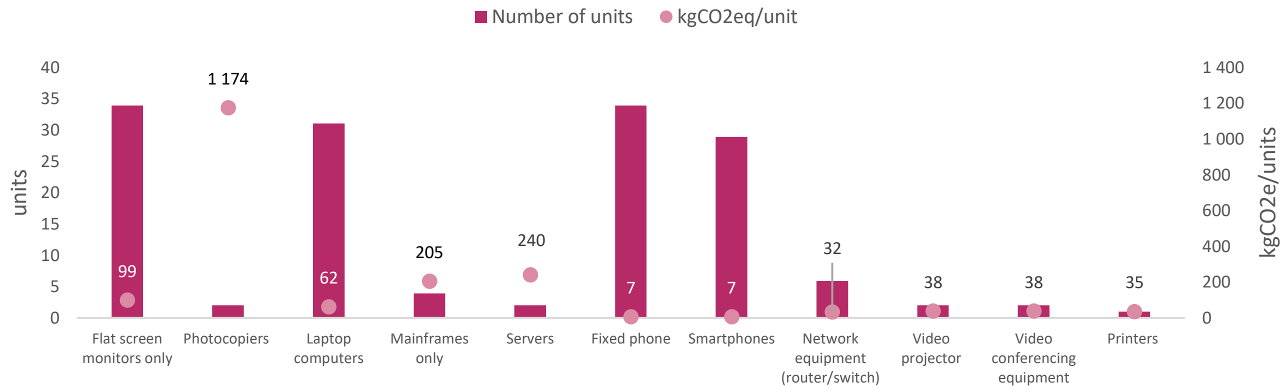
Results:

As shown in the following graph, the Capital Goods category mainly dominated by emissions from the IT assets, accounting for 39% (or 10 tCO_2eq). Zooming in all items in this category (graphic on the right), cabinets are the most emmiting one (5,4 tCO_2eq in total), followed by office buildings and falt screens (4,8 and 3,4 tCO_2eq respectively).





The graphic below compares de total unities of each IT asset versus their emissivity ($kgCO_2eq$/unit). Phones and smartphones are possessed in large quantities but have the lowest emissions.



IV.2.7. Waste (6 tCO_2eq or <1% of emissions)

Perimeter:

This item includes emissions generated by the treatment of waste produced by the Congress.

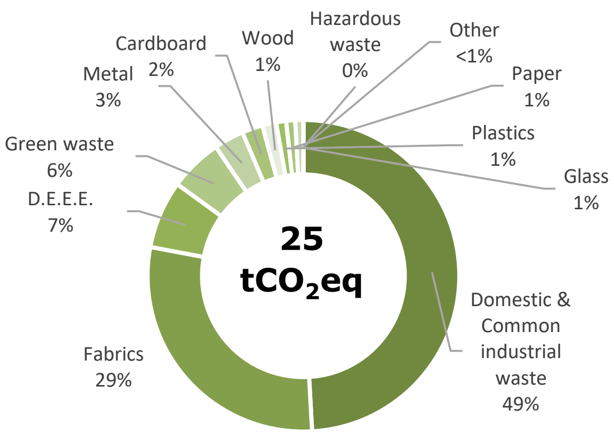
Methodology and assumptions :

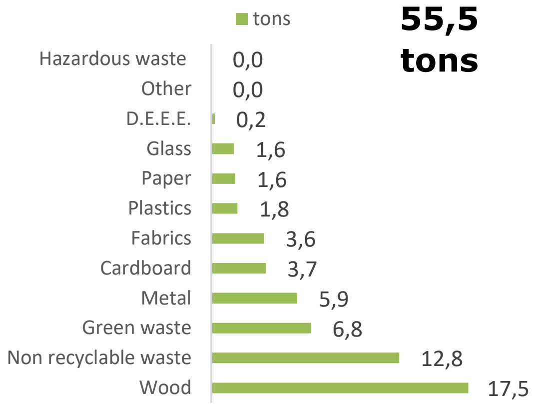
All waste generated was provided in tons. The emissions factors were chosen for their associated end of life treatment.

