GREENHOUSE GAS EMISSIONS ASSESSMENT OF THE ARTELIA GROUP'S MAIN INTERNATIONAL SUBSIDIARIES

2022 REPORT
REFERENCE YEAR : 2021

ARTELIA
Passion & Solutions

ARTELIA /AUGUST 2022 / DMCOM & RSE

CONTEXT

The greenhouse gas emissions assessment (BEGES) of Artelia's main international subsidiaries has been evaluated. This evaluation is outside the scope of the regulations in force in mainland France. However, it meets the following objectives:

- Identifying the main emission categories for the subsidiaries in question
- Comparing emissions between the various international subsidiaries
- Comparing the assessment of the subsidiaries with that of Artelia France

The international subsidiaries selected for the greenhouse gas emissions assessment, and their branch offices concerned, are:

- Artelia Vietnam
  - Ho Chi Minh City
  - Da Nang
  - Hanoi
- Artelia Italy
  - Rome
  - Milan
- Artelia UK: London
- MOE (Denmark)
  - Copenhagen
  - Aarhus
  - Aalborg
  - Fredericia
  - Vordingborg
  - Naestved

It should be noted that the previous evaluation of subsidiaries only took the registered office in Copenhagen into consideration for MOE. The emissions evaluated for MOE are hence higher due to the fact that other Danish offices have been integrated into the scope of the GHG assessment.

METHODOLOGY

Since the aim of the exercise is to compare the various assessments, the methodology used to obtain the results presented in this addendum is the same as the one used for the GHG assessment of Artelia France (presented in part 1 of this document). The emission categories considered are the same, and the same type of data (the same unit) has been used whenever possible.

N.B.: It was not always possible to achieve this methodological consistency in view of the data supplied by the subsidiaries. The methods used by subsidiaries to monitor data are not uniform across the Group.

This inconsistency in terms of types of data may have an impact on the comparison of greenhouse gas emissions.

Moreover, the Bilan Carbone® carbon assessment tool developed by the French Agency for Ecological Transition (ADEME) is used for emission accounting. This tool is perfectly suited to companies or projects on French territory, but it has a number of limitations for international applications:

- The emission factors related to car use are drawn from French averages ("average-size engine, continental France")
- The emission factors related to bus use are drawn from French averages

- The tool does not include emission factors for public transport networks in other countries; it only includes those for railway networks.

The reporting year for all subsidiaries is 2021.

It should be noted that Artelia France and Artelia's four main subsidiaries - Denmark, Italy, the United Kingdom and Vietnam - represent 5666 employees in total.

The scope of the GHG assessment (BEGES) therefore covers 85% of the Group's workforce.

REMINDER OF THE EMISSION CATEGORIES

The emission categories considered for the international subsidiaries are the same as those included in the GHG assessment of Artelia in mainland France. As a reminder, these are:

- **Direct GHG emissions** (GHG emissions from fixed or mobile GHG sources controlled by the company). More specifically, this category includes emissions from the following sources:
    - Heating from thermal boilers for all buildings rented or owned by the Artelia Group (offices, technical facilities and workshops, etc.). However, none of the international subsidiaries is concerned by the direct use of a thermal boiler.
    - Fugitive emissions from air conditioning and cooling systems in all buildings occupied by the company,
    - Business travel with vehicles belonging to the company (fleet of owned and controlled vehicles).
- **Indirect GHG emissions** (emissions from the production of electricity, heat or steam imported and consumed by the company for its activities). These emissions take the following sources into consideration:
    - Electricity consumed by all company systems (built assets, other facilities)
    - Heating consumed by company buildings connected to a district heating network.

- **Non-mandatory indirect emission sources:**
    - Emissions related to **business travel** of permanent company employees,
    - Emissions related to **home-to-work commuting by permanent company employees**, taking modes of transport into account,
    - Emissions related to the **purchase of paper supplies**.

      Emissions related to the **purchase of services** (post, telecommunications and printing) have not been calculated for the international subsidiaries. Data concerning the procurement of services are not available for all the subsidiaries. In addition, in mainland France, this category only represents 2.3% of total emissions. It has therefore been omitted from the evaluation of the international subsidiaries.

    - Emissions related to the **amortisation of IT equipment** (computers and photocopiers/printers), the **car fleet and real estate** (emissions related to the production of durable goods used by the company, taking a certain depreciation period or number of years of use into account).

ASSUMPTIONS COMMON TO ALL SUBSIDIARIES

A few assumptions common to all the international subsidiaries are given below. The assumptions specific to a given subsidiary are presented in the sections hereafter.

- For the **amortisation of IT equipment**:
  - IT equipment (desktop and laptop computers, printers, plotters, photocopiers) is considered to be depreciated over a five-year period
  - Premises (offices) are considered to be depreciated over a 25-year period.
- For **fugitive emissions from air conditioning systems** in buildings occupied by subsidiaries:
  In the absence of other data, the ratio of R22 leakage (in tonnes)/number of employees obtained for mainland France was calculated and applied to subsidiaries equipped with an air conditioning system in proportion to their respective workforces.
- For **commuting**, the emission factors used correspond to averages for continental France. This is one of the limitations of using the Bilan Carbone® tool (as it does not include averages for other countries in the area of transport):
  - Bus: emission factors corresponding to conurbations with more than 250,000 inhabitants, diesel/NGV, continental France
  - Car: medium size, medium-sized engine, continental France

COMPARISON OF GHG EMISSIONS

The table below summarises the results of the evaluations for the various subsidiaries, and provides an initial comparison with the figures obtained from the evaluation of Artelia France:

Tabl.19. Table summarising the GHG emissions identified in the various subsidiaries of Artelia, and the tCO2e/employee ratios (source: Artelia, 2022)

	TOTAL 2021	***RATIO 2021***	***TOTAL 2019***	***RATIO 2019***
Artelia subsidiary	**tCO_2e**	**tCO_2e/employee**	**tCO_2e**	**tCO_2e/employee**
Vietnam	*1577*	*2.3*	2874	*5.3*
Italy	*822*	*4.3*	944	5.6
UK	*308*	*2.8*	584	5.3
MOE	*2665*	*3.1*	1539	3.1
France	*12,113*	*3.1*	15,989	4.3
ARTELIA calculated	***17,134***	***3.0***	**21,958**	**4.5**

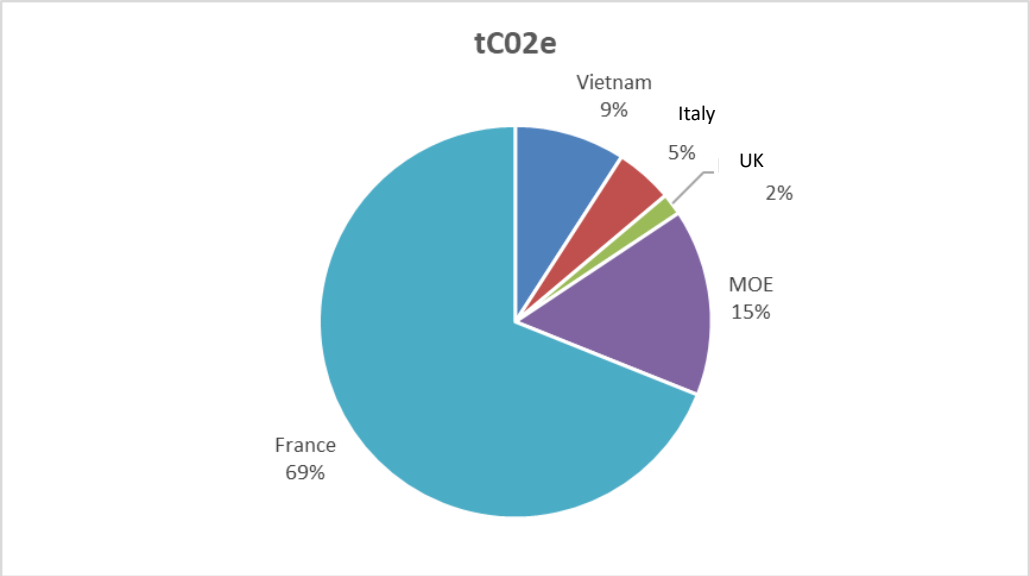

Fig.13. Breakdown of emissions between the various subsidiaries in % (source: Artelia, 2022)

On an initial approach, the French subsidiary is responsible for approximately 70% of the Group's emissions overall. This result is not surprising, given that the French subsidiary is the one with the largest workforce.

