

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Lufthansa Group (LHG), headed by Deutsche Lufthansa AG is a leading European airline group with operations worldwide. It plays a leading role in its European home markets. LHG is composed of the segments **Network Airlines, Eurowings, Logistics, Technics (MRO) and Catering** as well as Additional Businesses and Group Functions. LHG is an aviation group with operations worldwide. In the financial year 2021, the LHG generated revenue of **16.8 bn EUR** and employed as of 31.12.2021 **105.290 employees** and **713 aircraft**.

The **Network Airlines** segment comprises Lufthansa German Airlines, SWISS, Austrian Airlines and Brussels Airlines. Lufthansa German Airlines also includes regional airlines Lufthansa CityLine and Air Dolomiti as well as Eurowings Discover, the new holiday airline from the LHG which started operations in July 2021 and focuses on the touristic segment. With their multi-hub strategy, the Network Airlines offer their passengers a premium, high-quality product and service, with the multi-hub strategy which includes the hubs of Frankfurt, Munich, Vienna, Zurich, Brussels and a comprehensive route network with an outstanding degree of travel flexibility.

The **Eurowings** business segment includes the flight operations of Eurowings and Eurowings Europe, as well as the equity investment in SunExpress. Eurowings is positioned as Europe's value carrier for private and business travel, with a focus on European point-to-point traffic, enabling its customers low-cost and flexible flying with innovative services.

Logistics: In addition to **Lufthansa Cargo AG**, the Logistics segment includes the airfreight Container management specialist **Jettainer** group and the **time:matters** subsidiary, which specialises in particularly urgent consignments. The **Heyworld** subsidiary, which specialises in customised e-commerce solutions, and the investment in the airfreight company **AeroLogic** are also part of the segment.

MRO: Lufthansa Technik AG is the world's leading independent provider of maintenance, repair and overhaul services (MRO) for civilian commercial aircraft. Lufthansa Technik AG serves more than 800 customers worldwide, including OEMs, aircraft leasing companies and operators of VIP jets, as well as airlines.

Catering: The **LSG Group** offers a comprehensive range of products, concepts and services related to in-flight service as well as for other areas, such as retail and food producers. LSG Sky Chefs is a global food specialist with the highest hygiene and quality standards for airlines, the home delivery market and retail.

Additional Businesses and Group Functions include the Group's service and financial companies, above all AirPlus, Lufthansa Aviation Training and Lufthansa Systems as well as the Group functions for the LHG.

The business segments and the airlines are each under their own management. Overall coordination is by means of the Executive Board of the LHG and the Group Executive Committee, which consists of the members of the Executive Board of the LHG and the CEOs of the main companies. The supervisory Board of Deutsche Lufthansa AG consists of 20 members - 10 shareholder representatives and 10 employee representatives.

The distribution of tasks undertaken by the **Executive Board of Deutsche Lufthansa AG** remained unchanged in the 2021 financial year. The Executive Board comprises six functions. Chief Executive Officer of Deutsche Lufthansa AG, the Chief Customer Officer (who is also responsible for IT, Corporate Responsibility and the Lufthansa Innovation Hub), the Chief Commercial Officer, the Chief Operations Officer, the Chief HR & Legal Officer and the Chief Financial Officer.

The LHG positions itself among the largest airlines in the world and assumes the role as the leading European airline group. In this role, the LHG aims to continue to play a part in actively shaping the global airline market. It strives to follow the mission statement: the LHG connects people, cultures and economies in a sustainable way. In doing so, it aspires to set standards in terms of sustainability and customer-friendliness. It uses the potential of innovation and digitalisation to develop customer-focused products and increase efficiency. Corporate responsibility and **identity** are put into practice locally and supported by overarching functional processes that enable synergies and economies of scale. A strict focus on costs, operational stability and reliability in all areas are firmly established in the DNA of the LHG. The safety of flight operations is and will always be the top priority.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2021	December 31 2021	Yes	3 years

C0.3

(C0.3) Select the countries/areas in which you operate.

- Albania
- Algeria
- Angola
- Argentina
- Armenia
- Austria
- Azerbaijan
- Barbados
- Belarus
- Belgium
- Benin
- Bosnia & Herzegovina
- Brazil
- Bulgaria
- Burkina Faso
- Burundi
- Cabo Verde
- Cameroon
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Côte d'Ivoire
- Croatia
- Cuba
- Cyprus
- Czechia
- Democratic Republic of the Congo
- Denmark
- Dominican Republic
- Egypt
- Estonia
- Ethiopia
- Finland
- France
- Gambia
- Georgia
- Germany
- Ghana
- Greece
- Guam
- Hong Kong SAR, China
- Hungary
- Iceland
- India
- Iraq
- Ireland
- Israel
- Italy
- Jamaica
- Japan
- Jordan
- Kazakhstan
- Kenya
- Kuwait
- Latvia
- Lebanon
- Liberia
- Lithuania
- Luxembourg
- Maldives
- Malta
- Mauritius
- Mexico
- Micronesia (Federated States of)
- Montenegro
- Morocco

Myanmar
 Namibia
 Netherlands
 New Zealand
 Nigeria
 North Macedonia
 Norway
 Panama
 Philippines
 Poland
 Portugal
 Puerto Rico
 Republic of Korea
 Republic of Moldova
 Romania
 Russian Federation
 Rwanda
 Saudi Arabia
 Senegal
 Serbia
 Seychelles
 Sierra Leone
 Singapore
 Slovakia
 Slovenia
 South Africa
 Spain
 Sri Lanka
 Sweden
 Switzerland
 Thailand
 Togo
 Tunisia
 Turkey
 Uganda
 Ukraine
 United Arab Emirates
 United Kingdom of Great Britain and Northern Ireland
 United Republic of Tanzania
 United States Minor Outlying Islands
 United States of America
 Uruguay
 Venezuela (Bolivarian Republic of)
 Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

EUR

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Financial control

C-TO0.7/C-TS0.7

(C-TO0.7/C-TS0.7) For which transport modes will you be providing data?

