

Final report

# 2022 Greenhouse gas (GHG) accounting report

AIR HAMBURG

Reporting Period 01/01/2022 to 31/12/2022

October 2023



## **Details**

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## Acronyms and abbreviations

|                   |  |
|-------------------|--|
| CH <sub>4</sub>   | Methane  |
| CO <sub>2</sub>   | Carbon dioxide   |
| CO <sub>2</sub> e | Carbon dioxide equivalent                                |
| GHG               | Greenhouse gases   |
| HFCs              | Hydrofluorocarbons                                       |
| kg                | Kilogram   |
| MWh               | Megawatt hour  |
| N <sub>2</sub> O  | Nitrous oxide  |
| t                 | tonne  |
| UNFCCC            | United Nations Framework Convention on Climate Change    |
| US                | United States  |
| WFH               | Work-From-Home   |
| GJ                | Gigajoules   |
| CEDA              | Comprehensive Environmental Data Archive                 |
| BEIS              | UK Department for Business, Energy & Industrial Strategy |

## Executive summary

This report presents the inventory of AIR HAMBURG's operational greenhouse gas (GHG) emissions for the 2022 calendar year, based on its reported data. AIR HAMBURG was acquired by Vista Global Holding Limited (Vista) in 2022, hence this is the first reporting year and comparisons with previous years is not possible.

An operational control approach was taken for this accounting exercise, meaning emissions for all activities conducted under the control of AIR HAMBURG were calculated, using a combination of primary and extrapolated data.

A breakdown of emissions and relevant analysis is provided in this report for key sources of emissions, as per the categorisation specified in the GHG Protocol. All assumptions, data challenges, extrapolations, and limitations are described within this report and its annexes.

Based on the data provided by AIR HAMBURG, the total GHG emissions reported for the year 2022 are estimated to be **223,883.94** tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). Scope 1 emissions from the combustion of aviation fuel was the largest contributor to the footprint, and accounted for 146,360.26 tCO<sub>2</sub>e, 65.37% of total emissions.

Key performance indicators (KPIs) are found in Table 1, and an overview of GHG emissions by source is provided in Table 2, and Figures 1 and 2. The emissions intensity of AIR HAMBURG is 688.87 tCO<sub>2</sub>e per employee and 69.10 tCO<sub>2</sub>e per m<sup>2</sup> in 2022.

Please note that, due to rounding of numbers, the figures in the tables in this report may not add up exactly to the totals provided.

**Table 1: Summary of key performance indicators (KPIs)**

|                                   |       |                                       |        |
|-----------------------------------|-------|---------------------------------------|--------|
| <b>Number of employees</b>        | 325   | <b>tCO<sub>2</sub>e/employee</b>      | 688.87 |
| <b>Total area (m<sup>2</sup>)</b> | 3,240 | <b>tCO<sub>2</sub>e/m<sup>2</sup></b> | 69.10  |

(Source: South Pole, based on AIR HAMBURG, 2023)

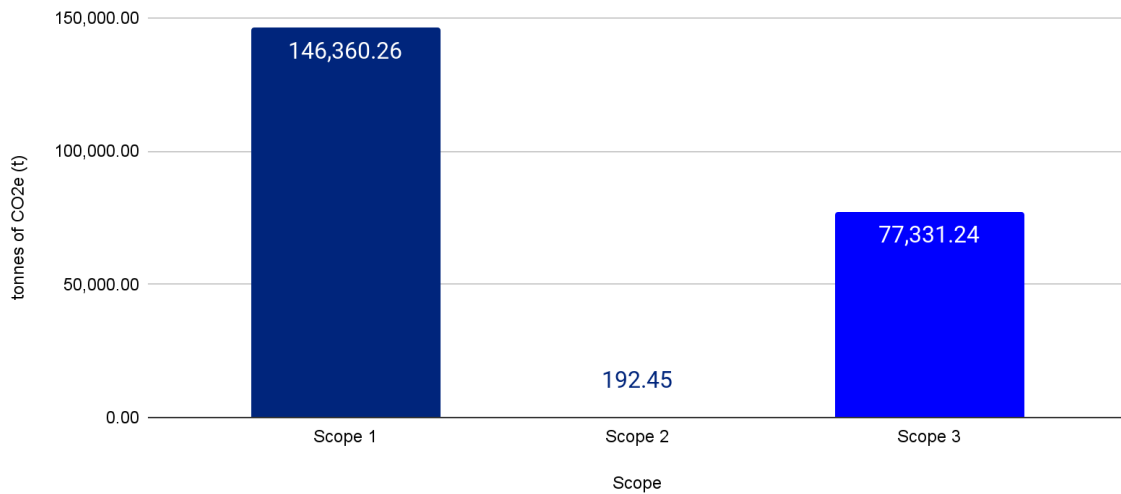
**Table 2: GHG emissions by scope and greenhouse gas**

| <b>Scope</b>  | <b>Total (tCO<sub>2</sub>e)</b> | <b>Percentage of total (%)</b> |
|---|---------------------------------|--------------------------------|
| Scope 1: direct GHG emissions   | 146,360.26                      | 65.37%                         |
| Scope 2: indirect GHG emissions (market based)                                | 192.45                          | 0.09%                          |
| Dual reporting Scope 2: indirect GHG emissions (location-based <sup>1</sup> ) | 165.82                          | -                              |
| Scope 3: other indirect GHG emissions   | 77,331.24                       | 34.54%                         |
| <b>Total GHG emissions (market-based)</b>                                     | <b>223,883.94</b>               | <b>100%</b>                    |

<sup>1</sup> A location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data). A market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice): it derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation or for unbundled attribute claims (e.g. RECs, GOs, etc.).