For information, the figures corresponding to the workforces used to draw up the ratios (tCO_2e/employee) are given below:

Tabl.20. Workforces of the various subsidiaries of Artelia for the years 2019 and 2021

SUBSIDIARY	2021 WORKFORCE	2019 WORKFORCE
Vietnam	*686*	*539*
Italy	*189*	*169*
UK	*110*	*110*
MOE[3]	*865*	*499*
France	*3816*	*3746*
ARTELIA calculated	*5666*	*4910*

[3] For MOE, the figure considered is the "Average Full-time Employee Count" and not the "Average Employee Count"

In total, the carbon assessment of these five countries covers 85% of the Group's workforce.

To establish an objective comparison between the various subsidiaries, the emission ratio per employee is used. The Vietnam subsidiary has the best ratio per employee (approx. 2.3 tCO_2e/employee), while the Italy subsidiary has the highest ratio (approx. 4.3 tCO_2e/employee). The other subsidiaries (MOE, United Kingdom, France) have relatively similar ratios, between 2.8 and 3.1 tCO_2e.

It should be noted that the emission ratios per employee have fallen for most subsidiaries, in comparison with those obtained in 2019. This decrease can partly be attributed to the Covid-19 pandemic, which had a significant impact in terms of cutting emissions relations to transport - both commuting and business travel. Since different countries were impacted by Covid-19 in different ways, care must be taken when comparing the results from the different subsidiaries.

The graph below gives the breakdown of emissions, within the tCO_2e/employee ratios, for each subsidiary and each emission category:

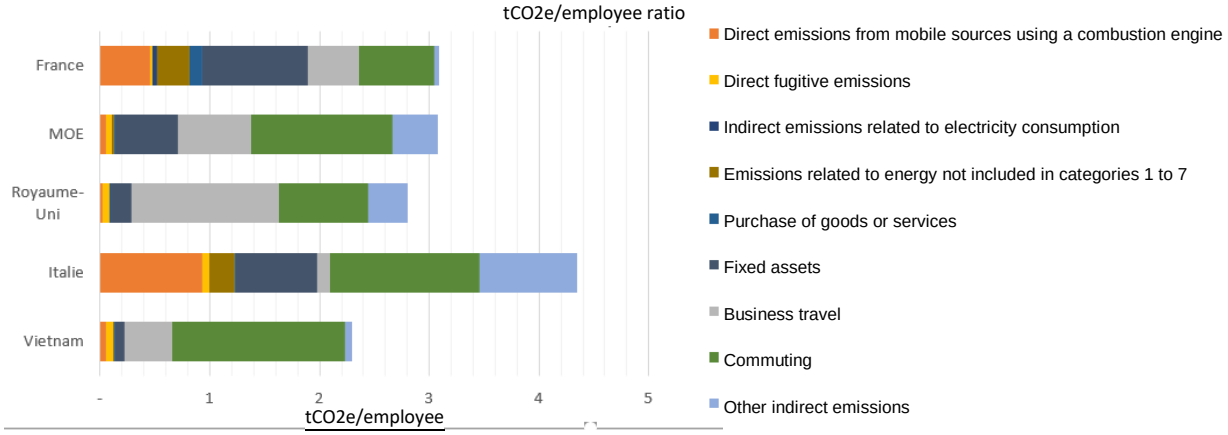

Fig.14. Breakdown of GHG emissions (in tCO2e/employee) per category and per subsidiary (source: Artelia, 2022)

For all the subsidiaries, the "travel" category predominates in the GHG assessment. This category is broken down mainly into business travel and commuting (in grey and green respectively in figure 13), but also appears under "direct emissions from mobile combustion sources" (in orange - the case of vehicles run directly by Artelia).

The sections below explain the results in more detail, with a precise breakdown subsidiary by subsidiary.

FOCUS ON THE "TRAVEL" CATEGORY

A more detailed analysis of emissions under the "travel" category is given below, given the weight of this category in relation to total emissions.

Travel is indeed responsible for approximately 60% of total emissions across all the subsidiaries considered (including Artelia France).

The graph below summarises the ratios (tCO2e/employee) of the various subsidiaries for the travel-related categories. The direct emissions from mobile combustion sources correspond to emissions related to business travel in vehicles run by Artelia.

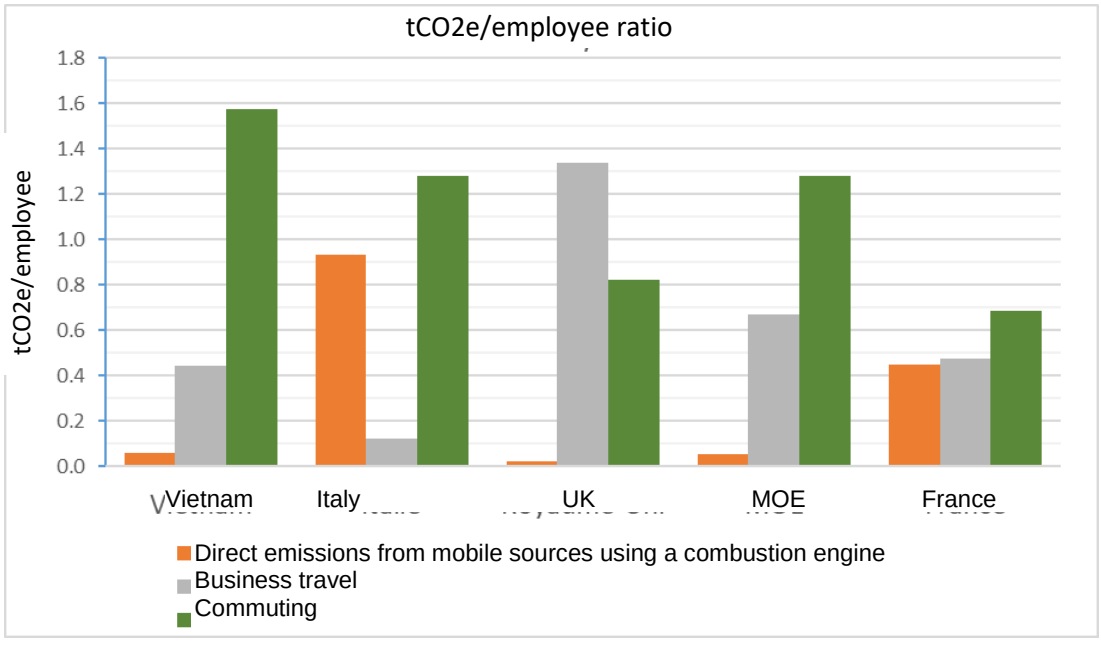

Fig.15. GHG emissions (in tCO_2e/employee) for travel-related categories (source: Artelia, 2022)

Business travel

Artelia Vietnam represents the highest ratio in terms of commuting. This is because cars and mopeds are the main modes of transport used for commuting. The context in European countries is more favourable to travel by public

transport or bicycle. In addition, the adoption of remote working in the European subsidiaries has reduced the impact of this category. In Vietnam, remote working is less common.