Results:

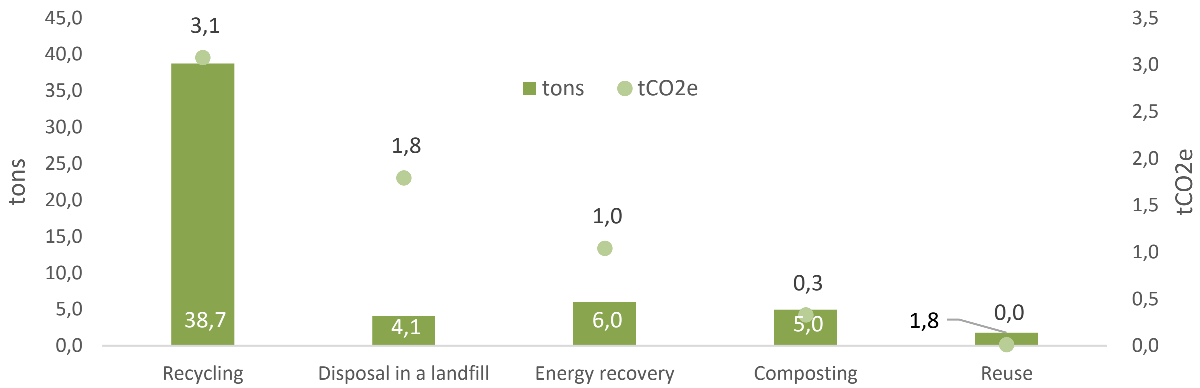
Waste treatment is very rarely a significant item in the emissions footprint of an event. It should be noted that the end of life of waste has a strong influence on emissions.

The Congress generated in total 55[3] tons of waste, for which 23% (or 12,8 tons) comes mainly from domestic and common industrial waste, whereas it is responsible for 49% of emissions (or 3,1 tCO_2eq). This is explained by the very emitter end of life associated (energy valorisation). On the other hand, wood represents most of the total mass of waste generated (32%, or 17,5 tons), against only 1% (0,1 tCO_2eq) of emissions.





Despite its low influence on the footprint, waste management is not only a carbon issue, but also a pollution one, if not correctly directed. In addition, a proper waste management contributes to the renforcement of a circular economy and generates avoided emissions (by feeding secondary material flows). Most of the waste generated by the Congress was directed to recycling.



[3] 111 tons of waste have been generated on the Congress. However, 51% of that waste were donated to different organisations & suppliers. Following this, only 55 tons of waste remained to be treated.

IV.2.8. Fugitive emissions (3 CO_2e or <1% of emissions)

Perimeter:

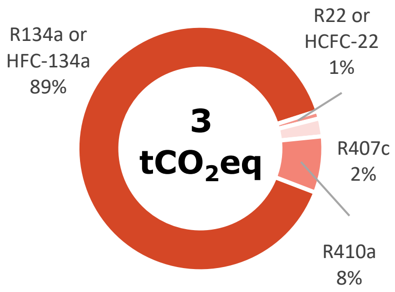
This item includes refrigerant gas leaks (powerful GHGs) from cooling facilities.

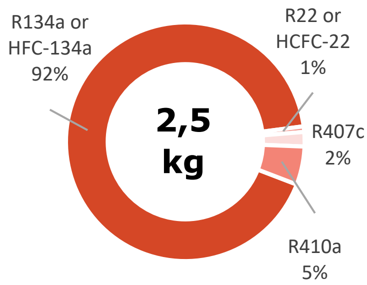
Methodology and assumptions :

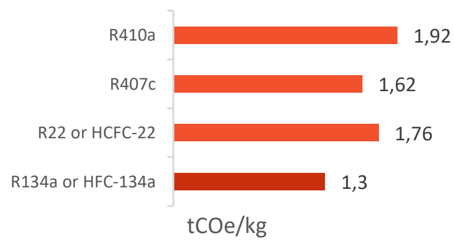
Data on the total weight of recharges in refrigerant gas were provided in kilos. Per year, leaks amount to 5% of the total weight of refrigerant refills (ADEME, 2010). The emissions were calculated in proportion to the duration of the event, for a total of 25 days over 365 days a year.

Results:

Total fugitive emissions equal to 3 tCO_2e for the duration of the event. The R134a fluid represents 89% of the emissions but 92% of the weight due to a lower emission factor than the other fluids.







IV.2.9. Digital emissions (2,3 CO_2eq or <1% of emissions)

Perimeter:

The Digital footprint is not part of the Bilan Carbone ® method. EcoAct proposes it in the basis of the energy consumption related to data flows.

For the Congress footprint, there are two perimeters taken into consideration :

- Digital use of the World Conservation Congress : digital viewers in summits, conferences and ceremonies; connexions to the global

plateform of the Congress; connexions to the wi-fi service - all between the 3rd and the 11th September 2021.
- Virtual Global Youth Summit : digital viewers in summits, conferences and ceremonies between the 5th and the 16th April 2021. The Youth Summit usually takes place during the Congress, but in this year's edition it was put forward due to the COVID-19 pandemic.

Methodology and assumptions :

This method breakdown GHG emissions is as follows:

- Energy consumption of hardware
- Energy consumption of storage in data centers
- Energy consumption of transfer of data via network (wi-fi or mobile connexions – 3/4/5G)

<u>Input Data</u>

All the input data for the digital footprint is either in amount of data (in Mb or Mo) or in time of connexion and transmission (in minutes).