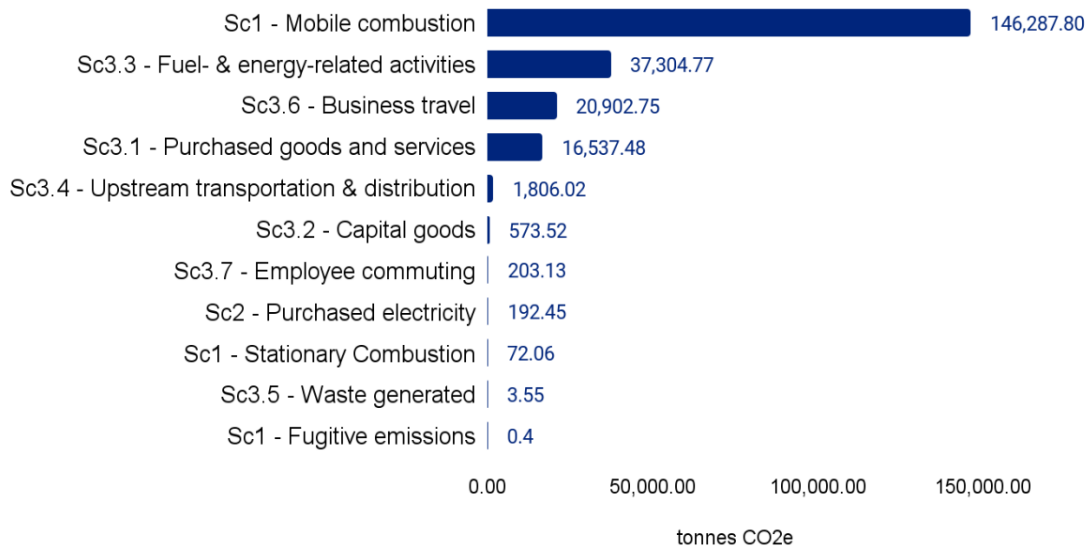
## AIR HAMBURG – 2022 GHG Accounting Report

(Source: South Pole, based on AIR HAMBURG, 2023)



**Figure 1: AIR HAMBURG's 2022 GHG emissions by scope**

(Source: South Pole, based on AIR HAMBURG, 2023)



**Figure 2: AIR HAMBURG's 2022 GHG emissions by GHG Protocol category**

(Source: South Pole, based on AIR HAMBURG, 2023)

## Introduction

Vista, the world's leading global private aviation group, has previously undertaken GHG inventories for 2019, 2020 and 2021. This is the first reporting year for AIR HAMBURG. This report provides an account of the GHG emissions from AIR HAMBURG's global operations from 1st January 2022 to the 31st December 2022, based on reported data by the client. It includes an analysis of key sources of emissions, as well as targeted recommendations focused on data improvement and decarbonisation.

Company information and the reporting period are presented in Table 3.

**Table 3: Company information**

| Company information |   |
|---------------------|---|
| Website             | <a href="https://www.air-hamburg.de/de/">https://www.air-hamburg.de/de/</a> |
| Business function   | Private aviation company  |
| Reporting period    | January 1 to December 31, 2022  |

(Source: South Pole, based on AIR HAMBURG, 2023)

## Methodology

The GHG accounting and reporting procedure is based on the 'The Greenhouse Gas Protocol: GHG Protocol: A Corporate Accounting and Reporting Standard – Revised Edition' (GHG Protocol) and the complementary 'Corporate Value Chain (Scope 3) Accounting and Reporting Standard' – the most widely used international accounting tools for government and business leaders to understand, quantify, and manage GHG emissions. The standards were developed in partnership between the World Resources Institute and the World Business Council for Sustainable Development.

All accounting is based on the principles of the 'GHG Protocol':

- **Relevance:** establishing an appropriate inventory boundary that reflects the GHG emissions of the company and serves the decision-making needs of users;
- **Completeness:** including all emission sources within the chosen inventory boundary. Any specific exclusion is disclosed and specified;
- **Consistency:** ensuring meaningful comparison of information over time and transparently documented changes to the data;
- **Transparency:** guaranteeing data inventory sufficiency and clarity, where relevant issues are addressed in a coherent manner; and
- **Accuracy:** minimising uncertainty and avoiding systematic over- or under-quantification of GHG emissions.

### Global warming potential (GWP)

Global warming potential (GWP) is a measure of the climate impact of a GHG compared to carbon dioxide over a time horizon. GHG emissions have different GWP values depending on their



efficiency at absorbing longwave radiation, and the atmospheric lifetime of the gas. The GWP values used in GHG accounting include the six GHGs covered by the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol, as presented in Table 4. These are the GWP used by the United Kingdom Department for Business, Energy and Industrial Strategy (BEIS) and are based on the 'Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5)', unless otherwise stated.

**Table 4: Applied global warming potentials (GWPs)**

| GHG                               | GWP (100 years) |
|-----------------------------------|-----------------|
| Carbon dioxide (CO <sub>2</sub> ) | 1               |
| Methane (CH <sub>4</sub> )        | 28              |
| Nitrous oxide (N <sub>2</sub> O)  | 265             |
| Hydrofluorocarbons (HFCs)         | See IPCC AR5    |
| Perfluorocarbons (PFCs)           | See IPCC AR5    |
| Refrigerants                      | See IPCC AR5    |

(Source: IPCC AR5, 2014)

## System Boundaries

### Organisational boundaries

AIR HAMBURG's GHG inventory follows the operational control approach, in accordance with the GHG Protocol. Under the operational control approach, a company accounts for 100% of emissions from operations over which it or one of its subsidiaries has operational control. This GHG inventory covers all activity from AIR HAMBURG's offices.