Italy has the highest ratio of emissions related to cars owned by the company. This is due to the large distances travelled using company-owned vehicles.

Business travel decreased significantly due to Covid-19 in all subsidiaries in comparison with 2019.

It should be recalled that data on travel-related categories are not available with the same level of detail from all the Group subsidiaries. Comparisons should therefore be considered with caution.

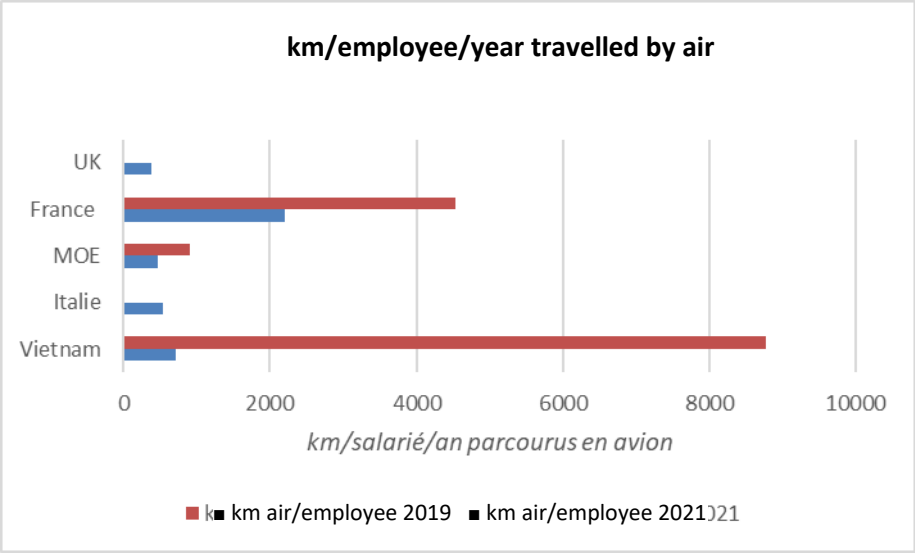

Fig.16. Distance travelled by air per employee per year in 2019 and 2021 for the various subsidiaries

Business travel at all the subsidiaries was severely affected by Covid-19. The distances travelled per employee were halved in France and divided by about 10 in Vietnam.

It should be noted that data corresponding to the breakdown of emissions under the "business travel" category were not available in 2019 for Artelia UK (see section "Focus on Artelia UK), making it impossible to make a complete comparison of all the subsidiaries for this category.

Fig.17. Distance travelled by air per employee per year in 2021 for the various subsidiaries (Artelia, 2022)

France has the highest ratio in terms of kilometres per employee (approx. 2200 km/employee).

The distances travelled per employee per year are very similar for all the other subsidiaries (between 370 and 700 km/year/employee).

Commuting

This category is responsible for approximately 30% of all emissions (France included).

The tCO2e/employee ratios for this category are summarised below:

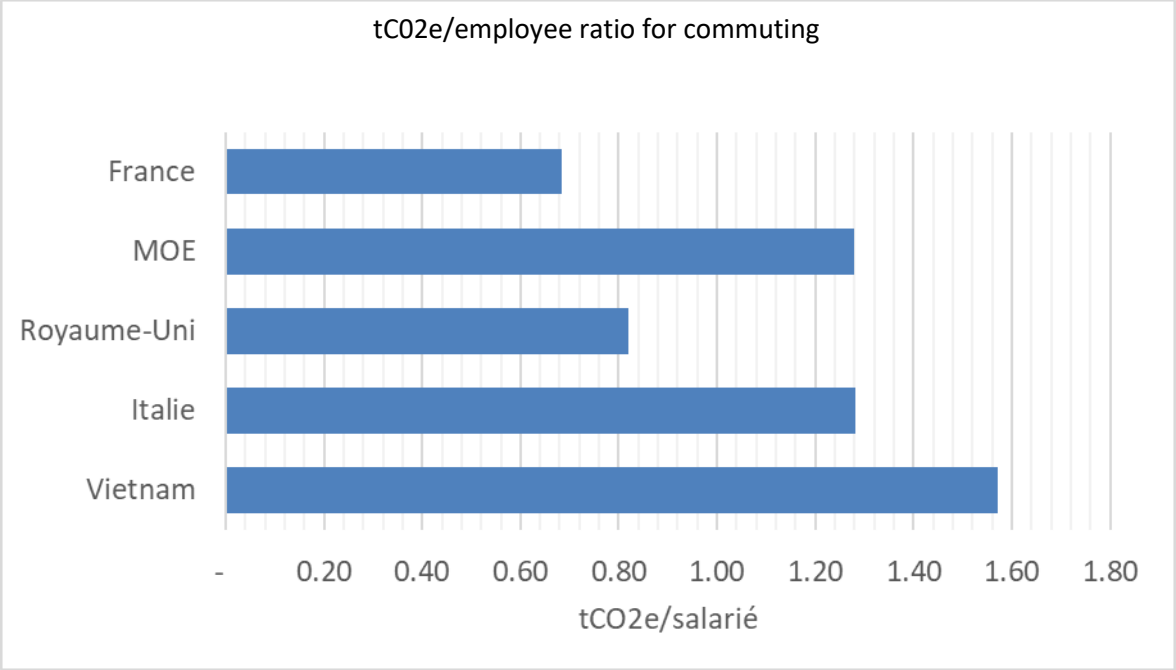

Fig.17. GHG emissions (in tCO_2e/employee) for commuting (source: Artelia, 2022)

The ratios for the various countries are fairly similar, between 0.7 and 1.6 tCO2e/employee.

The disparities observed are linked to the difference in modal split between the various subsidiaries. The split in each country for which the information is available is given below:

Tabl.21. Modal split for commuting in the various subsidiaries

Modal split	Car	Moped	Bus	Rail	Tram/ metro	Bicycle/Walking	Public transport
Italy	61%	5%	3%	17%	10%	4%	-
UK	14%	0%	2%	73%	11%	0%	-
Vietnam	10%	90%	0%	0%	0%	0%	-
MOE	85%	1%	1%	6%	1%	6%	-
France	44%	0.5%	-	-	41%	14%	41%

The modal share corresponds to a share of mileage per mode of transport and not to a share of users using a mode of transport

Vietnam has the highest ratio GHG emissions per employee for commuting (1.55 tCO2e/employee): this is because commuting accounts for significant mileage. Moreover, a majority of employees in Vietnam (90%) travel by moped. Mopeds are high-emission, individual vehicles and contribute to Vietnam's unfavourable assessment. The emission factors of various means of transport are compared in the table below. The emissions from a motorcycle are almost as high as those from a car.

Tabl.22. Emission factors of various means of transport (source: Bilan Carbone®, V8)

$kgCO_2e$/km	Manufacture	Upstream	Combustion
Car, average-size engine	0.040	0.043	0.171
Bus, town of more than 250,000 inhabitants		0.031	0.123
Motorbike, capacity less than 750 cm^3	0.037	0.032	0.135
Motorbike, capacity more than 750 cm^3	0.035	0.038	0.163

The table below summarises the average commuting distances and the average number of days of remote working per week.