For the World Conservation Congress digital footprint, the transfer of data was breakdown into four categories :

- Connexions to the global plateform : 12 148 unique connexions (by IP address) and a 1,9 Moctet (Mo) weight of the webpage, equaling to 23 081 Mo transferred.
- Live videos consumption : 15 800 000 Mo transferred.
- Videos on demande consumption : 4 200 000 Mo transferred.
- Wifi data : 35 515 860 Mo from bandwidth.

The total time spend online for each of the categories was :

- Connexions to global plateforme : 12 148 unique connexions (by IP address) and a 15-minute connexion in average (hypothesis), equaling to 182 220 minutes.
- Live videos consumption : 1 057 200 minutes.
- Videos on demande consumption : 223 860 minutes.

All data comes from reports of the IT provider for the Congress.

For the Global Youth Summit s digital footprint, the transfer of data only comes from connexions to the plateform for conferences and ceremonies (data available).

There were in total 29 000 participants connected to more than 150 channels (between ceremonies, workshops, classes) with a duration of 1 or 1,5 hour each. The hypothesis of data transfer for each connexion is of 2Mbps (or 0,25 Mo per second), equaling to 10 620 000 Mo transferred.

The hypothesis of time percentage of permanence of participants for the full duration of channels is 40%. This equals to 708 000 minutes of watching.

Conversion hypothesis

For the energy consumption rate for the hardware, a personal computer one was assumed for 50% of the total data and time, and a smartphone one was assumed for the remaining 50%.

Emissions factors for the total energy consumption was considered as follows :

- World Conservation Congress :
    - 100% French electricity mix for all connexion in wi-fi network at the Congress locations.
    - 25% French electricity mix for other network connexions (4G or wi-fi connexion) and 75% world average electricity mix.
    - 100% French based data centers (and consequently a French electricity mix).
    - 100% world average mix for hardware consumption.
- Global Youth Summit
    - 100% United States electricity mix, for network, hardware and data center consumption

The electricity emission factors are:

Emission Factor	kgCO2eq/kWh
French electricity mix	0,060
World average electricity mix	0,467
United States electricity mix	0,598

The conversion of data and time into kWh are as follows :

Data Centers	kWh/Mo
Energy consumption by data flow size	5,97E-05
Networks	**kWh/Mo**

Fixed network connection (Wifi)	4,88E-05
Mobile network connection (4G)	2,54E-04
Hardware	**kWh/min**
Smartphone	8,22E-05
Laptop computer	5,40E-04

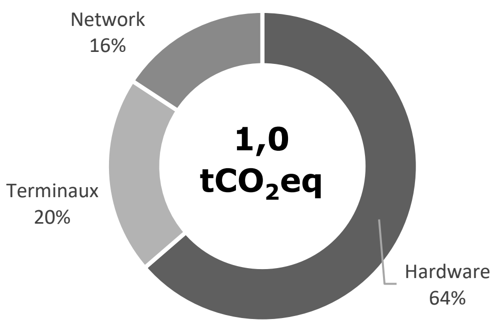
Results:

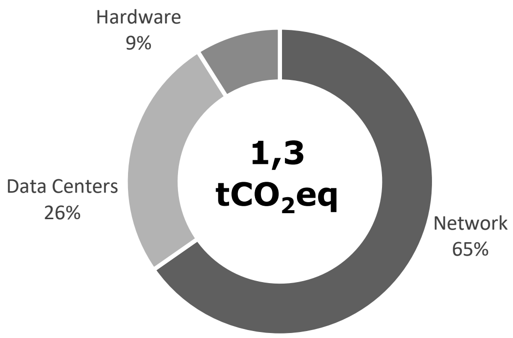
Globally, the Digital footprint of the Congress equals to 2,3 tCO_2e,q from which 1,3 tCO_2eq (or 55%) is due to the Global Youth Summit and the remaining 1,0 tCO_2eq to the digital activites of the World Conservation Congress.

In total, the World Conservation Congress consumed and transferd more data (45,5 million Mo for 1,4 million minutes of transmission) than the Global Youth Summit (10 million Mo for 708 thousand minutes of transmission).

The more important emissions from the Global Youth Summit are explained by the emitter electricity mix in the United States. While nuclear energy may have other impacts on the environment, its GHG emissions are very low compared to fossil fuels, which explains the less emitter caracter of the French electricity mix.