Table 5 shows the sites that were included in the 2022 GHG inventory.

**Table 5: Key figures for AIR HAMBURG's sites**

| Site location                  | Type of facility | Area (m <sup>2</sup> ) | Headcount |
|--------------------------------|------------------|------------------------|-----------|
| AIR HAMBURG Headquarters       | Office           | 1,899                  | 241       |
| AIR HAMBURG Warehouse          | Warehouse        | 631                    | 5         |
| AIR HAMBURG Executive Handling | Office           | 110                    | 9         |
| AIR HAMBURG Technik            | Maintenance      | 600                    | 70        |
| Total                          | -                | 3,240                  | 325       |

(Source: South Pole, based on AIR HAMBURG, 2023)

### Operational boundaries

Under the 'GHG Protocol', emissions are divided into direct and indirect emissions. Direct emissions are those originating from sources owned or controlled by the reporting entity. Indirect emissions are generated as a result of the reporting entity's activities but occur at sources owned or controlled by another entity.

The direct and indirect emissions are divided into three scopes as found below.

## Scope 1

Scope 1 emissions are all carbon emissions originating from sources that are directly managed by the organisation (direct GHG emissions). This includes the emissions from the combustion of fossil fuels in mobile and stationary sources (e.g. owned or controlled aircrafts, boilers, power generators and vehicles) and carbon emissions generated by chemical and physical processes, as well as fugitive emissions from the use of cooling and air-conditioning (AC) equipment. Table 6 (below) gives an overview of the emission sources considered in scope 1, based on the information provided by AIR HAMBURG.

**Table 6: Overview of scope 1 emission sources for 2022**

| Category                        | Emission sources  | Boundary and justification for exclusion |
|---------------------------------|---|--|
| Stationary combustion           | Generation of electricity and heat  | Included                                 |
| Mobile combustion               | Company-owned or leased vehicles / Fuels for mobile sources for passenger aircraft                              | Included                                 |
| Physical or chemical processing | Manufacture or processing of chemicals and materials  | Not applicable                           |
| Fugitive emissions              | Emissions from the use of cooling systems and AC equipment, leakage from CO <sub>2</sub> tanks or methane tubes | Included                                 |

## Scope 2

Scope 2 includes indirect GHG emissions from the generation of purchased electricity, steam, heat or cooling purchased by the organisation from external energy providers.

As required by the GHG Protocol, Scope 2 emissions are reported using both the location-based method and the market-based method<sup>2</sup>. This dual reporting allows corporations to compare their individual purchasing decisions to the overall GHG-intensity of the grids on which they operate.

The market-based method reflects emissions that result from electricity purchases that the company has purposefully chosen. When a contract is set up for the sale of electricity and the origin of energy generation can be guaranteed, then those specific and relevant emissions factors can be applied. The location-based method applies average emission factors that correspond to the grid where consumption occurs. The default method applied to AIR HAMBURG reporting is market-based; location-based results are shown for completeness and transparency.

Table 7 presents an overview of the emission sources considered in scope 2.

<sup>2</sup> A location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data). A market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice): it derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation for unbundled attribute claims (e.g. RECs, GOs, etc.).

**Table 7: Overview of scope 2 emission sources for 2022**

| Category         | Emission sources           | Boundary       |
|------------------|----------------------------|----------------|
| Electricity      | Purchased electricity      | Included       |
| Steam            | Purchased steam            | Not applicable |
| District heating | Purchased heating          | Not applicable |
| District cooling | Purchased district cooling | Not applicable |

## Scope 3

Scope 3 includes other indirect emissions, such as emissions from the extraction and production of purchased materials and services, vehicles not owned or controlled by the reporting entity, outsourced activities, or waste disposal.

According to the 'GHG Protocol', companies shall separately account for and report for emissions from Scope 1 and 2. Scope 3 is an optional reporting category according to the 'GHG Protocol', but as it is the most important scope for many organisations, companies are expected to assess at least the most relevant categories. In addition, it is best practice to include scope 3 emissions and it is a requirement for setting science-based targets (SBTs).

Table 8 presents an overview of the emission sources considered in Scope 3.

**Table 8: Overview of scope 3 emission sources for 2022**

| Category                                 | Emission sources   | Boundary |
|--|--|----------|
| Purchased goods and services             | Purchased goods (raw materials) and services   | Included |
| Capital goods                            | Production of capital goods (information technology [IT] equipment, machinery, buildings etc.)       | Included |
| Fuel- and energy-related activities      | Emissions from fuel and electricity generation, including transmission and distribution (T&D) losses | Included |
| Upstream transportation and distribution | Transportation and distribution of goods and services purchased by the reporting company             | Included |
| Waste generated in operations            | Waste management of operational waste (landfilling, recycling, etc.)                                 | Included |
| Business travel                          | Travel and accommodation of employees/contractors  | Included |
| Employee commuting and teleworking       | Employee travel between home and work and incremental emissions related to working from home         | Included |

| Category                                   | Emission sources   | Boundary                   |
|--|--|----------------------------|
| Upstream leased assets                     | Operation of assets leased by the organisation (lessee) in the reporting year and not included in scope 1 or 2 | Not material. Not included |
| Downstream transportation and distribution | Transportation and distribution of products not purchased by the reporting company                             | Not material. Not included |
| Processing of sold products                | Processing of intermediate products sold by the organisation   | Not material. Not included |
| Use of sold products                       | Emissions from the use of sold products (e.g. energy consumption during use)                                   | Not material. Not included |
| End-of-life treatment of sold products     | Waste disposal and treatment of sold products  | Not material. Not included |
| Downstream leased assets                   | Operation of assets owned by the company (lessor) and leased to other entities, not included in scope 1 or 2   | Not material. Not included |
| Franchises                                 | Operation of franchises not included in scope 1 or 2   | Not material. Not included |
| Investments                                | Operation of investments not included in scope 1 or 2  | Not material. Not included |