Aviation

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	DE0008232125

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	Group Executive Board of Deutsche Lufthansa AG: In the reporting year 2021 the "Group Executive Board of Deutsche Lufthansa AG" has been responsible for reviewing the Group's climate related strategy, measures and target setting. Climate-related decisions within the last two years: 2020: The Group Executive Board decided e.g. to go further than industry's (ATA) CO2 targets. The Group Executive Board decided to reduce CO2 emissions by half in 2030 based on 2019 and to reach net zero CO2 emissions in 2050. 2021 The Board decided to confirm previous years targets - despite the COVID 19 crisis: • Reduce CO2 emissions by half in 2030 based on 2019 and to reach net zero CO2 emissions in 2050. • 100% compensation of CO2 emissions - starting in 2019 - for all business related flights of LHG employee • CO2 neutral mobility on the ground by 2030 in Germany, Austria, Switzerland and Belgium • Carbon neutral electricity in 2021 for all LHG-buildings in Germany, Austria, Belgium and Switzerland. In November 2021, the Group Executive Board of Deutsche Lufthansa AG decides to further specified its emission reduction targets, made a commitment to science-based targets and submitted an application for validation of these reduction targets for 2030 in accordance with the Aviation Sector Guidance of the Science-based Targets Initiative (SBTi). The strategy and measures has been derived and prepared by the Head of Corporate Responsibility, direct report to the Executive Board member who is responsible for Corporate Responsibility (Chief Customer Officer (CCO)) in close cooperation with the Senior Vice President "Corporate International Relations and Government Affairs" (Direct Report to the Chief Executive Officer) .
Chief Financial Officer (CFO)	Since the implementation of the EU CSR Directive for the first time for the reporting year 2017 and also for this reporting year 2021 the Group's "Chief Financial Officer" had the final oversight of the annual report which includes the Non-financial declaration encompassing the climate / environmental strategy, climate-related risk assessment, organization, management, measures and targets. The Non-financial declaration is a compulsory part of the annual report and was subject to a voluntary audit with limited assurance in accordance with ISAE 3000 (revised) commissioned by the Audit Committee of the Supervisory Board. In 2021, the CSR content was updated to include mitigating instruments and measures. Furthermore, in 2021 LHG have reported to the TCFD and SASB recommendations for the first time.
Board-level committee	Supervisory Board of Deutsche Lufthansa AG 1. The "Supervisory Board" of the LHG as a whole reviews the entire LHG's strategy of which climate /environmental issues are part of. 2. Additionally the "Audit Committee" of the LHG Supervisory Board reviews and audits the Non-Financial declaration in their scheduled meetings. Climate /environmental issues and climate risk assessment is part of the Non-Financial declaration Decisions in 2021: The Lufthansa Supervisory Board has used emission reduction targets as an element of long-term variable remuneration for the Executive Board of Deutsche Lufthansa AG since 2011. Since the remuneration system was changed in 2019, the Supervisory Board has regularly defined an environmental target as one of the strategic and sustainability targets for the long-term variable remuneration (MVV), which accounts for 15% of target achievement for the MVV (see also the remarks in the remuneration report). As the economic situation remains tense, the Supervisory Board has suspended variable remuneration components for the Executive Board members for financial year 2021. In the spirit of good corporate governance, Executive Board members were nonetheless set specific targets for 2021 and the four-year period from 2021 to 2024. One focus of the long-term targets was again to reduce the fleet's specific CO2 emissions per passenger-kilometre flow. At the meeting on 3 May 2021, the Supervisory Board approved the purchase of ten new, more fuel-efficient aircraft put into operation – including Airbus A220-300, A320neo and A321neo and Boeing 777F, all featuring modern engines. In 2021 the training event and the Supervisory Board meeting on 20 and 21 September 2021 were dedicated to the topics of sustainability and climate protection. An event devoted to environmentally relevant sustainability aspects took place in 2021, which was organised for the Supervisory Board together with the Executive Board of the LHG.
Other C-Suite Officer	At Executive Board the Chief Customer Officer (CCO) is responsible for the Company's environmental, climate and social impact and the regularly updating of the Board on progress in relation to decisions taken by the LHG on sustainability and climate change strategies. Decision 2021: In Nov. 2021 the Chief Customer Officer signed the "SBTi Commitment Letter of Lufthansa Group" and confirm that LHG committing to set science-based emissions reduction targets (near-term targets), in line with the SBTi Criteria and Recommendations, submit them to the SBTi for validation and publish our approved targets, all within a maximum of 24 months. . The Chief Customer Officer has also decided to conduct a qualitative and quantitative climate scenario analysis for the LHG. The results were disclosed in LHG's TCFD report 2021.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Setting performance objectives Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures	<Not Applicable>	Board Level Committee: 1.LHG Executive Board Meetings takes place every two weeks. Additionally climate-related issues are also being prepared and discussed at the strategic "Executive Board Offsite" Meeting (twice a year). Climate related strategy has been integrated in overall strategy decisions by the Executive Board in some of their scheduled Board meetings. The targets from 2020 have been re-established in 2021, despite the COVID-19 pandemic: 1. Reduce scope 1 CO2 emissions by half in 2030 based on 2019 and to reach net zero CO2 emissions in 2050. 2. to carbon neutrality on ground by 2030 in LHG home markets (Germany, Austria, Switzerland, Belgium) 3. to off-set 100% of LHG own duty flights 4. to achieve 100% green electricity in home markets. Most relevant decision for climate related issues is the investment into new fuel efficient aircrafts. These decisions are being taking by the Executive Board as well as the Supervisory Board. In 2021, the LHG took delivery of 10 new aircrafts which are up to 25% more fuel efficient. Despite the crisis, decision to still modernize the fleet with the most efficient aircraft has been taken. The Group Executive Board reviewed the introduction and pushed the further integration of COMPENSAID. This online CO2-compensation platform, has been in-house developed by the Lufthansa Innovation Hub. The customer can either buy sustainable aviation fuel and/or compensate their flights with high quality (Gold Standard) CO2 reduction projects with our long-term partner "myclimate" or to use a combination of both. 2. Group Executive Committee (GEC) consists of Executive Board Members plus CEOs of the Business Units plus Executive Vice Presidents (Corporate Controlling, Corporate Strategy, Corporate Communications): Climate-related issues were scheduled in 2021 at the agenda of the Group Executive Committee at some meetings with relevance on strategy or political decisions, risk management or major capital expenditures like aircraft or Sustainable Aviation Fuel. Therefore climate related considerations were integrated in board decisions on strategy, business plans or major capital expenditures.
Scheduled – some meetings	Reviewing and guiding strategy Monitoring and overseeing progress against goals and targets for addressing climate-related issues	<Not Applicable>	"Supervisory Board "of the LHG: The environmental strategy as part of the corporate responsibility strategy is being reviewed annually by the Supervisory Board as part of the entire LHG Strategy. Strategy and environmental targets as well as major projects such as strategic plans concerning e.g. Fleet renewal, Sustainable Aviation Fuels are also being reviewed.
Scheduled – some meetings	Reviewing and guiding strategy Other, please specify (Recommends the acknowledgement of the non-financial report by the Supervisory Board)	<Not Applicable>	"Audit Committee" of the Supervisory Board and the " CFO" having reviewed and audited the Non Financial declaration which encompasses also the climate / environmental strategy, risks, targets and measurement

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	Yes, within the Group Executive Board of Deutsche Lufthansa AG the CEO and the Brand & Sustainability Board have special competence on climate-related issues. The Head of Corporate Social Responsibility at LHG is a direct report to the Chief Customer Officer. Both the CEO and Brand & Sustainability Board regularly participates actively in climate-related events or panel discussions (e.g. Chief Customer Officer at "Handelsblatt Podcast - How green can flying be?" from 08.06.2021 and on the BDI Klimakongress (23.11.2021) or the CEO on a panel discussion at the "Umweltforum" Congress of Deutsche Bahn. Furthermore, within the Supervisory Board one out of 10 shareholder representatives with dedicated knowledge & experiences in the field of climate and sustainability related issues. Criteria used to assess competence: Responsibility about climate issues within own company/organisation. In addition, in 2021, a special training event of the Group Executive Board and the Supervisory Board on 20 and 21 September 2021 were dedicated to the topics of sustainability and climate protection.	<Not Applicable>	<Not Applicable>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Other C-Suite Officer, please specify (Chief Customer Officer (CCO)) <i>The highest non Board but management level position dealing with climate-related issues is the Head of Corporate Responsibility which has been established on 01.01.2020 as a direct report to the CCO (Chief Customer Officer).</i>	<Not Applicable >	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly
Chief Risks Officer (CRO) <i>explanation see below C1.2.a</i>	<Not Applicable >	Assessing climate-related risks and opportunities	<Not Applicable>	Quarterly
Other committee, please specify (Group Executive Committee Executive Board Members plus CEOs of the Business Units) <i>see description in C1.2a and previous C1.1</i>	<Not Applicable >	Other, please specify (Preparing decision and giving strong advice on climate related risks and opportunities for the Executive Board)	<Not Applicable>	As important matters arise
Other, please specify (Executive Board Strategic Offsite) <i>explanation see below C1.2.a</i>	<Not Applicable >	Other, please specify (Evaluating and taking decisions on climate-relates Risks and opportunities)	<Not Applicable>	Half-yearly
Other, please specify (Head of Corporate Responsibility, Vice President)	<Not Applicable >	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

The Chief Customer Officer is Executive Board Member of Lufthansa Group, responsible for Customers, IT, Corporate Responsibility and the Lufthansa Innovation Hub . Climate related issues are monitored at the Executive Board meetings which takes place twice a month.

The Chief Risk Officer is also the **Executive Vice President Corporate Controlling** and has been reporting in 2021 to the CFO of LHG. In regards of Risk Management this position is responsible for the groupwide Risk Management System. Environmental /climate related risks are reported and monitored within the RMS as are other sustainability risks. The Group Head of Corporate Responsibility has been the Risk Owner of environmental /climate related risks in 2021. The risk assessment is done **quarterly**. The entire Risk Management System is being reviewed by the Executive Board on a regular basis and discussed annually with the Supervisory Board (Audit Committee). The risk ownership of a particular environmental / climate related risks depends on its most important characteristic. While the Head of Corporate Responsibility is the risk owner of climate- or environmental risks. Environmental / climate related risks with an underlying market price like for example emission trading are owned by the Head of Corporate Finance.

The Group's Head of Corporate Responsibility has been reporting to the Executive Board Member responsible for Customer, IT and Corporate Responsibility (Chief Customer Officer, CCO) and is responsible for the coordination of Group-wide environmental goals, strategies and measures, assessing climate related risks and opportunities. This includes the management of environmental activities within the Lufthansa Group for e.g. Lufthansa German Airlines, Lufthansa Technik, SWISS, Austrian Airlines, Eurowings, Brussels Airlines as well as the analysis and development of innovative environmental concepts – in cooperation with the departments concerned. The Group Head of Corporate Responsibility has been the Risk Owner of environmental /climate related risks in 2021.

Group Executive Committee (GEC)

Executive Board Members plus CEOs of LHG main subsidiaries plus Executive Vice Presidents (Corporate Controlling, Corporate Strategy, Corporate Communications) to act as advisory council to the Board, preparing various Board decisions also those of climate / environmental Group Strategy inclusive of targets and measures.

Executive Board Strategic Offsite

The Executive Board Strategic Offsite takes place twice a year. It is a strategic gathering of the Executive Board Members to discuss in depth strategic issues inclusive of climate-, environmental strategies.