Tabl.23. Average commuting distances and numbers of days of teleworking

	Average commuting distance	Ave. no. days of remote working per week
Italy	23.1	2.2
Vietnam	15.9	0.1
MOE	16.0	1.1
France	18.5	-

The average commuting distances for the various subsidiaries are fairly similar (between 15.9 and 23.1 km). Vietnam is the subsidiary with the lowest average commuting distances, although the low rate of remote working leads to higher cumulative distances over the year.

It should be noted that the data corresponding to the breakdown of emissions under the "commuting" category is not available for Artelia United Kingdom (see section "Focus on Artelia UK), making it impossible to make a complete comparison of all of the subsidiaries for this data.

These results should be used with great care. Several features of the data collected may be detrimental to a comparison:

- There are methodological differences in this comparison: the modal split for commuting is drawn from surveys of employees in the Vietnam, MOE and Italy subsidiaries. As the survey response rates vary very widely, the representativeness of the data collected varies from one subsidiary to another. Moreover, the responses given for multi-modal travel (i.e. a journey using several modes of transport) only rarely included the breakdown of mileage for each mode used. Assumptions were hence made, leading to an additional margin for error.

- The commuting distances were reconstituted on the basis of employees' post codes in the case of MOE and Artelia France:

    - Each post code is associated with geographical coordinates (longitude, latitude). These coordinates correspond to a central location within the area covered by each post code. With the aid of a mathematical formula, these coordinates were used to calculate the approximate distance between the work site and the employees' addresses.

    - This calculation may introduce errors: the reference address of an employee does not always correspond to the address of his or her daily commute. These inconsistencies are more difficult to detect in an international context.

- The reconstitution of commuting distances was drawn directly from the questionnaire on commuting in the case of Italy. In this questionnaire, all employees were asked to state the distance of their commute; the very high response rate (97%) enabled us to obtain reliable results and to avoid the uncertainties inherent to calculating distances using the post code-based method described above. For the 3% who did not respond, the average commuting distance obtained from the responses to the questionnaire was applied.

- In the case of Vietnam, the employees' post codes were not available. The response rate for the questionnaire was 35%, but in the absence of other data, the average distance of 16 km obtained from the questionnaire was applied to all employees (see "Focus on Artelia Vietnam" section).

- In the case of the UK, the available data are the annual distances for all employees for each mode of transport. Artelia UK uses these data in drawing up its carbon assessment. These are the data which were used (see "Focus on Artelia UK" section).

FOCUS ON ARTELIA VIETNAM

Input data

The main data used to draw up the carbon assessment of Artelia Vietnam are presented in the table below. These data group together the information collected from the three Vietnamese sites: Ho Chi Minh City, Da Nang and Hanoi.

Tabl.23. Data used to draw up the GHG assessment of Artelia Vietnam

	TOTAL VIETNAM 2021	TOTAL VIETNAM 2019
Workforce	686	**539**
Surface area occupied	1276	1063 m²
Electricity consumption	98,610	152,365 kWh
Air Conditioning	Yes	Yes
Fixed assets		
PCs + desktop computers	557	458
Printers/photocopiers	29	25
Use of paper		
No. of A4 sheets	817,500	995,000
No. of A3 sheets	192,500	200,000
Business travel		
Air	491,193	3,385,880 km
Rail	-	N/A
Car - short-term rental	111,209	221,417 km
Car - Artelia fleet	229,233	94,920 km
Commuting		
Average commuting distance	15.9 km	15 km
Modal split		
Moped	95%	90%
Car/taxi	5%	5%
Public transport (bus)	0%	5%

Compared with the other subsidiaries, the Vietnamese sites are characterised by a heavy reliance on individual modes of transport (car, but especially moped). 90% of employees travel to work by moped. In total, this percentage corresponds to 4,352,346 km per year (approx. 6,300 km/employee/year). For employees in mainland France, this percentage is just 0.55% and corresponds to 27 km/employee/year.

The modal share for private car travel in Vietnam is 10% (corresponding to 458,363 km, or 668 km/employee). In France, this same share is 42.5% (2050 km/employee/year).

Assumptions specific to Artelia Vietnam and limitations

- Emission factor for electricity consumption:
    - Electricity purchased, average for Vietnam: 0.432 kgCO2e/kWh (source: Bilan Carbone® V8)
- Emission factor for moped use:
    - Consideration of “Motorcycle” emission factors with the Bilan Carbone® V8 tool
    - Capacity less than 750 cm³, petrol, urban area, mainland France, Base Carbone® database: 0.204 kgCO2e/km
    - Capacity more than 750 cm³, petrol, urban area, mainland France, Base Carbone® database:

0.238 kgCO2e/km

- Commuting:
    - An average commuting distance of 15.9 km is considered for each employee. This distance corresponds to the average commuting distance obtained from the survey of modes of transport used by employees, applying a filter for distances greater than 70 km (employees living further than 70 km away have accommodation close to the site and are hence not concerned by daily home-to-work travel). Information on employees' places of residence is not available in Vietnam.
    - The modal split applied for the whole of Vietnam is drawn from the survey on commuting. The breakdown obtained from the results of the survey was applied to all the employees.
    - An average of 0.1 days of remote working per week was determined from the results of this same survey, then applied to all the employees to estimate the annual distance travelled.

- Results of the assessment (using the Bilan Carbone® method)

The Artelia Vietnam subsidiary is responsible for approximately **1,577 tCO2e** or approximately 9% of the emissions calculated for Artelia as a whole. This translates to a ratio per employee of approximately **2.3 tCO_2e**/employee.

- Change compared to 2019

Artelia Vietnam's GHG emissions have decreased by about 45% compared to 2019 **(1577 tC02e** in 2021 and **2900 tCO_2e in 2019).** The ratio per employee has fallen from 5.3 to 2.3 **tCO_2e**/employee, a decrease of approximately 56%.

This decrease should be seen in light of the pandemic, which led to a drop in both business travel and commuting, and an increase in remote working. Since these two categories predominate in GHG emissions, a change in these has a significant impact on the total GHG emissions for the subsidiary.

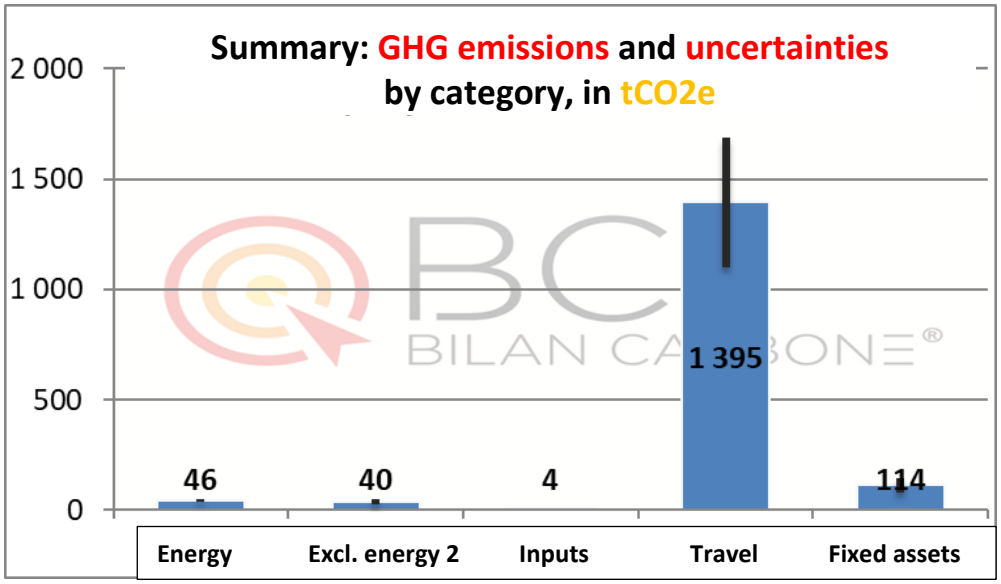

Fig.20 Breakdown of emissions by category (in tCO_2e) and related uncertainties for Artelia Vietnam (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