## Data inventory and assumptions

Overall, the data inventory, emission factors, and assumptions are based on the 'GHG Protocol'. Unless otherwise specified, all emission values in this report are given in metric tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

Where activity data of the inventory was lacking, extrapolations and estimations were made. The complete overview of activity data, extrapolations, and estimations is summarised in Annex II. Whilst every effort has been made to calculate emissions as accurately as possible, GHG emissions calculations carry an inherent level of limitation and uncertainty. As standard practice and in line with the GHG Protocol, the choice of assumptions and emission factors followed a conservative approach.

The quality of activity data provided for a GHG inventory has a significant impact on the reliability and accuracy of emissions calculations. Primary activity data, such as the kWh of electricity purchased within a reporting year, yields to the highest quality calculations. Spend based data, which relies on a far greater number of assumptions, results in the least accurate.

## Results

Based on the data provided by AIR HAMBURG, the total GHG emissions for the year 2022 are estimated to be **223,883.94 tCO<sub>2</sub>e**. Table 9 below illustrates the key figures in terms of GHG emissions (in tCO<sub>2</sub>e) and energy intensity (in gigajoules [GJ]) relevant to corporate sustainability

reporting, in accordance with the GRI Standards. Please note that, due to rounding of numbers, the figures may not add up exactly to the total provided.

**Table 9: Key figures according to the Global Reporting Initiative (GRI)**

| GRI Standard |   | Topic  | Quantity     | Unit                            |
|--------------|---|--|--------------|---------------------------------|
| 302-1        | e | Energy consumption within the organisation             | 2,049,787.48 | GJ                              |
|              | a | Total fuel consumption from non-renewable sources      | 2,047,419.71 | GJ                              |
|              |   | Aviation fuel  | 2,045,963.60 | GJ                              |
|              |   | Natural gas  | 1,435.10     | GJ                              |
|              |   | Diesel   | 21.01        | GJ                              |
|              | b | Total fuel consumption from renewable sources          | 0.0          | GJ                              |
|              | c | Total electricity consumption                          | 2,367.77     | GJ                              |
| 305-1        | a | Direct GHG emissions (scope 1)                         | 146.360.26   | tCO <sub>2</sub> e              |
| 305-2        | a | Location-based energy indirect GHG emissions (scope 2) | 165.82       | tCO <sub>2</sub> e              |
|              | b | Market-based energy indirect GHG emissions (scope 2)   | 192.45       | tCO <sub>2</sub> e              |
| 305-3        | a | Other indirect GHG emissions (scope 3)                 | 77,331.24    | tCO <sub>2</sub> e              |
| 302-4        |   | GHG emissions intensity                                | 688.87       | tCO <sub>2</sub> e/<br>employee |

(Source: South Pole, based on AIR HAMBURG data, 2023)

**Table 10: GHG emissions by scope and activity for 2022**

| Activity   | Consumption   | Unit           | Emissions (tCO <sub>2</sub> e) | Percentage of total (%) |
|--|---------------|----------------|--------------------------------|-------------------------|
| Scope 1: direct GHG emissions  |               |                | 146,360.26                     | 65.37%                  |
| Stationary combustion  |               |                | 72.066                         | 0.03%                   |
| Natural gas  | 266.61        | MWh            | 47.99                          | 0.02%                   |
| Natural gas  | 11,942.00     | m <sup>3</sup> | 24.07                          | 0.01%                   |
| Mobile combustion  |               |                | 146,287.80                     | 65.34%                  |
| Aviation fuel  | 15,947,485.00 | gal            | 146,286.40                     | 65.34%                  |
| Diesel   | 550.00        | litres         | 1.40                           | <0.01%                  |
| Fugitive emissions   |               |                | 0.39                           | <0.01%                  |
| Refrigerants   | 3,240.00      | m <sup>2</sup> | 0.39                           | <0.01%                  |
| Scope 2: indirect GHG emissions from purchased electricity, heating and cooling (market-based) |               |                | 192.45                         | 0.09%                   |
| Purchased Electricity  | 387.42        | MWh            | 192.45                         | 0.09%                   |
| Grid   | 270.29        | MWh            | 168.12                         | 0.08%                   |
| Supplier specific  | 117.12        | MWh            | 24.33                          | 0.01%                   |