LHG encompasses many subsidiaries. To ensure a fitting environmental /climate related strategy and monitoring concept, many of the larger sub-companies have additional Environment/Sustainability Managers who are steering and monitoring climate issues in their respective business unit. Most of the positions include issues like monitoring and managing energy consumption and overall efficiency, waste management, green energy and carbon-neutral mobility. The Business Units are required to meet the Lufthansa Group goals and pathways, they are free to set even more ambitious goals. For example, Lufthansa CityLine and Lufthansa Technik have been pioneers within the Group when it comes to the implementation of environmental management systems or the use of green energy, e-mobility and waste management. Brussels Airlines has been the first company to consume electricity from renewable sources only. In 2021, all Lufthansa Group companies in Germany, Austria and Switzerland use almost 100% green electricity. These achievements are just examples to illustrate how Environment/Sustainability Managers in different positions all over the company support "their" own company to set and reach ambitious sustainability targets.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Executive Board remuneration consists of fixed, performance-unrelated and performance-related variable components. The three main components are the base salary, the one-year variable remuneration (annual bonus) and the multi-year variable remuneration (long-term incentive, LTI). Other performance-unrelated components also being a part of the remuneration system, are the ancillary benefits and the retirement benefits. The Share Ownership Guidelines are also an essential component of the remuneration system. They oblige the Executive Board members to hold a multiple of their base salary in Lufthansa shares during the service period on the Executive Board and beyond. 15% of the target achievement of the annual bonus and the long-term incentive is based on non-financial sustainability targets. The Supervisory Board decides on the non-financial sustainability targets on an annual base. The Supervisory Board focuses on sustainability aspects in particular to ESG topics.

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Board/Executive board	Monetary reward	Efficiency target	In economic terms, the financial year 2021 was again defined by the ongoing impact of the global spread of the coronavirus on global air traffic and thus on the business of the LHG. The Lufthansa Supervisory Board has used emission reduction targets as an element of long-term variable remuneration for the Executive Board of Deutsche Lufthansa AG since 2011. Since the remuneration system was changed in 2019, the Supervisory Board has regularly defined an environmental target as one of the strategic and sustainability targets for the long-term variable remuneration, which accounts for 15% of target achievement for the long term variable remuneration. As the economic situation remains tense, the Supervisory Board has suspended variable remuneration components for the Executive Board members for financial year 2021. In the spirit of good corporate governance, Executive Board members were nonetheless set specific targets for 2021 and the four-year period from 2021 to 2024. One focus of the long-term targets was again to reduce the fleet's specific CO ₂ emissions per passenger-kilometre flown.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	1	The short-term time horizon for climate related risks is aligned with the financial time horizons.
Medium-term	1	3	The medium-term time horizon for climate related risks is aligned with the financial time horizons.
Long-term	3	10	The long-term time horizon for climate related risks is aligned with the financial time horizons . Furthermore, specific impacts of climate-related risks are discussed in special committees like for example the finance cockpit committee, which responsibility is to identify, assess, monitor and control major financial risks. In this committee the aspects of CORSIA and EU ETS have been discussed for a 10 years time horizon. The mitigation path for realizing net zero CO ₂ emissions (SCOPE 1) in 2050 has been discussed with the Lufthansa Group Executive Board.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

A **substantive financial or strategic impact** on our business is defined in our risk management process as follows: either the effect on Ebit/profit is more than EUR 225 million and the probability of occurrence is above 2%, or the effect on Ebit/profit is EUR 112,5 and the probability of occurrence is above 30%. We consider any opportunity or risk to be of substantive strategic impact if it materially affects Lufthansa Group's future business potential and, therefore, its valuation. This includes changes of future growth potential – e.g. due to changes of customer satisfaction, regulatory limitations, financing capabilities, etc. – as well as changes of future profitability (EBIT margin, ROCE) – e.g. due to changes of cost positions, capital efficiency, etc..

The methodological evaluation of risks having a substantive financial impact on LHG business within the **Enterprise Risk Management** at Lufthansa Group (LHG) distinguishes between qualitative and quantitative risks. Climate related risks are updated and (re-)assessed on a quarterly basis. Financial impacts of climate-related risks are quantified if possible, otherwise they are described as qualitative risks.

Qualitative risks are long-term developments and challenges with potentially adverse consequences for the LHG. Qualitative risks are often identified in the form of weak signals. As specific information often is not available, these risks can either not be quantified precisely or not quantified at all. To evaluate them as systematically as possible, estimates are made about the probability of their occurrence and their significance. Significance describes the potential impact of the individual risk or development under consideration of the reputation, the business model or earnings of the LHG.

After evaluation, both the individual qualitative and quantitative risks are **divided into priority classes A, B, C and D to assess their materiality**. The thresholds for classifying the monetary earnings effect are defined centrally for the LHG according to a standardized logic.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