The "travel" category is responsible for 87% of emissions from the Artelia Vietnam subsidiary, of which a large proportion is related to commuting. The breakdown of emissions under the "Travel" category is presented below:

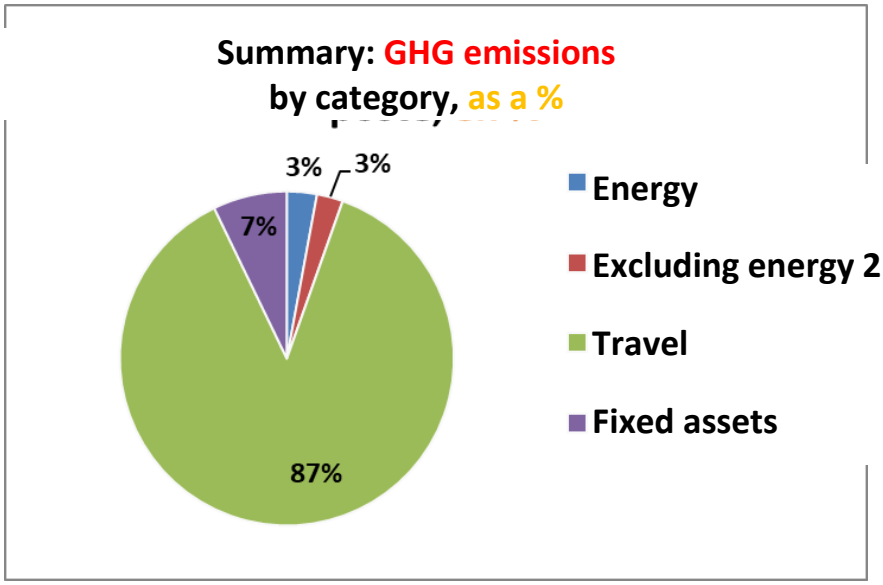

Fig.21 Breakdown (in %) of emissions by category for Artelia Vietnam (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

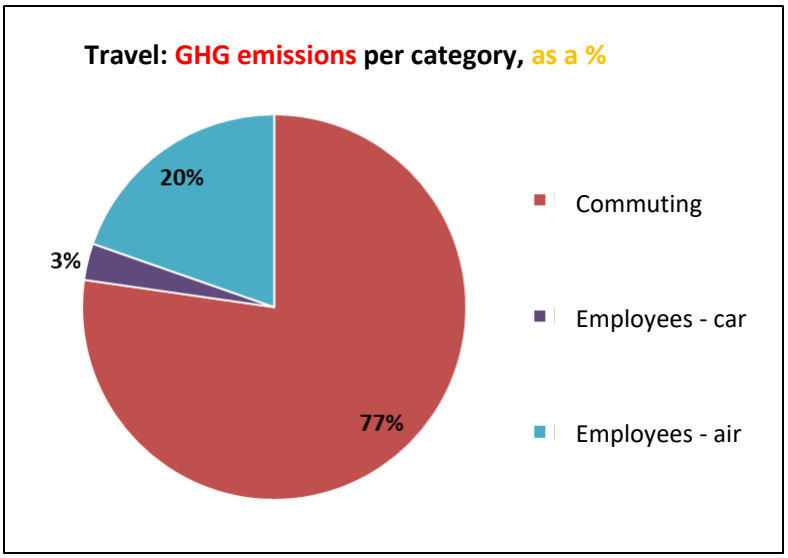

Fig.22 Breakdown (in %) of emissions within the "Travel" category for Artelia Vietnam (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

Emissions related to commuting represent a very large proportion of travel-related emissions: approximately 77%. Emissions related to business travel represent 23% of travel-related emissions. This is a significant change on 2019, when travel by air represented 78% of travel-related emissions. It should, however, be noted that the distances travelled by air decreased by 85% in 2021 compared to 2019, as a direct result of the pandemic. This 85% drop in distances travelled by air accounts for much of the reduction in Vietnam's GHG footprint compared to 2019.

FOCUS ON MOE

Input data

The main data used to draw up the carbon assessment of MOE are presented in the table below.

Most of these data are drawn from the "Climate Report, 2021" produced by MOE, which includes a GHG emissions assessment. However, this assessment does not include the "Commuting" category. This category has been added to the considerations in MOE's report and is included in the evaluation presented in this section.

The GHG emissions assessment performed by MOE this year includes emissions from its offices in Aarhus, Aalborg, Næstved, Vordingborg and Fredericia as well as the head office in Copenhagen. In 2019, only the Copenhagen head office was taken into consideration. It is hence important to note that the GHG emissions calculated in 2019 and 2021 are not on the same cope, and cannot be compared.

Tabl.24. Data used to draw up the GHG assessment of MOE

	TOTAL MOE 2021	TOTAL MOE 2019
Workforce	869	499
Surface area heated	16,894	11,332 m²
Electricity consumption		
Purchase of electricity	930,000	687,000 kWh
PV production	79,000	55,000 kWh
Air conditioning	YES	YES
Heating	939,000	543,000 kWh
Fixed assets*		
PCs	*1209*	694
Desktop computers	*23*	13
Printers	*21*	12
Plotters	*5*	3
Use of paper	*4648 reams (*)*	2669 reams (*)
Business travel		
Air	399,098 km	453,842 km
Rail	86,021 km	25,831 km
S-train	-	38,471 km
Bus	1864 km	1231 km
Metro	216,650 km	158 km
Diesel car	-	223,327 km
Petrol car	584,257 km	485,515 km
Electric car	574,725 km	20,199 km
Diesel car - Artelia fleet	35,014 km	17,165 km
Petrol car - Artelia fleet	46,146 km	99,909 km
Electric car - Artelia fleet	97,738 km	20,199 km
Commuting	155,551 km	
Total commuting distance (sum for all employees)	16,094 km	approx. 8500 km
Modal split		
Car	approx. 15,660 km	55%
Bicycle		24%
Public transport	85%	12%
Combined (public transport, car, bicycle)	7%	7%
Walking		2%

	1%	
	6%	
	1%	
	-	

(*) As data for fixed assets (IT equipment and paper) are not available for 2021, a proportionality rule as a function of the increase in the workforce was applied, using the 2019 data as a basis to obtain the 2021 fixed assets

The MOE subsidiary is characterised by:

- Heating via a district heating network, rather than electrically as is the case with the other international subsidiaries