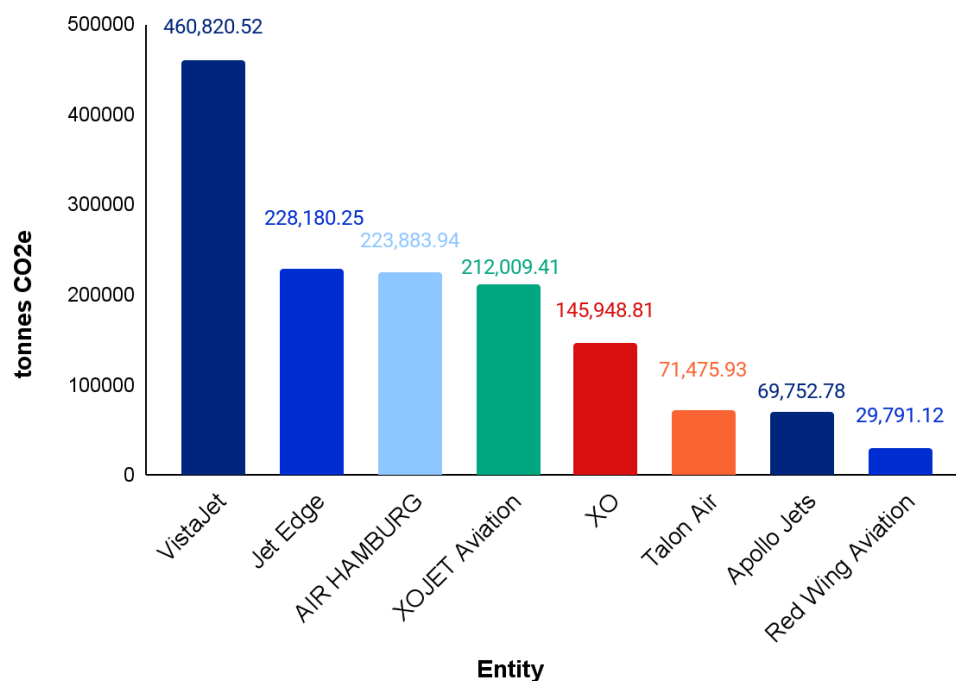
| Activity   | Consumption   | Unit   | Emissions (tCO <sub>2</sub> e) | Percentage of total (%) |
|--|---------------|--------|--------------------------------|-------------------------|
| Scope 3: other indirect GHG emissions  |               |        | 77,331.24                      | 34.54%                  |
| Category 1: Purchased goods and services   |               |        | 16,537.48                      | 7.39%                   |
| Flight-related (i.e. handling, aircraft parts, catering services, etc.)                |               |        | 15,710.94                      | 7.02%                   |
| Non flight-related (i.e. training, food and drink products, marketing materials, etc.) |               |        | 826.54                         | 0.37%                   |
| Category 2: Capital goods  |               |        | 573.52                         | 0.26%                   |
| Flight-related (tools and equipment)   | 579,728.60    | EUR    | 239.09                         | 0.11%                   |
| Non flight-related (IT equipment)  | 1,081.00      | units  | 334.43                         | 0.15%                   |
| Category 3: Fuel- and energy-related activities  |               |        | 37,304.77                      | 16.66%                  |
| Aviation fuel  | 15,947,485.00 | gal    | 37,236.54                      | 16.63%                  |
| Diesel   | 550.00        | litres | 0.34                           | <0.01%                  |
| Natural gas  | 266.61        | MWh    | 9.19                           | <0.01%                  |
| Natural gas  | 11,942.00     | m3     | 4.10                           | <0.01%                  |
| Electricity  | 387.42        | MWh    | 54.61                          | 0.02%                   |
| Category 4: Upstream transportation and distribution                                   |               |        | 1,806.02                       | 0.81%                   |
| Air transportation   | 1,286,621.00  | EUR    | 1,805.46                       | 0.81%                   |
| Ground transportation  | 1,919.00      | EUR    | 0.56                           | <0.01%                  |
| Category 5: Waste generated in operations  |               |        | 3.55                           | <0.01%                  |
| Commercial and industrial waste  | 114.33        | ton    | 2.43                           | <0.01%                  |
| Glass  | 31.51         | ton    | 0.23                           | <0.01%                  |
| Oil waste  | 40.03         | ton    | 0.85                           | <0.01%                  |
| Paper/Cardboard  | 83.33         | ton    | 0.04                           | <0.01%                  |
| Category 6: Business travel  |               |        | 20,902.75                      | 9.34%                   |
| Accommodation  | 44,444.00     | nights | 1,108.86                       | 0.50%                   |
| Air travel   | 10,449,522.65 | pkm    | 19,357.90                      | 8.65%                   |
| Ground transportation (vehicle leasing)  | 12,267.71     | EUR    | 4.21                           | <0.01%                  |
| Ground transportation (rental car, taxi, e-bike and train)                             | 3,987,749.99  | km     | 431.79                         | 0.19%                   |
| Category 7: Employee commuting   |               |        | 203.13                         | 0.09%                   |
| Car  | 445,454.10    | km     | 97.70                          | 0.04%                   |
| Other (taxi and motorbike)   | 174,999.84    | km     | 35.35                          | 0.02%                   |
| Public transport (bus and train)   | 422,474.34    | pkm    | 35.03                          | 0.02%                   |

| Activity                             | Consumption | Unit        | Emissions (tCO <sub>2</sub> e) | Percentage of total (%) |
|--------------------------------------|-------------|-------------|--------------------------------|-------------------------|
| Teleworking                          | 14,800.00   | person days | 35.05                          | 0.02%                   |
| Walk                                 | 724,746.75  | pkm         | 0.00                           | 0.00%                   |
| Total GHG emissions (location-based) |             |             | 223,843.56                     | -                       |
| Total GHG emissions (market-based)   |             |             | 223,883.94                     | 100%                    |

(Source: South Pole, based on AIR HAMBURG, 2023)

## Overall results – Vista

Figure 3 presents a breakdown of Vista’s GHG emissions for each of its eight business units. In 2022 AirHamburg is the third in terms of highest GHG emissions of all eight global entities, at 223,883.94, tCO<sub>2</sub>e, accounting for 15.5% of the overall global footprint.