Risk management at the LHG aims to fully identify material risks, to present and compare them transparently and to assess and manage them. Climate-related risks and opportunities (R/Os) are integrated into LHG's multi-disciplinary company-wide risk management process. Risk owners are obliged to monitor and manage risks and opportunities proactively and to include relevant information in the planning, steering and control processes. The Group guidelines on risk management adopted by the Executive Board define all the binding methodological and organisational standards for dealing with R/Os. Identification: The LHG has implemented a systematic Enterprise Risk Management (ERM) process at both Group level and at the level of larger Business Units within the LHG. The closed and continuous risk management process, which is supported by IT, begins with the identification of current and future, existing and potential R/Os from all material internal and external areas. The LHG defines opportunities and risks as the possible positive or negative deviations from a forecast figure or a defined objective. All identified risks are documented in the Group's risk portfolio. The risk portfolio documents the systematic entirety of all individual risks and constitutes the quality-assured result of the identification phase. As the risk landscape is dynamic and subject to change, the identification of risks is a continuous task for the risk owner. Assessment: The R/Os identified are assessed for plausibility and substantive financial or strategic impact (see C2.1b) by the companies' or LHG's risk coordinators and gathered together in the Group's risk portfolio. Therefore all identified individual risks are measured according to uniform measurement principles. Risks are generally evaluated on a net basis, i.e. taking implemented and effective management and monitoring instruments into account. A methodological distinction is made between qualitative and quantitative risks. Qualitative risks are mostly long-term developments with potentially adverse consequences for the LHG (e.g. chronic physical climate risks). Quantitative risks are those whose potential effect on earnings can be estimated. A distinction is made between different probabilities of occurrence. Regardless of the risk type, objective criteria or figures derived from past experience are used for the evaluation wherever possible. The individual qualitative and quantitative risks are divided into classes A, B, C, D and other risks to assess their materiality. All quantitative and qualitative A and B risks that are at least of a "substantial" significance and a "high" magnitude count as material risks for the LHG. Risk owners are obliged at least once a quarter to verify that the risks for which they are responsible are complete and up to date. They also evaluate the extent to which circumstances involving risk have already been included in the forecast results and to what extent there are additional R/Os of achieving a better or worse result than the one forecast. Climate related R/Os are identified and assessed by the LHG ESG Team, in conjunction with the ERM team and the concerned department(s) (e.g. climate regulation risks with the regulatory affairs department). Respective Group committees are being involved through consultation engagements and regular reporting. The departments also use the Group environmental expert know how and data to capture and store information about the identified R/Os. This information is being used to calculate key indicators, which help reducing risks to and from climate change by improving LHG's performance in environmental protection on a continuous basis. Process for responding to climate related R/Os: The Risk owners actively manage R/Os by means of risk mitigation instruments and measures. On this basis, the Executive Board (EB) is regularly informed about the current risk situation of the LHG and its business segments. The EB reports annually to the Audit Committee on the performance of the risk management system, the current risk situation of the LHG and on significant individual risks and their management. In the event of significant changes to previously or recently identified and assessed top risks, mandatory ad hoc reporting processes have been defined in addition to these standard reports. Managers with budgetary and/or disciplinary responsibility are designated as risk owners. Their role is to implement risk management for their area. The identification, evaluation, monitoring and management of risks are therefore fundamental aspects of every management role. The Supervisory Board's Audit Committee monitors the existence and the effectiveness of the LHG's risk management. The Risk Management Committee ensures, on behalf of the EB, that business risks are always identified at an early stage, evaluated and managed across all functions and processes. It is also responsible for improving the effectiveness and efficiency of risk management. Appointments to and the responsibilities of the committee are defined in internal regulations. Case studies: Transition risks LHG has identified environmental regulation as a climate-related risk. Prominent examples include changes to existing regulations (e.g. EU ETS) and emerging regulations (e.g. ReFUEL EU Aviation, national SAF mandates) as risks, which are always included in our climate-related risk assessments. In 2021 via a specific TCFD-aligned climate-scenario analysis exercise (see C3.2), LHG has assessed these transition risks in order to a.) evaluate whether and how two different scenarios can influence LHG's business and b.) analyse whether LHG's current climate strategy is able to recognise the identified R/Os in time and to minimize the identified risk and/or maximize the opportunities. The analysis has shown, that the dominant cost driver in both scenarios is the development of oil and SAF price, which exceed the costs for carbon emissions especially in the medium term. With regard to the quantitative impacts of changing transportation markets resulting from shifting demand patterns and subsidy structures, both climate scenarios show an increase in demand for passenger transportation. It were also showed that LHG's current strategy already reflects many of these findings with climate-related issues affecting its products and services, its value chain, investments in R&D and its operations. The results of the quantitative scenario analysis confirm that LHG's strategic initiatives are suitable to minimize the respective risks and to create opportunities.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Air traffic within the EU is already part of the EU Emissions Trading Scheme EU-ETS, which has been associated with the Swiss Emissions Trading Scheme since the beginning of 2020 as well as the UK ETS regulation since the beginning of 2021. The periodic tightening of this regulation in conjunction with the price development of emissions allowances (from 9 Euro per tonne CO2 in 2018 to 80 Euro per tonne CO2 at the end of 2021) the relevance of this risk type is always included in LHG climate-related risk assessments. LHG publicly disclosed climate related regulatory risks in it's 2021 Annual report (page 89). Besides the risk from increasing prices for carbon allowances, the ETS has two more concrete risks to LHG emission expenses: Reducing the emission cap and reducing the free allocation of allowances.
Emerging regulation	Relevant, always included	Because of the emerging climate regulations like the bundle of European Commission legislative initiatives to support the targets of the EU Green Deal initiative launched in 2020, which will potentially have a high financial cost impact on the LHG, the relevance of this risk type is always included in LHG climate-related risk assessments. The bundle is named "Fit for 55 package", i.e. a legislative proposal for a SAF mandate in Europe (2% in 2025, 5 % in 2030), a legislative proposal to end the exemption of the energy tax for jet fuel and a reform of the EU ETS rules for aviation by gradually remove free emissions allowances for the aviation sector and to move to full auctioning of allowances by 2027.
Technology	Not relevant, included	In the frame of our defined time horizon for identifying, and assessing climate-related risks (up to 10 years) we have not identified any technology related risks for the LHG. Technology risks will be industry-wide risks.
Legal	Relevant, always included	As a large company with global operations, potential legal issues are always in consideration in LHG's risk assessments, including climate-change related risk assessments. The potential for litigation could also affect LHG, by way of adverse court decisions and the associated reputational damage. For example, in May 2022, the German Environmental Aid (DUH) is taking legal action against misleading advertising promises claiming that products are "climate neutral". To this end, the environmental and consumer protection association has initiated legal proceedings against initially eight companies. Same happens in the Netherlands: Environmental groups took legal action in May 2022 against an airline that, according to the claimants, was misleading the public about the sustainability of flying. As climate-change focused litigation increases around the world, failure to monitor and prepare for potential legal risks could cause reputational and financial damage to the LHG.
Market	Relevant, always included	In the frame of our defined time horizon for identifying, and assessing climate-related risks (up to 10 years) we have the following market risks identified for the LHG.: - Market price risks for emission allowances - SAF prices and SAF sourcing (presently a monopolistic market) - higher competition on market for voluntary carbon offsets - Competition impact due to emission regulations, especially in intercontinental competition.
Reputation	Relevant, always included	Any negative impact on brand perception has the potential to have impacts on the ability to hold customers or to attract new customers, to form partnerships and community relations and as well on institutional investors. This could result in a) reduction in passenger/customer preferences and therefore could have impacts on revenue and b) in a downgrading by rating agencies. Aviation has been identified as a "hard to decarbonize" industry with a growing carbon footprint. Public concern about climate change and negative perception about the aviation industry may lead to increased calls for operating restrictions or financial penalties and brand damage to airlines. To identify potential reputational environmental/climate risks LHG is regularly conducting broad stakeholder surveys on sustainability topics such as materiality analysis, conducted latest in 2018, send out to 10.000 stakeholders. The responses of the stakeholders are combined with top management's assessments in a materiality matrix, which has been published in the Group's sustainability report Balance and is also the basis for the Non-financial statement. Over the years ahead, this matrix serves the LHG as the base from which to advance the strategic development of corporate responsibility management (including climate topics). A next broad Stakeholder survey in the context of the materiality analysis is intended to be hold in 2022 - postponed due to COVID-19 and major changes with upcoming EU CSRD and ESRs and their definition of materiality. Furthermore, LHG is monitoring relevant media reporting on climate and aviation related topics to identify potential reputational risks for the LHG and its subsidiaries.
Acute physical	Relevant, always included	Acute physical risks like isolated extreme weather events (e.g. cyclones, hurricanes, or floods) don't have the potential to jeopardize LHG business, because LHG focuses on diversifying its operations through a global network. Those effects will usually have a larger impact on ground operation but might also affect flight operation. Individual destinations and flight routes or regions could be affected. LHG is constantly improving its weather forecasting capabilities and works closely with meteorological organizations like the "Deutsche Wetterdienst" and research facilities around the world in order to improve climate and weather forecasts by more intensively using aircraft based weather information. During the flight, LHG pilots are using the so called newly developed "Enroute Weather Display" which has the most accurate data e.g. for turbulence areas.
Chronic physical	Not relevant, included	In the frame of LHG's defined time horizon for identifying, and assessing climate-related risks (up to 10 years) LHG don't have identified chronic physical related risks for the LHG. Nevertheless, LHG has included chronic physical risks in its assessment, as these climate change risks include changes in average temperature, changes in average precipitation and sea level rise on a time horizon of more than 10 years, which may have an impact on LHG's flight operations, as well as changes in consumer preferences, which may affect demand for LHG's travel services. For example, a rise in the average temperature in the Mediterranean region may mean that traditional holiday destinations in this region, which are regularly served by the LHG, are no longer attractive destinations due to the high summer temperatures. Moreover sustained heat or stronger wind events (e.g. changes in jet stream) may increase LHG's operating costs (delays, fuel/emissions cost, cooling, maintenance). The LHG can manage these risks by adjusting flight plans, better forecasting and appropriate preparation. Indirectly, engagement in research projects and initiatives as well as our CO2 reduction target and related measures also contribute to limiting the chronic physical risks of climate change.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Current regulation	Carbon pricing mechanisms
--------------------	---------------------------

Primary potential financial impact

Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Risk description: Cost incurring from carbon price changes in the EU Emissions Trading Scheme (ETS) regulation. Since 2012, the air transport sector is included in the ETS, requiring airlines operating within the EU to buy carbon allowances to offset their emissions. All flights carried out by the LHG within the European Economic Area (EEA) and since 2020 between EEA and Switzerland are subject to this scheme. Prior to COVID-19 LHG has emitted around 8.7 mn tonnes of CO2 on flights within the European Economic Area (EEA), which corresponds to a share of around 26 % of total emissions of LHG. These flights are part of the EU Emissions Trading Scheme (EU ETS), in which each tonne of CO2 is subject to a CO2 price that affects the LHG's operating costs. A certain proportion of these emissions is subject to a free allocation quota, which is, however, reduced by 2.2 % annually. At the same time, the EU-Allowance's (EUA) price per tonne of CO2 has increased from around 25 € at the end of 2019 to around €80 at the end of 2021. It is expected, that costs for EUA's will continue to fluctuate significantly and will further increase in future due to an increased

scarcity of available offsetting allowances. Increased emission costs negatively affecting LHG's result, and can also cause a decline in demand and reduce revenue from European flights if the costs are passed through to customers. LHG already takes into account the additional emission costs due to CORSIA (so-called Carbon Offsetting and Reduction Scheme for International Aviation), the measure initiated by the International Civil Aviation Organization (ICAO). CORSIA has aimed at stabilizing airline net emissions from international flights at the average level of 2019/ 2020 from 2021 onward. On 30th June 2020 it has been agreed by ICAO due to COVID-19 pandemic, to use only 2019 as baseline. The airlines are obligated to compensate their emissions exceeding the baseline by purchasing emission reduction units. Prices for eligible projects differ widely. This risk encompasses also according to LHG risk definition the market risks /risk of change in market prices for allowances.

Time horizon

Medium-term

Likelihood

More likely than not

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

765000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

These costings are provided only as an illustration of how the financial impacts may be calculated. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. LHG assumed that within the next 3 years LHG would need to buy EU-Allowance's (EUA) for up to 70% of its CO2 emissions p.a., caused by intra-EU and Swiss flights. The cost burden associated with this mainly depended on the price trend for emissions allowances and the development of LHG's transport- and CO2-performance. Based on 2021 figures and calculated with assumed market prices of around € 85 per EUA, a prognostic traffic growth within the EU and including own hedging strategies the costs would have amounted to €765 mn over the next 3 years. The majority of these costs have already been taken into account in the budgets of the following years. The COVID-19 pandemic has impacted the demand for air traffic in a dramatic way. To what extent the pre-pandemic scenarios are still valid depend very much on how air traffic is going to develop over the next months. The numbers above represent now an upper scenario where air traffic returns very quickly to pre-pandemic levels and prices for allowances remain high.

Cost of response to risk

3500000

Description of response and explanation of cost calculation

The approximately €3.5 mn in costs for mitigate and control the risk arising from the existing emissions regulations consist of the costs for: - implemented, maintain and operate IT structures and relevant processes to ensure verified emission reports - a hedging strategy for emission allowances procurement and - monitors CO2 and climate policy and regulatory developments constantly - a stringent risk controlling process which considers and monthly reports the actual and expected ETS and CORSIA costs and which shows possible scenarios for the future. The overall willingness to address climate-related risks has enabled LHG to react more flexible to reduce the financial impact of emission trading schemes. In addition, LHG implemented and monitored a total of 22 fuel-saving projects in 2021. These projects comprise activities relating to performance and procedures, weight reduction, flight route optimisation and technical developments. This enabled another 30.4 thousand tonnes of CO2 emissions permanently eliminated in 2021. The quantity of kerosene saved amounted to around 9.6 thousand tonnes – this is equivalent to approximately 113 return flights between Munich and New York with an Airbus A350-900 aircraft.