The footprint breaksdown into the three categories of energy consumption as follows :



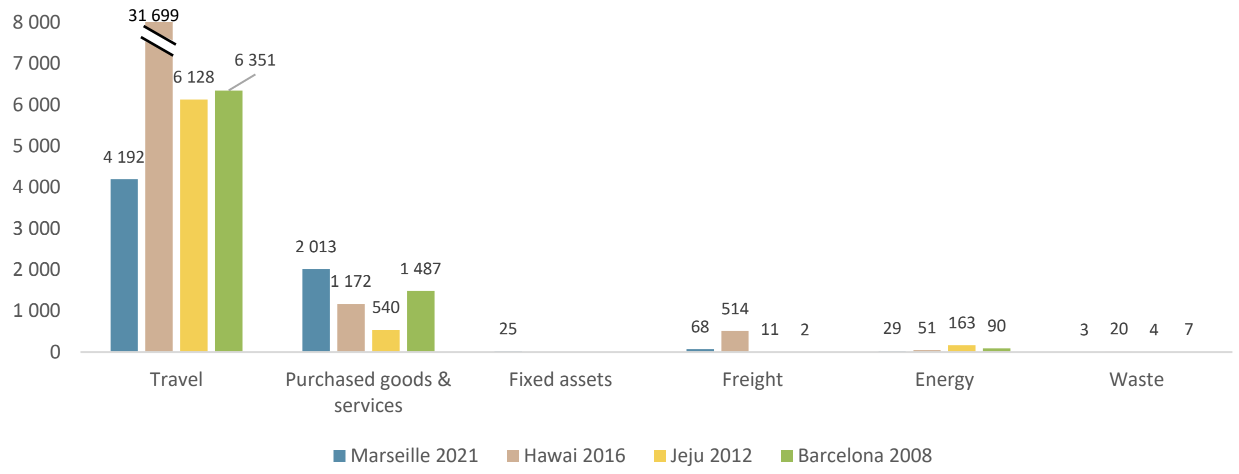


For the World Congress (graphic on the left), most emissions come from use of hardware (64%, or 0,66 tCO_2eq), due to the world electricity mix emission factor employed, almost 8 times emitter than the French electricity mix.

As for the Global Youth Summit, network usage generates the majority of emmissions (65%, or 0,83 tCO_2eq), mostly due to high the consumption of energy from mobile 4G connexions.

APPENDIX: Comparison with the previous congresses

Compared to the previous 3 editions of the Congress, held in Hawai in 2016, in Jeju in 2012, and in Barcelona in 2008, there is an increase in Marseille's GHG emissions for the Purchased Goods & Services category, and a decrease in emissions related to Travel. Hypothesis and perimeter of the calculation are approached in detail in the precedent sections of this report.



Globally, the main differences in emissions are due to two reasons :

- There were fewer participants in Marseille's edition of the Congress, combined with a much stronger mix of French and European participants. This results in a positive impact on transport emissions (that are hence minor).
- There were also more facilities with Nature Generation Areas : a total of around 20,000m² of space available, for the first time dedicated to the general public in an IUCN Congress. As a result, more emissions from Purchased Goods & Services were generated.

The comparison of the total number of participants highlights that this year's edition had the lowest presence of onsite participants[4], reducing commuting and therefore the use of plane travel and its emissions.

Marseille 2021	Hawai 2016	Jeju 2012	Barcelona 2008
4 833	7444	5130	5520

[4] Not taking into account French delegation, Local Territory and Media.

Some of the main sources of emissions of the four latest Congress are as follows:

Emissions (tCO_2eq)	Marseille 2021	Hawai 2016	Jeju 2012	Barcelona 2008
Hotel Nights	689	1 082	536	1 485
Energy	29	51	163	90
Waste	6	20	4	7
Meals	50	88	-	-
Freight	68	514	11	2
Plane travel	3 849	31 586	5 991	6 213

Finally, although the global emissions of the different editions vary, the operational scope of the GHG emissions footprint is still comparable, following all recommendations of the Bilan Carbone® method.

About EcoAct

EcoAct, an Atos company, is an international advisory consultancy and project developer that works with clients to help them succeed in their climate ambitions. We work with many large and complex multinational organisations to offer solutions to their sustainability challenges.

We believe that climate change, energy management and sustainability are drivers of corporate performance and we seek to address business or organisational problems and opportunities in an intelligent way.

EcoAct France

+33 (0)1 83 64 08 70
contact@eco-act.com

EcoAct USA

+1 917 744 9660
usaoffice@eco-act.com

EcoAct Turkey

+90 (0) 312 437 0592
turkeyoffice@eco-act.com

EcoAct UK

+44 (0) 203 589 9444
ukoffice@eco-act.com

EcoAct Spain

+34 935 851 122
contacta@eco-act.com

EcoAct Kenya

+254 708 066 725
info@climatepal.com

ecoact
an atos company