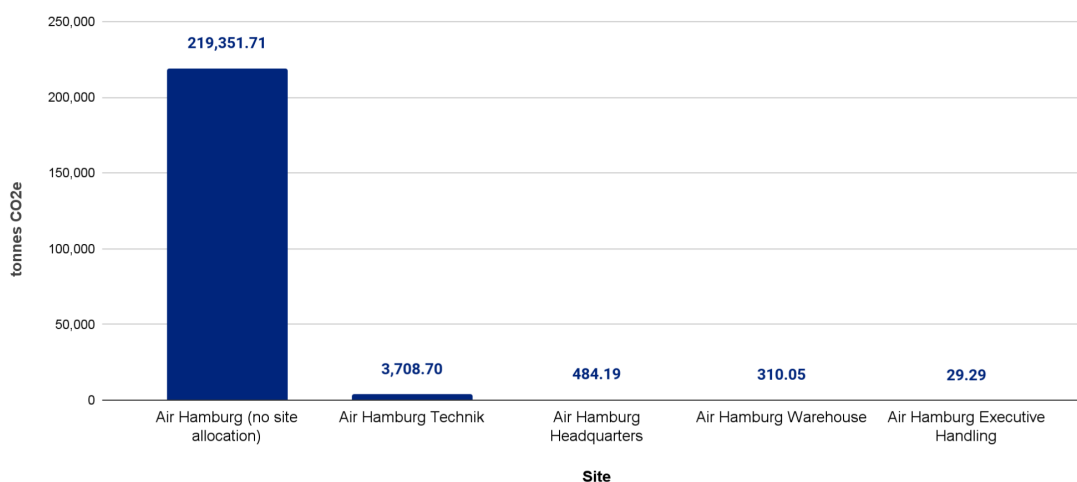


**Figure 3: Vista overall 2022 GHG emissions by business entity**

(Source: South Pole, based on Vista 2023)

## Site-level results

Figure 4 presents a breakdown of emissions for each of AIR HAMBURG’s 4 sites. Over 97.98% of emissions fall under AIR HAMBURG’s global operations in this GHG inventory. This is partly because scope 1 and scope 3 (Category 3) emissions from aviation fuel fall under AIR HAMBURG’s global operations, but also because a significant quantity of scope 3 data for purchased goods and services, capital goods and business travel have been provided at the entity (‘AIR HAMBURG’) level rather than site level for this inventory.



**Figure 4: AIR HAMBURG's 2022 GHG emissions by site**

(Source: South Pole, based on AIR HAMBURG, 2023)

## Category-level results

Figure 5 presents a breakdown of AIR HAMBURG's overall 2022 emissions by scope. The vast majority of emissions – 65.37% – fall under Scope 1. This is largely driven by emissions associated with the burning of aviation fuel, which accounts for over 99.95% of the Scope 1 footprint. 34.54% of emissions fall under Scope 3, and 0.09% under Scope 2.

Figure 6 further provides a breakdown of emissions by GHG Protocol category. Mobile combustion is the largest source of emissions, accounting for 65.34% of the overall footprint.

The upstream scope 3 emissions associated with burning aviation fuel – which are accounted for under *Category 3 – Fuel and energy related activities* is the second largest source of emissions, and specifically accounts for 16.63% of the 2022 footprint. Overall, aviation fuel is therefore responsible for 81.97% of the total emissions for 2022.

Business travel and Purchased goods and services are the third and fourth highest sources of emissions, accounting for 9.34% and 7.39% of the total footprint respectively.



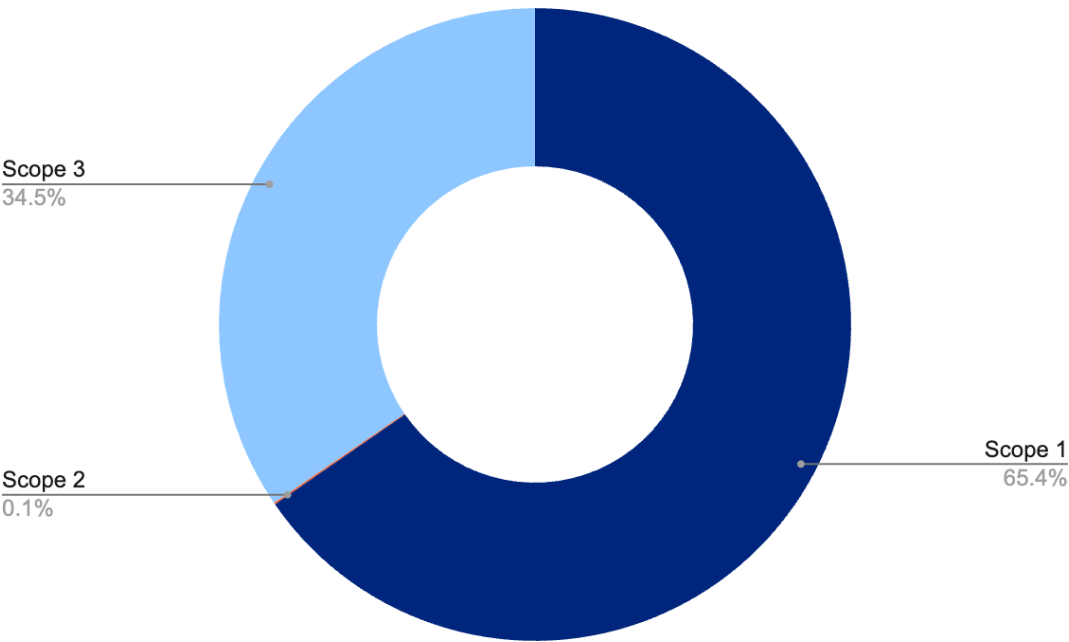


Figure 5: AIR HAMBURG's 2022 GHG emissions by scope  
(Source: South Pole, based on AIR HAMBURG, 2023)