Comment

The estimated costs associated with management actions and maintenance of the instruments EU ETS regarding the introduction of an internal Emissions Trading organization and related processes (e.g. expenditures for internal personnel, ETS trading software, IT infrastructure, verification, quality check of monitoring concept, consulting) amounts to 3 mio EUR for the whole LHG. The running costs of the ETS organization within the LH Group are estimated on 0.5 mio EUR p.a.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation	Other, please specify (Other, please specify (Widened regulation concerning emissions - EU "Fit for 55 Package" implications))
---------------------	--

Primary potential financial impact

Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

In summer 2021, the European Commission presented its Fit for 55 legislative package which included proposed regulations for meeting Europe's climate targets. Of the total of 13 legislative initiatives, three are particularly relevant for aviation: the reform of the emissions trading system (EU-ETS), a rising quota for sustainable aviation fuel blending (ReFuelEU Aviation) and a proposal for implementing a kerosene tax (Energy Taxation Directive). These regulations are to come into force from 2023. Reform of EU-ETS: For the time from 2023 there is for example one possible scenario, that the EU includes all EU-inbound and outbound flights in its scope of the ETS, if the CORSIA don't fulfill the expectations of the EU. Other scenarios include that there is no further free of cost allocation of some emission allowances to the participating airlines or that the current free of cost allocation is quickly phased out. ReFuel EU Aviation: The proposed SAF mandate will significantly increase fuel cost. Especially as it will affect all fuel uplifts in the EEA (where nearly 70 % of all LHG fuel is uplifted). Energy Tax Exemption foresees the abolishment of the tax exemption for all jet fuel used within the EEA. The LHG welcomes the ambitious targets set out within the climate package, however it has also presented tangible proposals for improving the measures in order to avoid the potential disadvantages for EU airlines when facing international competitors. However, the stricter EU emissions trading system and quota for sustainable, and therefore more expensive, fuels increase costs in a one-sided way for long-haul flights that connect at EU hubs. Any of these regulation is geographically confined and therefore induces competitive distortion to the disadvantage of European airlines. Internal analyses show clearly that the gap in prices caused by the Fit for 55 regulations

would increase considerably and at Germany's and Europe's expense. An example: While tickets from LHG main Hub Airport Frankfurt would be more than 25 percent more expensive by 2035, the cost increase for Istanbul would be just 4 percent. Consequently, demand for Frankfurt Airport would decrease by about 15 percent whereas Istanbul could expect passenger numbers to grow.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

3000000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The above mentioned potential financial impact figure is estimated for the year 2030 (description below) and these costings are provided only as an illustration of how the financial impacts may be calculated. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. As the legal initiatives in conjunction with the EU Fit for 55 package have not yet passed the EU institutions, and the impacts of the ongoing COVID-19 pandemic effects on air travel are not clear yet, the estimate is based on a great deal of uncertainty. Indirect financial impact could result from competition distortion between EU and non EU airlines is difficult to estimate. Nevertheless, with regard to the study "AVIATION FIT FOR 55" conducted by NLR-SEO Amsterdam Economics and published in March 2022, the costs of air travel increase due to these policies. According to the study, the Fit for 55 regulations could increase the price per passenger kilometre flown by 1.51 eurocents for intra EEA-flights in 2030 and for flights from EEA countries to non-EEA countries by 0.24 eurocents per passenger kilometre, compared to a no policy scenario in those year. With regard to the revenue pax kilometres (RPK) flown by LHG Airlines in 2019 this means a cost increase of € 3 bn in the year 2030, compared to a no policy scenario in those year. Other effects as increased costs - like inflates ticket prices as these costs are passed on to passengers, which results in a demand drop - are not considered here. Nevertheless, the Fit for 55 impact on passenger demand depends on the pass through by the airline. At the full 100% pass-through, on intra-EU routes, demand for aviation is considered to be reduced by 10 percent in 2030 - for LHG that means around 11 mn passengers (with reference to the year 2019) - in comparison with the reference case of a no Fit for 55 policies. On non-EEA routes passenger numbers decrease by 1.4 % - for LHG that means around 300.000 passengers (with reference to the year 2019). The lower relative reduction in passenger demand on non-EEA destinations is partly driven by the fact that passengers can reroute via non-EEA hubs, to mitigate some of the Fit for 55 compliance costs.

Cost of response to risk

14500000000

Description of response and explanation of cost calculation

The LHG has set ambitious climate protection targets. It is striving to lower its net CO2 emissions to half of 2019 levels by 2030 and is seeking to be carbon-neutral by 2050. LHG joined the SBTi in 2021 to align its carbon reduction pathway with the targets of the Paris Climate Agreement based on scientific calculations. The LHG's key levers for achieving this climate targets – and therefore also reduce the respective transition risk – are: - Fleet modernisation - Efficient flight operation - Sustainable alternative fuel (SAF) - Intermodal transport - Carbon Offsetting By far the two most cost-intensive and at the same time most climate-effective levers are fleet renewal and the use of sustainable alternative fuels. The above risk response costs are made up of these two levers and cover the period 2022 to 2029. - Fleet modernisation o In 2021 ten new, more fuel-efficient aircraft put into operation. In return, a total of 55 older aircraft left the Group fleet. o Nine jets are planned to join the LHG fleet in 2022. The emissions of these aircraft are up to 30% less than with the predecessor models. o In total LHG has fixed orders about 175 new aircrafts between 2022 and 2029. Order commitments for aircraft and reserve engines amount to €14.3bn (previous year: €12.9bn). - SAF o In order to safeguard the supply of SAF in the long term, the LHG has developed a three-pronged strategy: 1. In the short term, up to USD 250mn (€234mn) has been released for the procurement of SAF. 2. In the medium term, options for long-term supply commitments are under consideration around the world. These offer significant production volumes and security of supply from around 2025 onwards. 3. In the long term, the LHG CleanTech Hub will provide support for innovative supply concepts with the goal of transforming today's start-ups and developers into tomorrow's suppliers. o Some recent initiatives: - In April 2021 Lufthansa Cargo undertook the first carbon neutral freight flight and has been one of the first customers of the world's first power-to-liquid (PTL) fuel system in Werlte (Germany). - SWISS established a complete logistics chain for importing SAF to Switzerland. The risk of regulatory duplication incl. adding cost and competitive distortion (for example EU ETS may continue to apply to international aviation during the phases of CORSIA) is managed through direct political lobbying by LHG as well as through airline industry groups and associations (e.g. IATA).

Comment

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical	Other, please specify (Increased severity and frequency of extreme weather events such as cyclones and floods)
----------------	--

Primary potential financial impact

Decreased revenues due to reduced production capacity

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Increase in extreme weather conditions: The Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) indicates that a change in temperature extremes is very likely in the future. Heat waves will be more intense, more frequent and longer lasting in a future warmer climate and cold episodes are projected to decrease significantly. For the LHG, a change in temperature/weather extremes could result in higher rates of flight cancellations or delays and therefore loss of revenues and/or in higher operational cost due to the higher costs for use of air-condition systems at aircraft on ground and at airports. The effects could range from temporary closure of stations or airspaces to damage/destruction of buildings, apron facilities, runways, air traffic control, media infrastructure and aircraft. In the reporting

year 2021 LHG has not recorded any high numbers of weather-related flight cancellations or delays, both in absolute terms and as a proportion of the total number of departures, but is monitoring developments closely. Between November 2017 and October 2018 for instance the weather related flight cancellations of Lufthansa German Airlines at Frankfurt airport amounted for 1,280 flights - a doubling compared to the same period of the previous years. In relation to the over 150,000 departures during this period, however, this is still a relatively manageable proportion.

Time horizon

Long-term

Likelihood

More likely than not

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

8500000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

These potential financial impact figure are provided only as an illustration of how the financial impacts may be calculated. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. The above-mentioned costs are based on the following scenario: The average annual costs of weather-related delays and flight cancellations of Lufthansa German Airlines at the locations FRA and MUC (where about 95 % of the flights of Lufthansa German Airlines take place), amounted to an average of €8.5 in the years 2009 - 2019 - estimated on the basis of a cost calculation prepared by Lufthansa. In the event of cancellations due to weather conditions in accordance with EU261/2004 directive, the passenger is not entitled to compensation. Nevertheless, according to EU law, airlines have to provide food, drinks, hotels and substitute transportation. In a scenario in which weather-related delays and flight cancellations would double compared to the long-term average, the resulting costs would also double by approximately €8.5 mn. This does not include the costs incurred by the other airlines belonging to LHG due to weather-related delays and flight cancellations. As in 2020 also in 2021 we did not have that many cancellations due to severe weather conditions.