Assumptions specific to MOE and limitations

- The modal split for the "commuting" category is drawn from an employee survey. A substantial proportion of the employees who responded commute by combining several modes of transport. As the questionnaire does not enable combined transport to be taken into account in a detailed manner, assumptions were made for these journeys which result in an additional margin of error.
- Commuting distances were estimated using employees' post codes.
- The average number of days' remote working per week is drawn form the employee survey of commuting habits, and amounts to approximately 1.1 days per week. This value was then applied to all MOE employees to calculate the total distances travelled per year;
- Emission factor for electricity consumption:
- Electricity purchased, average for Denmark: 0.360 kgCO2e/kWh (source: Bilan Carbone® V8)
- For public transport, the "Metro, tram, trolley bus, continental France, Base Carbone® database" ratio of 0.00681 kgCO2e/passenger.km was used (in the absence of a ratio specific to metro systems in Denmark). This is one of the limitations of using ADEME's Bilan Carbone® tool, as it is not perfectly suited to international companies.
- For bus transport, the "conurbation of more than 250,000 inhabitants, diesel/NGV, continental France, Base Carbone® database" ratio of 0.154 kgCo2e/passenger.km was used (in the absence of a ratio specific to buses in Denmark).
- For ferry transport, the "daytime ferry (passenger), continental France, Base Carbone® database" ratio of 0.978 kgCo2e/passenger.km was used (in the absence of a ratio specific to ferries in Denmark).
- For consumption of heat, the emission factor of the heating network was used as indicated in the MOE report and drawn from Gladsaxe Fjenvarme, 2021: 49 gCO2e/kWh
- The emission factors for distances travelled by air differ depending on the type of journey made. The breakdown of distances travelled by type of journey (long-haul, medium-haul) was estimated on the assumption that it is similar to that for the United Kingdom, where the breakdown data are available.

Results of the assessment (using the Bilan Carbone® method)

The MOE subsidiary is responsible for approximately **2665 tCO_2e**, i.e. approximately **15%** of the emissions calculated for Artelia as a whole. This translates to a ratio per employee of 3.1 tCO_2e/employee.

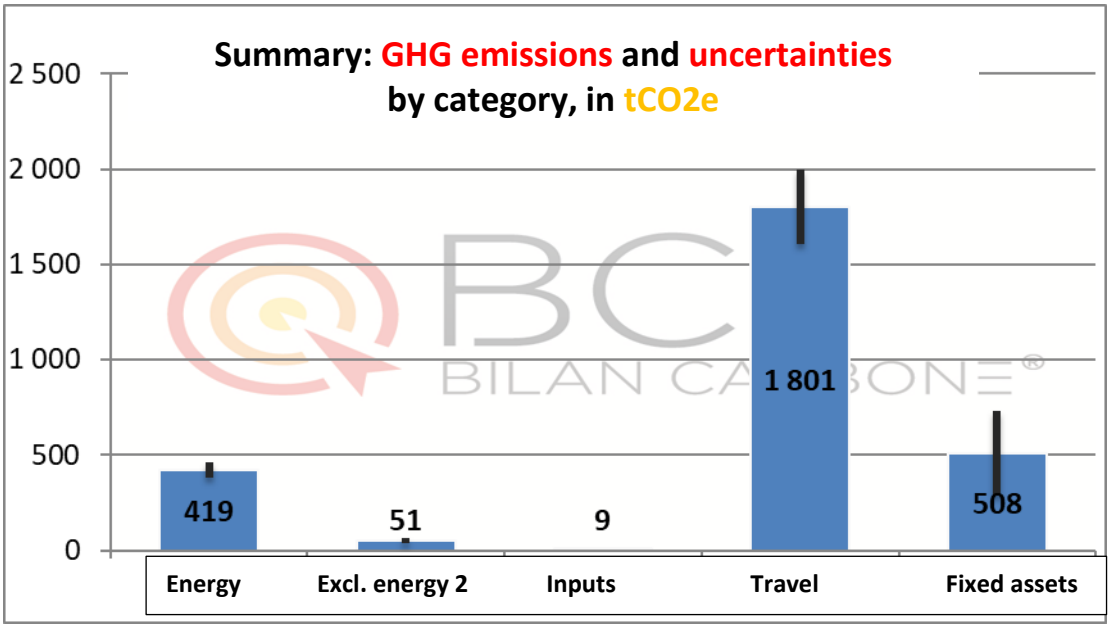

Fig.23 Breakdown of emissions by category (in tCO_2e) and related uncertainties for MOE (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

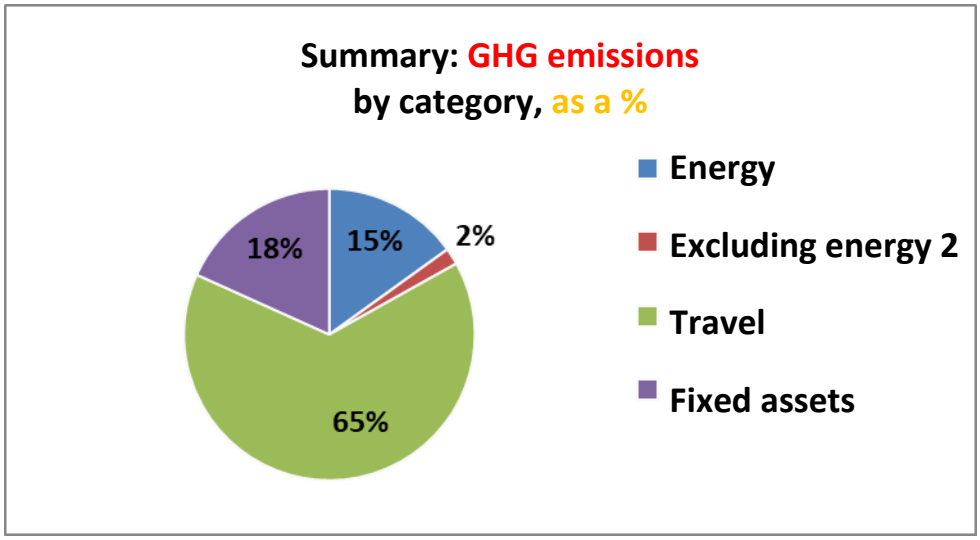

Fig.24 Breakdown (in %) of emissions by category for MOE (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

The “travel” category predominates, and accounts for approximately 65% of the emissions generated by MOE.

FOCUS ON ARTELIA UK

Input data

The main data used to draw up the carbon assessment of Artelia UK are presented in the table below.

Tabl.25. Data used to draw up the GHG assessment of Artelia UK

	TOTAL UK 2021	TOTAL UK 2019
Workforce	110	110
Surface area occupied	629 m²	629 m²
Electricity consumption	77,779 kWh	51,713 kWh
Air conditioning	YES	YES
Fixed assets		
PCs	110	110
Printers/photocopiers	3	3
Use of paper		
No. of A4 sheets	250 reams (*)	250 reams (*)
No. of A3 sheets	3 reams (*)	33 reams (*)
Business travel		
All means - excluding car	-	40,962 kgCO_2e
Car - short-term rental	-	572,358 km
Car - Artelia fleet	14,840 km	-
Air	41,514 km	-
Rail	1,588,424 km	-
Commuting		
Car	135,930 km	429,930 km
Public transport	-	96,037 km
Bus	21,216 km	-
Tram/metro	104,561 km	-
Bicycle	46,023 km	-
Rail	691,104 km	-

Assumptions specific to Artelia UK and limitations

- Emission factor for electricity consumption:
- Electricity purchased, average for UK: 0.457 kgCO2e/kWh (source: Bilan Carbone® V8)
- For public transport, the "Metro, tram, trolley bus, continental France, Base Carbone® database" ratio of 0.00681 kgCO2e/passenger.km was used (in the absence of a ratio specific to metro systems in the United Kingdom). This is one of the limitations of using ADEME's Bilan Carbone® tool, as it is not perfectly suited to international companies.
- For bus transport, the "conurbation of more than 250,000 inhabitants, diesel/NGV, continental France, Base Carbone® database" ratio of 0.154 kgCO2e/passenger.km was used (in the absence of a ratio specific to buses in the United Kingdom).
- The data on paper use were reconstituted on the assumption that use remained constant in comparison with 2019. As this category represents a minimal share of GHG emissions, the uncertainty induced on the GHG assessment by this assumption is very low.
- The data available for 2021 on business travel are more precise than those available for 2019. A summary of km travelled by means of transport is available, whereas only the total costs associated with transport were

available in 2019. This enables a more precise GHG assessment to be drawn up, but, since the data typologies used are different, care must be taken when comparing 2021 with 2019.