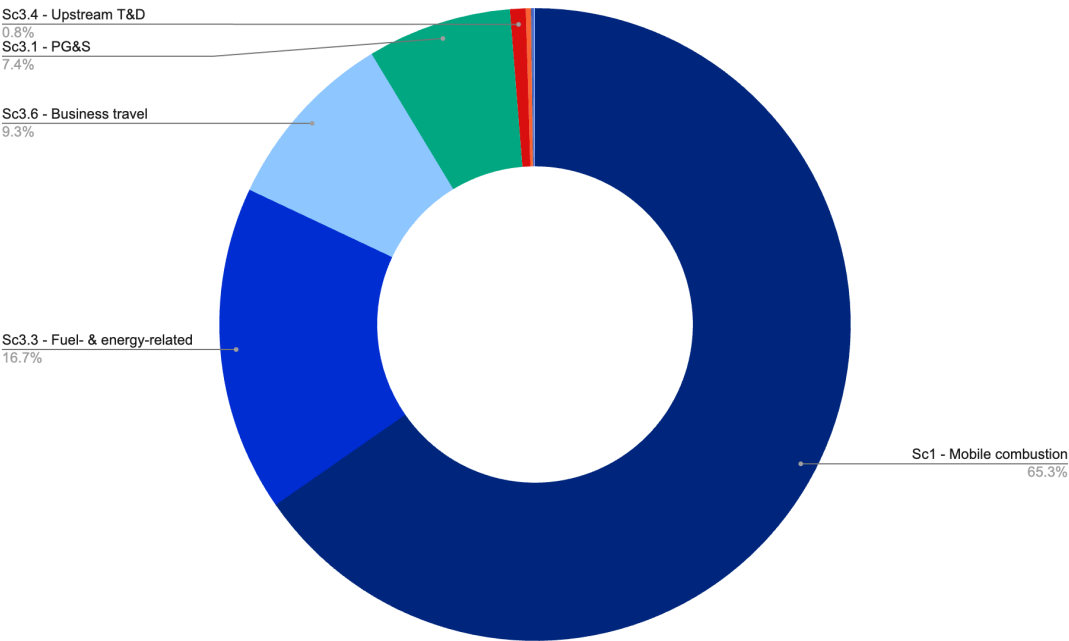


Figure 6: AIR HAMBURG's 2022 GHG emissions by GHG Protocol category  
(Source: South Pole, based on AIR HAMBURG, 2023)

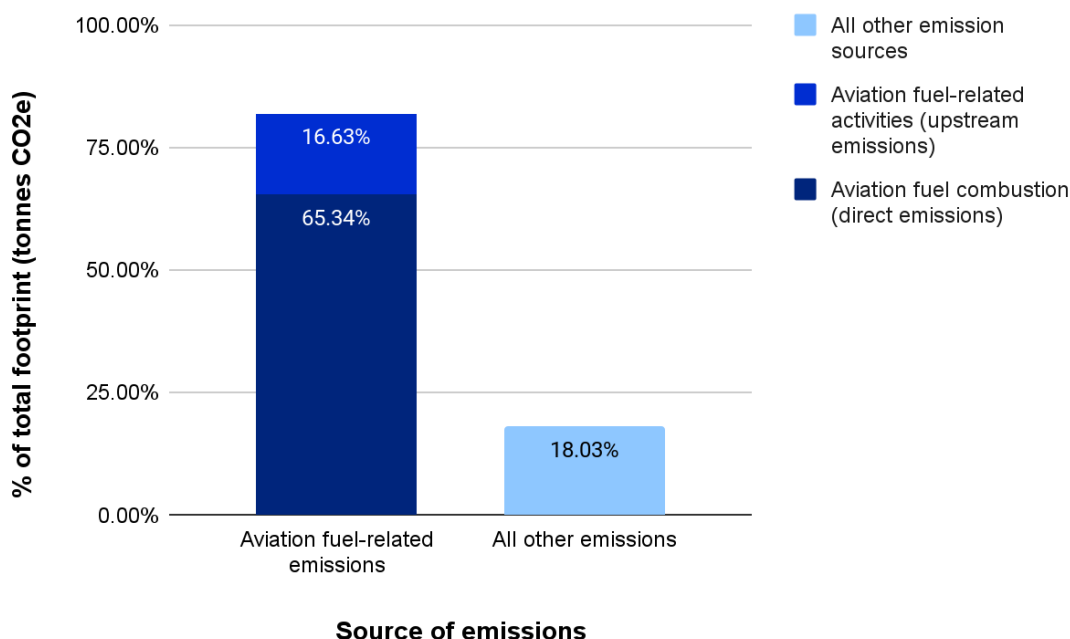


Figure 7: A comparison of AIR HAMBURG's aviation fuel emissions and all other emissions

(Source: South Pole, based on AIR HAMBURG, 2023)

## Conclusions

The annual measurement of GHG emissions is an essential first step that organisations must take on their journey to mitigating climate impact.

This report has presented a summary of AIR HAMBURG's 2022 GHG footprint. The mobile combustion of aviation fuel is the primary driver of emissions.

It is important that AIR HAMBURG takes steps to continue improving the quality and accuracy of its GHG footprint, and implements measures to decarbonise its operations. Glasgow's COP26 and the 2021 IPCC report shone a spotlight on the critical need to achieve Net Zero emissions to keep global warming within the 1.5 degree limit. Private aviation is a highly emissions intensive industry, and AIR HAMBURG has an important role to play in this transition.