Cost of response to risk

0

Description of response and explanation of cost calculation

No additional management costs are incurred, as such interruptions to operations are taken into account and dealt with in already existing structures and processes. LHG focuses on diversifying its operations through a global network. We try to compensate for weather related interruptions within our networks in order to avoid major long-term damage to our business. Moreover, LHG is constantly improving its weather forecasting capabilities. We work closely with meteorological organizations and research facilities around the world in order to improve climate and weather forecasts by more intensively using aircraft based weather information. Since 1994, LHG has been actively engaged in several international climate research projects, which help scientists to evaluate and further improve their climate and weather models and to identify, monitor and minimize the climate impact of air traffic (examples: CARIBIC, IAGOS). The active support of these projects is also an instrument for LHG to better manage the potential physical and other climate change risk. Furthermore, LHG has a strong cooperation with the Deutscher Wetterdienst (DWD, German Meteorological Service) and other meteorological institutes to continuously improve weather forecasts and extreme weather events. Regarding physical risks, LHG Operation Control Centres monitor weather conditions on a real-time basis and inform their respective pilots about the current situation. In addition, there are so-called Special Assistant Teams (SAT) within the LHG. SAT members are requested by Lufthansa's crisis team when necessary. Aircraft accidents, natural events or medical emergencies, for example, can lead to their deployment. Within the Lufthansa Group and its airlines, a total of about 3,000 employees worldwide belong to the SAT organization.

Comment

Reliable weather forecast is a prerequisite for a safe airline operation. It is a permanent task for LHG and its partners to continuously work on improvements to have these data available more often, at the highest and fastest possible quality for cockpit and dispatch use. An addition through the engagement in climate research LHG may be able to use the results and the knowledge provided by the research projects to reduce climate-change-induced costs.

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Downstream

Risk type & Primary climate-related risk driver

Reputation	Shifts in consumer preferences
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Primary potential financial impact

Decreased revenues due to reduced demand for products and services

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Lufthansa Group (LHG) faces risk of loss of reputation in case of not responding to environmental issues in an appropriate manner. A perceived lack of action by LHG or the industry in general could result in a loss of reputation and a shift in consumer attitude, potentially resulting in reduced demand. This particular risk mainly arises from the strong dependency of the air traffic sector on fossil fuel. Due to the COVID-19 pandemic less flights have been conducted and some consumers might shift preferences even more to use less flights for sustainability reasons. However, so far demand has returned whenever travel restrictions have been revoked. As the COVID-19 pandemic is still ongoing it is hard to predict the consumers' future behavior. There could be also a shift from less business travel towards more leisure trips in the shortterm, as customers due to the pandemic could not travel as before and might have a bigger need to travel once the travel restrictions are gone.

Time horizon

Medium-term

Likelihood

About as likely as not

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

42000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The potential financial impact figure is only for demonstrative purposes of how one could start to estimate the potential financial impact. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. We assume no structural changes to the long-term trend to make sure we do not underestimate future traffic and CO2-emissions. Nevertheless, an increasing rejection of fossil fuel air travel could have a negative impact on the long-term growth rate of the aviation industry worldwide, which in turn could have an impact on the LHG. In a scenario where customers decide not to fly or to fly less in future for reasons of climate protection, this would also have a financial impact. If, for example, this were lead to a 0.15% loss of revenue in 2024 - in relation to LHG's traffic revenue from 2019 - this could result in LHG losing traffic revenue of € 42mn in 2024. In order to derive this scenario, the requests received from LHG corporate customers in the CDP Supply Chain Questionnaire 2021 were used to disclose the respective CO2 emissions caused by flights with LHG aircraft. Thus, the corporate customers who requested LHG to disclose their emissions via CDP in 2021 corresponded to 0.15 % of the total Scope 1 emissions of the LHG aircraft fleet in 2020. These customers thus represent a plausible proportion of companies and individuals who have concerns about the impact of flying on the climate or are willing to switch to the airline with the best climate protection performance.

Cost of response to risk

7730000000

Description of response and explanation of cost calculation

LHG has a comprehensive carbon emissions mitigation strategy in place and undertakes regular stakeholder dialogues and assessments for better understanding the environmental issues and impacts that concern LHG's stakeholders. The Group has set ambitious climate protection targets and joined the SBTi in 2021 to align its carbon reduction pathway with the targets of the Paris Climate Agreement based on scientific calculations. The associated cost to response to risk is an illustrative cost and covers a multi-year period 2022-24 and include additional effects - not mentioned here - that lead to a overall reduction in operating costs and contribute to minimise further risks. The key levers for achieving this climate targets – and therefore also reduce the respective transition risk – are: - Fleet modernisation - Efficient flight operation - Sustainable alternative fuel (SAF) - Intermodal transport - Carbon Offsetting By far the most cost-intensive and at the same time most climate-effective levers are fleet renewal and the use of SAF. From 2022 to 2024 the net investment in new more fuel efficient aircraft amounts to €7.5bn. In total the LHG have order commitments for 175 new aircraft delivered until 2029. Furthermore, in 2021 the LHG Executive Board has als decided to released €234m (USD 250m) for the procurement of SAF between 2022 and 2024. In addition the LHG is engaged in several SAF developing cooperations. Furthermore, the LHG is responding to customer expectations for a steady carbon reduction with further initiatives, programs and offers: - Expanding intermodal transport enables a lower number of shorthaul flights and alternative ways for reaching hubs. The LHG, in cooperation with the national railway companies and bus operators in the home markets, offers a variety of other alternatives for travel to and from the hubs in addition to flights. Three national destinations in each county are linked to the hubs in Vienna and Zurich by rail. In Germany seven new destinations to be added to the express rail network in 2021 (>220 daily connections to and from Frankfurt have been offered). - Moreover LHG operate voluntary carbon offsetting programs either by using SAF or by high-quality, certified carbon offset projects. In 2021/22, this offer was further optimised for both B2C and B2B customers, made easier to access and use within the booking process. Furthermore the communication on LHG's climate commitment and engagement was significantly expanded.

Comment

The disruption and demand impacts caused by COVID-19 are significant also in 2021 and so forecasts remain highly uncertain.

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Opp1

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

The LHG is constantly working on reducing its specific fuel consumption and CO2 emissions. Between 1990 and 2019, the specific net CO2 emissions from LHG flight operations have already been reduced by 41%. The significant reduction in demand caused by COVID-19 has led to a meantime decline of specific fuel consumption. Nevertheless, the LHG was able to reach its pre-crisis level of 276 g fuel consumption/tonne kilometre in 2021. The continuous fleet modernisation and use of more fuel-efficient aircraft in particular contributed to the efficiency increase. Through this continuous improvement in environmental performance together with it's coherent

emissions reduction strategy and transparent communication about the associated goals and measures, the LHG has the opportunity - compared to its competitors - to achieve a higher level of attractiveness for customers (product differentiation). This can lead to increased customer loyalty and/or the acquisition of new customers as well as an improvement in the LHG's position with investors or lenders who include the sustainability performance of companies in their decisions. A greater influence on aircraft designers and manufacturers towards more efficient, cleaner aircraft (airframes and engines) using different propulsion technologies such as electric or hydrogen energy, can also be an opportunity supported by a credible and transparent communication of the LHG's environmental performance.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

42000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

More and more customers are including climate protection aspects in their purchasing decisions. A growing awareness of climate change may persuade customers to buy tickets from companies/airlines with a good performance track on climate change and sustainability. Positive perceptions and reputations enhances increased demand of a company's products and services, which in turn gives the opportunity of increased production capacity and investment opportunities. These opportunities could bring additional interest in our services and an increase in sale. The potential financial impact figure is only for demonstrative purposes of how one could start to estimate the potential financial impact. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. In a scenario where customers decide to fly with an LHG airline instead of a competing airline due to the extensive LHG climate protection measures and services, this would also have a positive financial impact. The above-mentioned amount of €42 mn is based on a climate protection performance-related increase in revenue of 0.15% in 2024 - in relation to LHG's traffic revenue in 2019, (approx. €28 bn). In order to derive this scenario, the requests received from LHG corporate customers in the CDP Supply Chain Questionnaire 2021 were used to disclose the respective CO2 emissions caused by flights with LHG aircraft. Thus, the corporate customers who requested LHG to disclose their emissions via CDP in 2021 corresponded to 0.15 % of the total Scope 1 emissions of the LHG aircraft fleet in 2020. These customers thus represent a plausible proportion of companies and individuals who have concerns about the impact of flying on the climate or are willing to participate in programs to reduce them.