- As regards commuting, the annual distances per mode of transport are taken directly from the '*Carbon Footprint 2021'* report in which the UK subsidiary draws up an assessment of its GHG emissions.

Results of the assessment (using the Bilan Carbone® method)

The Artelia UK subsidiary is responsible for approximately **307 tCO_2e**, i.e. approximately **2%** of the emissions calculated for Artelia as a whole. This translates to a ratio per employee of **2.8 tCO_2e**/employee.

- Change compared to 2019

Artelia UK's GHG emissions have decreased by about 48% compared to 2019 (307 tC02e in 2021 and 600 tCO_2e in 2019). The ratio per employee has fallen from 5.3 to 2.8 tCO_2e/employee, a decrease of approximately 45%.

This decrease should be seen in light of the pandemic, which led to a drop in both business travel and commuting, and an increase in remote working. Since these two categories predominate in GHG emissions, a change in these has a significant impact on the total GHG emissions for the subsidiary.

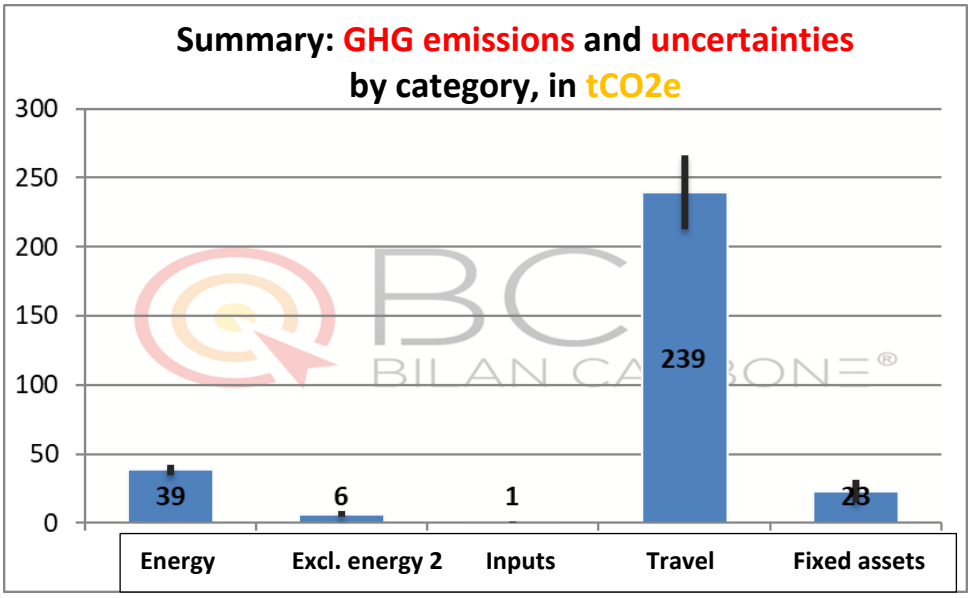

Fig.25 Breakdown of emissions by category (in tCO_2e) and related uncertainties for Artelia UK (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

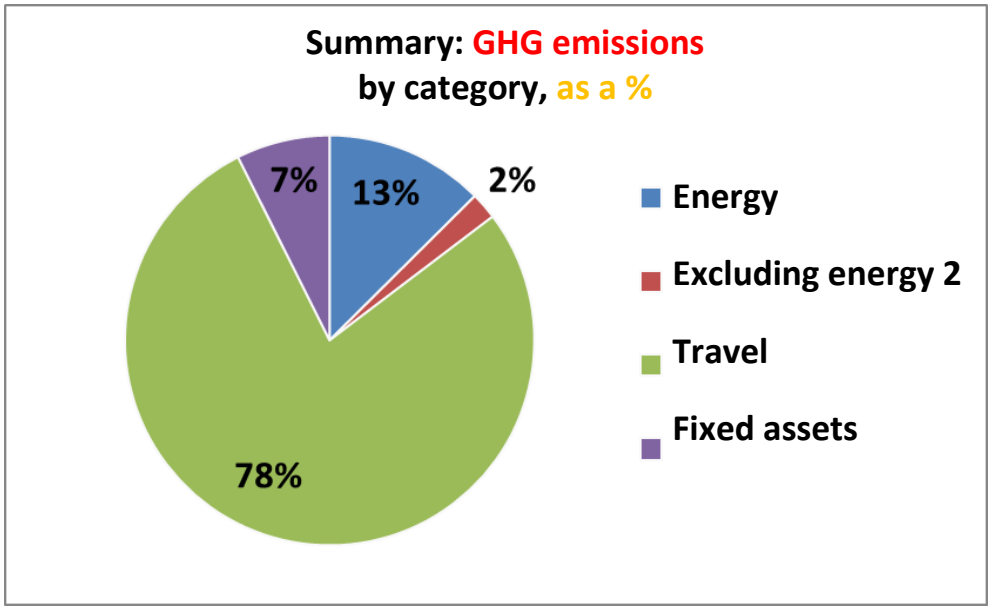

Fig.26 Breakdown (in %) of emissions by category for Artelia UK (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

As with the other subsidiaries, the travel-related category predominates (89% of overall emissions).

FOCUS ON ARTELIA ITALY

Tabl.26. Data used to draw up the GHG assessment of Artelia Italy

	TOTAL Italy 2021	TOTAL Italy 2019
Workforce	189	169
Surface area occupied	3200 m²	3200 m²
Electricity consumption	384,907 kWh	356,469 kWh
Air conditioning	YES	YES
Fixed assets		
PCs	364	312
Desktop computers	64	78
Printers/plotters	12	6
Photocopiers	3	14
Use of paper		
No. of A4 sheets	968 kg	454 reams (*)
Business travel		
Air	103,298 km	182,760 kgCO_2e
Rail	433,636 km	37,500 kgCO_2e
Car - short-term rental	18,715 km	1896 kgCO_2e
Car - Artelia fleet	1,016 394 km	880,000 km
Commuting		
Modal split		
Car/taxi	61%	40%
Public transport (bus and metro)		60%
Bus	3%	
Tram/metro	10%	
Bicycle/walking	4%	
Rail	17%	
Motorcycle/moped	5%	

Assumptions specific to Artelia Italy and limitations

- Emission factor for electricity consumption:

  Electricity purchased, average for Italy: 0.406 kgCO_2e/kWh (source: Bilan Carbone® V8)

- The modal split for the "commuting" category is drawn from an employee survey. A substantial proportion of the employees who responded commute by combining several modes of transport. As the questionnaire does not enable combined transport to be taken into account in a detailed manner, assumptions were made for these journeys which result in an additional margin of error.