In order to improve the quality of the GHG footprint, the following courses of action are recommended:

- **Collect primary activity data:** AIR HAMBURG can improve data quality by collecting primary consumption data as activity volumes for all sources of emissions. This allows for far more accurate and reliable GHG calculations than spend-based data.
- **Continue establishing formalised data collection procedures:** Formalised data collection procedures, with internal quality controls, supplier communication, assigned roles, and clear frameworks allow for a more streamlined data collection processes and limits the risk of missed data.
- **Review data assumptions in Annex 2:** Annex 2 in this document provides a more granular breakdown of key data assumptions. Treat these as priority emission sources to act on and improve data collection procedures for.

The following next steps are recommended for AIR HAMBURG to continue on its decarbonisation journey.

- **Prioritise investment in and uptake of Sustainable Aviation Fuel (SAF):** The 2022 GHG footprint re-emphasised the role of aviation fuel in AIR HAMBURG's footprint. Decarbonising fuel, for instance by switching to SAF, should be an absolute priority for AIR HAMBURG to act on its climate ambitions.
- **Set science based targets with SBTi:** The Science Based Targets initiative drives ambitious climate action in the private sector by enabling companies to set science-based emissions targets. AIR HAMBURG should demonstrate its commitment to sustainability in the aviation sector, and cement its position as a sector leader, by setting targets with SBTi.

## Annex I

### Emission factors sources

Table 11: Emission factors sources

| Activity  | Emission factor reference <sup>3</sup>  |
|---|---|
| Fuels (stationary and mobile combustion) and fuel-related activities                      | BEIS, 2022, SBTi Aviation Tool 2.0  |
| Electricity and electricity related activities  | Renewable and grid location-based: German Umweltbundesamt 2022, IEA 2022, for %CH <sub>4</sub> and %N <sub>2</sub> O<br>Renewable market-based: IEA 2022, IPCC, 2014<br>Grid market-based: AIB 2022, Ecoinvent v.3.9.1. and AIB 2022 grid mix for CH <sub>4</sub> and N <sub>2</sub> O<br>Supplier specific for AIR HAMBURG Executive Handling (3) (Vattenfall): 207.7 gCO <sub>2</sub> e/kWh |
| Refrigerants  | ADEME 2022; BC V8.8   |
| Business travel   | BEIS, 2022; CEDA, 2022  |
| Business accommodation  | CHSB 2021, M1, mean   |
| Commuter travel   | BEIS 2022   |
| Teleworking   | IEA energy indicators 2022; Anthesis, 2020; BEIS 2022; eGRID, 2021; SP custom EF's  |
| Purchased goods and services (consumables, food and drink products, aircraft maintenance) | CEDA, 2022; BEIS, 2022  |
| IT devices  | Lenovo 2020, Cisco Systems 2013, Dell 2021, Konica Minolta 2018, HP 2022, Acer Chromebook 2019, BEIS, 2022  |
| IT services   | CEDA, 2022  |
| Waste   | BEIS, 2022  |
| Freight   | BEIS, 2022; CEDA, 2022  |

<sup>3</sup> South Pole derives its emission factors from reliable and credible sources. South Pole is not responsible for inaccuracies in emission factors provided by third parties.

## Annex II

### Data assumptions and extrapolations

Table 12: Data assumptions and extrapolations

| Category                      | Sub-Category | Relevant sites                   | Assumption   |
|-------------------------------|--------------|----------------------------------|--|
| Fugitive emissions            | Refrigerants | All                              | Emissions from refrigerant leakage were estimated based on average sectoral consumption values and applied to AIR HAMBURG sites based on total site area.  |
| Purchased Heat                | Heating      | Warehouse and Executive Handling | Emissions from heating were estimated based on average sectoral heat intensity metrics for office spaces. Sites with an all-year hot climate were excluded from estimations.   |
| Purchased electricity         | Electricity  | Warehouse                        | Emissions from purchased electricity were estimated based on average kWh/m <sup>2</sup> from the primary data of the other AIR HAMBURG sites electricity consumptions.   |
| Purchased goods and services  | Water supply | Warehouse                        | Emissions from water supply were estimated based on figures for country/regional level water consumption and extrapolated based on site headcount.   |
| Waste generated in operations | Solid waste  | Warehouse                        | Emissions from solid waste generation were estimated based on country/regional figures for waste consumption, waste type and waste disposal, and applied to each site based on the area (m <sup>2</sup> ).   |
| Business travel               | All          | All                              | When applicable, Scope 3 emissions include Well-to-tank (WTT) emissions, which are those associated with the upstream production and distribution of the fuel and energy.  |
| Business travel               | Flights      | All                              | Flight emissions include a radiative forcing index (RFI) multiplier of 1.9, which accounts for the effects of non-CO <sub>2</sub> emissions (contrails, water vapour, nitrogen oxides and soot). This is in line with BEIS recommendations, which are informed by wider industry research. |
| Business travel               | Flights      | All                              | Extrapolated AIR HAMBURG flights emissions based on hotel bookings considering Hamburg as the origin for all the trips and the destination IATA provided and considered only 10% of all pkm based on client indication.  |
| Employee commuting            | Teleworking  | All                              | Teleworking emissions were estimated based on country and regional electricity and heating consumption for employees working from home, and applied to sites based on headcount.   |

|                    |        |     |   |
|--------------------|--------|-----|---|
| Employee commuting | Travel | All | Employee travel emissions were estimated based on country and regional travel data for modes of commuter transport and applied to sites based on headcount. |
|--------------------|--------|-----|---|