Cost to realize opportunity

7730000000

Strategy to realize opportunity and explanation of cost calculation

The associated cost to realize the opportunity is an illustrative cost and covers a multi-year period 2022 to 2024 and include additional effects - not mentioned here - that lead to an overall reduction in operating costs and contribute to minimise risks. In order to actively engage consumers for environmental issues and to meet their increased awareness for these issues resulting in changing consumer behavior, LHG has implemented services like the carbon calculator and the voluntary carbon offset program for its customers. In 2021 LHG has further developed and expanded its CO2 compensation platform COMPENSAID to make it easier for LHG's customers to reduce their carbon footprint by either purchasing SAF or by compensating their CO2 flight emissions by supporting climate protection projects or a combination of both. The development and maintenance for the COMPENSAID platform caused costs of approximately € 0.3 -0.8m p.a.. LHG has also continued the programme for certain corporate customers with a corresponding contract in 2021. CO2 emissions for their flights within Europe will be compensated by LHG via its cooperation partner myclimate. Furthermore, LHG is constantly modernizing its fleet in order to offer its customers flights with the most modern and fuel efficient aircrafts. Some corporate customers already judge upon the type of aircraft, when choosing their suppliers for air travel. Despite the ongoing COVID-19 pandemic in 2021 LHG remains committed to continue modernizing its fleet with to keep its products competitive, to generate fuel and carbon efficiencies to improve continuously its environmental footprint. In 2021 LHG has put 10 new fuel efficient aircraft into service. From 2022 to 2024 the net investment in new more fuel efficient aircraft amounts to €7.5bn . In total the LHG have order commitments for 175 new aircraft delivered between 2022 and 2029. In 2021 the LHG Executive Board has also decided to released €234m (USD 250m) for the procurement of SAF between 2022 and 2024. In addition the LHG is engaged in several SAF developing cooperations. In order to responding to customer expectations for a steady carbon reduction LHG is expanding intermodal transport, enables a lower number of shorthaul flights and alternative ways for reaching hubs. The LHG, in cooperation with the national railway companies and bus operators in the home markets, offers a variety of other alternatives for travel to and from the hubs in addition to flights.

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Primary potential financial impact

Other, please specify (Reduced operational costs - less fuel, less CO2 compensation certificates, less aircraft operating costs (aircraft usage is reduced))

Company-specific description

The intensive debate on effective measures to mitigate climate change opens up even more the opportunity for the introduction of a Single European Sky (SES) to be implemented more rapidly and with greater attention. Improved air traffic management based on international agreements. For example, the Single European Sky (SES) is an air traffic management modernisation project with huge climate protection potential. The SES' flight efficiency objective tackles the problem of flying longer routes than ideally necessary. European Air Traffic Management inefficiency is costing EUR 5 billion extra a year to airlines and passengers (calculated Pre-COVID-19). A Single European Sky (SES) would eliminate unnecessary detours: 0.8 to 1.6 tons of CO2 per flight could be saved. For Lufthansa, that would be around 1 to 1.8 million tons less CO2 per year (pre COVID-19). The foundations for a unified European airspace system were in fact already laid in the 1990s. The plan was to help make the European air traffic control system more efficient in commercial terms and also more environmentally friendly. But being such a large scale project, there were countless political and

technical agreements that had to be made and compromises that needed to be reached along the way. Due to the intensive climate change debate, the restructuring process is now gaining more and more momentum and improvements are being achieved in many areas through the use of innovative solutions, not at least through the involvement of the LHG which works for numerous SES projects such as enhanced IT tools, optimizing flight patterns saving fuel /reducing CO2 emissions.

Time horizon

Long-term

Likelihood

More likely than not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

200000000

Potential financial impact figure – maximum (currency)

400000000

Explanation of financial impact figure

The potential financial impact figure are provided only as an illustration of how the financial impacts may be calculated. It should not be interpreted as a definitive projection of the LHG's financial risk or future financial performance. Calculations and estimates of impacts, will be reviewed and adjusted or revised by the LHG on a regular basis. The European Organisation for the Safety of Air Navigation (Eurocontrol) states a SES would eliminate unnecessary detours – 0.8 to 1.6 tons of CO2 per flight could be saved. For LHG, that would be 1 to 1.8 mio tons less CO2 per year prior to COVID-19 pandemic. With a consumption of 10 mio tons of kerosene in 2019 (last year prior to COVID-19) and corresponding CO2 emissions of 32 Mio. tons of the LHG aircraft fleet, a SES would result in cost savings on EUR 200m to 400m for the LHG depending on actual prices for kerosene and EU ETS certificates and recovery speed of air travel. As 2021 has been the second extraordinary year in row due to COVID-19 pandemic, calculation should remain on 2019 basis.

Cost to realize opportunity

150000

Strategy to realize opportunity and explanation of cost calculation

The LHG explicitly supports the efforts of the EU and campaigns via the European airline association Airlines for Europe (A4E) for the creation of a dependable and efficient European airspace. A key milestone for achieving a Single European Sky is the harmonisation and modernisation of the European aviation infrastructure, for which the European Commission has set up the SESAR programme (Single European Sky ATM Research). SESAR is to develop, test and implement Europe-wide new technologies, procedures and standards that contribute to harmonising and optimising European air traffic management. The LHG supports SESAR with the clear expectation that measurable operational improvements in air traffic management are implemented. The aim is to generate direct benefits for customers and the environment and to sustainably reduce air traffic control costs. The implementation of these technologies in daily operations is jointly coordinated by the members of the industry consortium SESAR Deployment Manager (SDM). The LHG is a member of this consortium and provides local experts. Across Europe, the SDM currently coordinates 341 projects (2021) of which 230 modernisation projects already in operation in 2021. The various airlines in the LHG and Lufthansa Systems are also actively involved as IT providers for SESAR research and demonstration projects. These activities are supported by additional research and development projects such as "EffFlug" in cooperation with DLR (German Aerospace Institute). Within EffFlug methods, IT Tools and workflows are derived to optimize the planning of the flight operation such as optimizing flight paths based on the evaluation of real flight data. These findings are being implemented into software tools which calculate more precisely fuel consumption and noise emissions. These projects have been supported financially by the ministry of economics in order to support more sustainable and environmental friendly air traffic by flying more efficiently. The management cost associated with LH's actions to promote the SES and SESAR in 2021, incurring for seconded two LHG staff members to the SESAR Deployment Manager (SDM) Programme. Costs are partly financially by funding of the german ministry of economics.

Comment

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Primary potential financial impact

Other, please specify (Creating availability of energy source and potential of lowering cost)

Company-specific description

Growing public climate debate increases the need of fossil free energy sources and pushes the awareness of producing Sustainable Aviation Fuel (SAF) either through enhanced R&D and production by the fuel industry and or raising national, EU and international financial and structural governmental support to further develop SAF and to promote market entry at affordable levels. At LHG, SAF demand will be driven by mandates, customer demand and environmental targets. In order to noticeably reduce its greenhouse gas emissions in the future, the LHG must focus on the commercialisation of a competitive sustainable jet fuel (SAF) that has significantly lower life-cycle carbon emissions compared to petroleum-based jet fuel. LHG must secure access to strategic production factor SAF, accelerate the market introduction of advanced technologies and drive down the cost curve. Therefore, LHG uses partnerships with innovators (via LHG CleanTechHub, CTH) to drive research projects on sustainable aviation fuel. LHG build up strategic cooperations with established fuel suppliers to signal demand for SAF. LHG has a proven track record over more than 10 years in research, testing and commercialization of SAF.

Time horizon

Long-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

No, we do not have this figure

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

We experience interest for CO2 neutral air transport among customers. LHG therefore aims to integrate SAF into a sustainable product portfolio (see C4.5a), yet due to logistics and lead-times quantities have to be purchased on own risk. SAF is 4 to 6 times as expensive as fossil fuel. LHG designates €234 M for this purpose until 2024. LHG faces the highest SAF price because competitors benefit from local support mechanisms (that however may deprive SAF from its environmental benefits).

Cost to realize opportunity

234000000

Strategy to realize opportunity and explanation of cost calculation

In order to safeguard the supply of SAF in the long term, the LHG has developed a three-pronged strategy: 1. In the short term (until 2024), up to USD 250mn (= €234mn) has been released for the procurement of SAF on the spot market by decision of the Executive Board. 2. In the medium term, options for long-term supply commitments are under consideration around the world. These offer significant production volumes and security of supply from around 2025 onwards. However, commitment periods and cost risk is much higher. 3. In the long term, the CleanTech Hub established at the LHG will provide support for innovative supply concepts with the goal of transforming today's start-ups and developers into tomorrow's suppliers in order to get more technologies and suppliers into the market and foster competition. SAF should only be as expensive as it really needs to be. Some recent initiatives: Lufthansa Cargo is involved in researching and using SAF and in April 2021 undertook the first carbon neutral freight flight. Since Oct. 2021, LH Cargo has been one of the first customers of the world's first power-to-liquid (PtL) fuel system in Werlte (Germany). SWISS established a complete logistics chain for importing SAF to Switzerland. Furthermore in 2019, for instance, LHG signed a letter of intent with Heide refinery on future supplies of PtL fuel to Hamburg Airport. Among other things, the LHG also supports the Lausitz power-to-X centre of excellence. Another partnership was begun in the reporting year with ETH Zurich and its two spin-offs Synhelion and Climeworks. The experts at ETH Zurich have developed innovative methods for removing CO2 from the atmosphere and, together with water and with the help of concentrated sunlight, convert it into a synthesis gas that can be used to generate fuel. LHG is still involved with the cross-sector Powerfuel initiative coordinated by the German Energy Agency (dena) to build an international alliance to develop the strategic importance of synthetic renewable fuels, to jointly advance a global market for these fuels and to accelerate their market development. As "Green hydrogen" is vitally important for synthetic fuels LHG is taking part in the HySupply initiative launched by the Federation of German Industries and acatech. The aim is to develop a supply chain for green hydrogen from Australia. LHG is a member of the working group Clean Skies for Tomorrow.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?