- The commuting distances were extracted directly from the survey of employees, in which they entered their commuting distance; the high survey response rate (97%) makes it possible to obtain representative results, and to avoid approximations related to calculating distances on the basis of post codes.

- The average number of days' remote working per week is drawn from the employee survey of commuting habits. This value was then applied to all Artelia Italy employees to calculate the total distances travelled per year.

Results of the assessment (using the Bilan Carbone® method)

The Artelia Italy subsidiary is responsible for approximately **822 tCO2e**, i.e. approximately **4%** of the emissions calculated for Artelia as a whole. This translates to a ratio per employee of **4.4** tCO_2e/employee.

- Change compared to 2019

Artelia Italy's GHG emissions have decreased by about 13% compared to 2019 (**822 tC02e in 2021** and **950 tCO_2e in 2019)**. The ratio per employee has fallen from 5.6 to 4.4 tCO_2e/employee, a decrease of approximately 20%.

This decrease should be seen in light of the pandemic, which led to a drop in both business travel and commuting, and an increase in remote working. Since these two categories predominate in GHG emissions, a change in these has a significant impact on the total GHG emissions for the subsidiary.

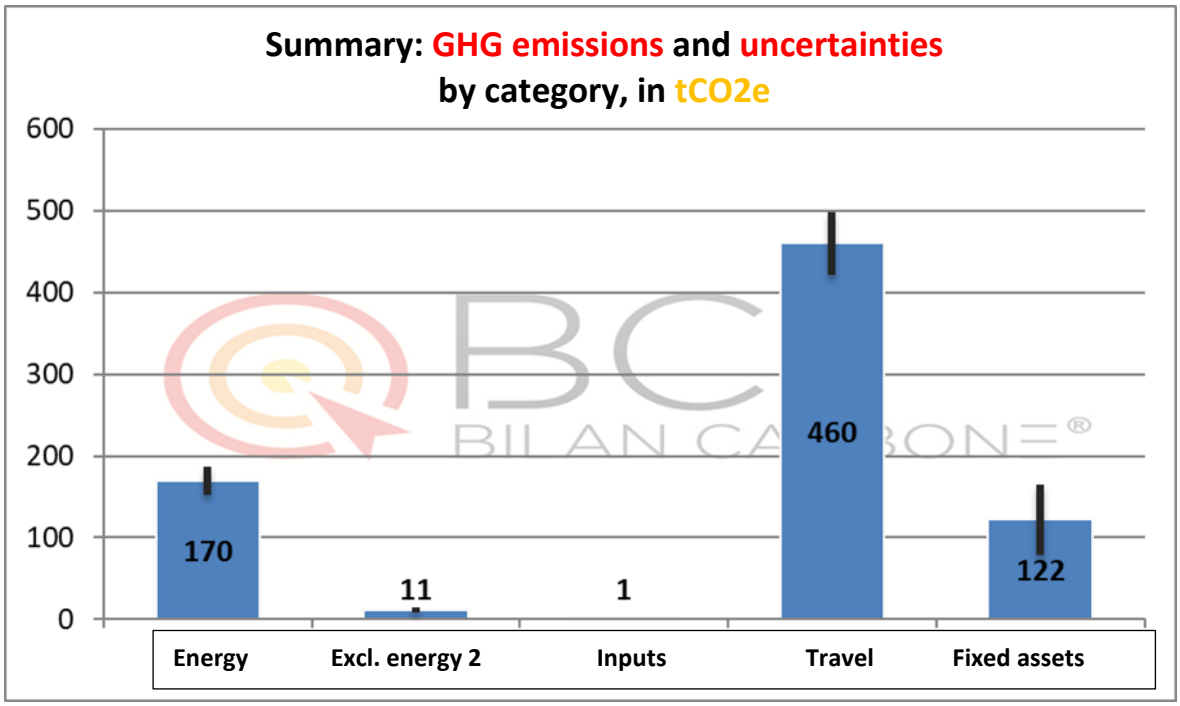

Fig.27 Breakdown of emissions by category (in tCO_2e) and related uncertainties for Artelia Italy (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

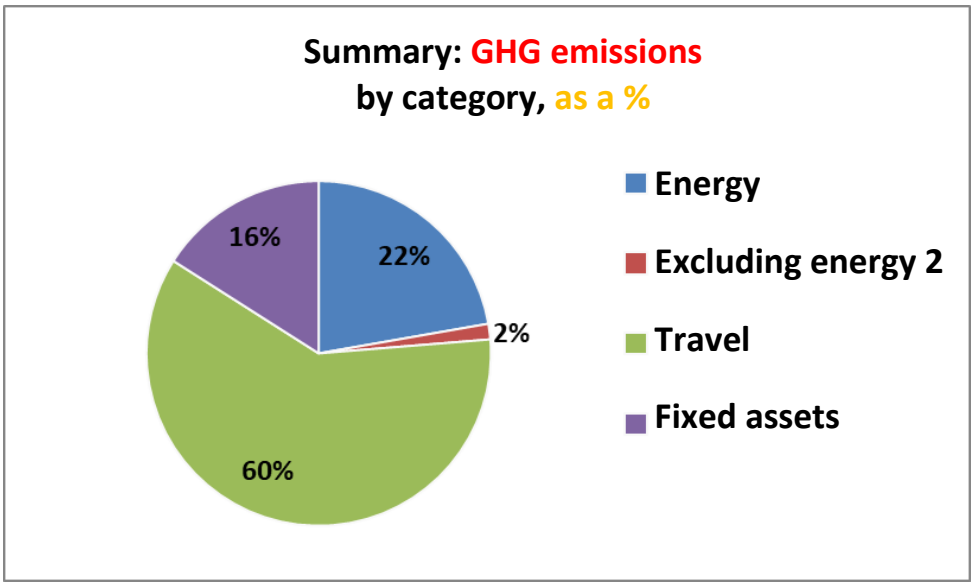

Fig.28 Breakdown (in %) of emissions by category for Artelia Italy (source: according to Bilan Carbone® version 8, ARTELIA, 2022)

As with the other subsidiaries, the travel-related category predominates (66% of overall emissions).

CONCLUSIONS AND GUIDELINES

One trend is continuing: “travel” is the predominant category for all the subsidiaries. A variation in the breakdown between commuting and business travel at the various subsidiaries is also observed.

In addition, an overall decrease in the subsidiaries' GHG emissions compared with 2019 is observed. This decrease is not consistent across all the subsidiaries, and must be analysed in the light of the particular health situation in 2021.

As a reminder, the results from the comparison between the various subsidiaries must be taken with great care. As was stated for several of the assumptions, the level of precision and the quality of the data differ from one subsidiary to another.

A number of challenges and proposals are identified for the future, in particular to facilitate and improve the quality of results in future assessments:

- Improve and harmonise the quality of the data that the various branch offices can provide. To this end, build a network of leads tasked with collecting the data and ensuring that the same data monitoring method is used in all the subsidiaries.

- Create a monitoring unit within the GHG assessment steering committee, to capitalise on best practices that can be reproduced across all the branch offices while taking the commercial and geographical realities of each subsidiary into consideration. One example of a best practice is the use of digital tools, which was stepped up in 2020 by the pandemic.

- As regards commuting, we wish to reiterate the essential role that Artelia must play in supporting employees’ transport budgets so as to encourage the use of means of transport with the lowest emissions. It should also be stressed that the branch offices share the responsibility for raising awareness of this issue among employees.