Row 1

Transition plan

No, our strategy has been influenced by climate-related risks and opportunities, but we do not plan to develop a transition plan within two years

Publicly available transition plan

<Not Applicable>

Mechanism by which feedback is collected from shareholders on your transition plan

<Not Applicable>

Description of feedback mechanism

<Not Applicable>

Frequency of feedback collection

<Not Applicable>

Attach any relevant documents which detail your transition plan (optional)

<Not Applicable>

Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future

The aviation sector does currently not have sufficient technological options to produce a Transition Plan that is 1.5°C aligned. This was also acknowledged by the SBTi: "The SBTi endeavors to keep our resources and sector-specific methodologies up to date to align with the latest climate science, data availability and research. Consequently, as knowledge and data develop within this arena, potential future updates to this guidance could include: (1) a 1.5°C-aligned pathway for the aviation sector" [...] (cf. SBTi - SCIENCE-BASED TARGET SETTING FOR THE AVIATION SECTOR, Aug. 2021, page 33). Therefore, the LHG has committed itself to the goal of "well below 2°degrees" according to the Paris Climate Agreement and in line with the actual SBTi aviation sector guidance and has developed a corresponding transition plan.

Explain why climate-related risks and opportunities have not influenced your strategy

<Not Applicable>

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices		
<table border="1"> <tr> <td>Transition scenarios</td> <td>IEA SDS</td> </tr> </table>	Transition scenarios	IEA SDS	Company-wide	<Not Applicable>	<p>Lufthansa Group (LHG) has been signatory to the TCFD since 2021 and has followed the recommendations to conduct both a qualitative and quantitative scenario analysis. The qualitative scenario analysis preceded the quantitative one. LHG has considered two contrasting scenarios from the IEA ETP 2020, the - the Sustainable Development Scenario (SDS) - the Stated Policies Scenario (STEP). LHG has identified these scenarios to offer well described and plausible climate scenarios that provide two contrasting cases against which to test potential impacts on LHG business. The scenarios use concrete assumptions such as global GDP growth, population developments, the relative use of different energy sources (renewables vs fossil), CO2 price development and the penetration of SAFs in air traffic to model energy systems and industries consistent with the respective underlying level of global warming. These scenarios were linked to hot spots defined by the LHG and corresponding parameters of a previously created qualitative scenario heatmap, which have identified transition risks currently as most the relevant risks for the LHG. The LHG's climate goals adopted in 2021 (for 2030 and 2050, with 2019 as the base year) were defined as time frames. Several further internal and external sources were also used (e.g. fuel procurement quantities, the development of the average fuel consumption per tonne kilometre, operational cost structure, sales / revenue volume, assumptions on customer price sensitivity as well as fuel and carbon prices, internal climate/emissions risk assessments), to analyse the effects on passenger as well as on freight transport. The two hot spots that were subjected to quantitative analysis are: 1. A potential increase in operating costs due to rising CO2 and increased use of sustainable aviation fuels (SAF) and 2. A potential change in market demand driven by higher ticket prices (from hot spot 1) and subsidies for other modes of transport which could increase modal shift e.g. to rail. Important parameters relevant for the quantitative results were e.g. CO2 and oil price development. Basic macroeconomic factors affecting transport demand were also included in the analysis. Likewise, technological assumptions relevant to the quantitative results such as continuous fleet modernisation and increasing SAF quotas were considered. By calculating external costs, different impact categories can be compared and their relative relevance can be assessed.</p>
Transition scenarios	IEA SDS				
<table border="1"> <tr> <td>Transition scenarios</td> <td>IEA STEPS (previously IEA NPS)</td> </tr> </table>	Transition scenarios	IEA STEPS (previously IEA NPS)	Company-wide	<Not Applicable>	<p>Lufthansa Group (LHG) has been signatory to the TCFD since 2021 and has followed the recommendations to conduct both a qualitative and quantitative scenario analysis. The qualitative scenario analysis preceded the quantitative one. LHG has considered two contrasting scenarios from the IEA ETP 2020, the - the Sustainable Development Scenario (SDS) - the Stated Policies Scenario (STEP). LHG has identified these scenarios to offer well described and plausible climate scenarios that provide two contrasting cases against which to test potential impacts on LHG business. The scenarios use concrete assumptions such as global GDP growth, population developments, the relative use of different energy sources (renewables vs fossil), CO2 price development and the penetration of SAFs in air traffic to model energy systems and industries consistent with the respective underlying level of global warming. These scenarios were linked to hot spots defined by the LHG and corresponding parameters of a previously created qualitative scenario heatmap, which have identified transition risks currently as most the relevant risks for the LHG. The LHG's climate goals adopted in 2021 (for 2030 and 2050, with 2019 as the base year) were defined as time frames. Several further internal and external sources were also used (e.g. fuel procurement quantities, the development of the average fuel consumption per tkm, operational cost structure, sales / revenue volume, assumptions on customer price sensitivity as well as fuel and carbon prices, internal climate/emissions risk assessments), to analyse the effects on passenger as well as on freight transport. The two hot spots that were subjected to quantitative analysis are: 1. A potential increase in operating costs due to rising CO2 and increased use of sustainable aviation fuels (SAF) and 2. A potential change in market demand driven by higher ticket prices (from hot spot 1) and subsidies for other modes of transport which could increase modal shift e.g. to rail. Important parameters relevant for the quantitative results were e.g. CO2 and oil price development. Basic macroeconomic factors affecting transport demand were also included in the analysis. Likewise, technological assumptions relevant to the quantitative results such as continuous fleet modernisation and increasing SAF quotas were considered. By calculating external costs, different impact categories can be compared and their relative relevance can be assessed.</p>
Transition scenarios	IEA STEPS (previously IEA NPS)				

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

The focal questions to be addressed by the qualitative and quantitative climate scenario analysis were: 1. What are the most relevant climate risks and opportunities for the LHG and which impacts on LHG business could they potentially have? 2. Is the LHG sufficiently well positioned to identify potential risks and opportunities at an early stage and to counter them? For this purpose, at the beginning of 2021, LHG has carried out - together with an independent, professional consulting agency – a qualitative climate-related scenario analysis based on the IEA SDS Scenario. This analysis resulted in a climate risk & opportunities heat map which showed that the transition risks currently have the highest potential to influence Lufthansa's business. In the course of a subsequent quantitative scenario analysis, two hotspots were filtered out of this heatmap. These two hotspots were then subjected to a detailed examination on the basis of the two IEA scenarios mentioned in C3.2a (SDS and STEP) in order to a.) evaluate whether and how the scenarios can influence LHG's business and b.) analyse whether LHG's current climate strategy is able to recognise the identified risks and opportunities in time and to minimize the identified risk and/or maximize the opportunities. From LHG's point of view, the two selected IEA scenarios were particularly suitable because they offer well-described and plausible climate scenarios by using concrete assumptions such as global GDP growth, population developments, the relative use of different energy sources (renewables vs fossil), CO2 price development and the penetration of SAFs in air traffic to model energy systems and industries consistent with the respective underlying level of global warming. This made it possible to present a spectrum of potential risks that was as broad as possible, but also as realistic as possible, on the basis of which possible effects on the LHG business could be estimated and were thus suitable for providing an answer to the two focus questions.

Results of the climate-related scenario analysis with respect to the focal questions

With respect to the focal question on relevant risks and potential impact, the analysis has shown, that transition risks are the most relevant risks for LHG. The dominant cost driver in both scenarios is the development of oil and SAF price, which exceed the costs for carbon emissions especially in the medium term. In the SDS (1.8°C) scenario, which is based on an ambitious decarbonisation pathway, the costs associated with this decarbonisation increase significantly by 2050. However, assuming no regulatory interference in market pricing, oil prices decrease because of lower general market demand in this scenario. SAF shares increase to almost 50% by 2050. In sum, these effects could lead to only a slight increase in OPEX in the medium-term for the passenger fleet of the LHG. The long-term effects on OPEX are remaining insignificant. In the STEP (2.7°C) scenario, CO2 prices rise more slowly. However, higher demand for crude oil in this scenario means that fuel costs increase potentially inducing a significant increase in OPEX both in the medium and long term. In both scenarios, the global demand for passenger transportation volume increases with global population and economic growth (especially in economically developing regions). In this model a homogeneous implementation of CO2 prices across regions and sectors was assumed. The risks related to regional differences in policy approaches and the related distortion of competition therefore exists and should be examined more closely in a further analysis. With regard to the quantitative impacts of changing transportation markets resulting from shifting demand patterns and subsidy structures, both climate scenarios show an increase in demand for passenger transportation. In the 2.7°C scenario, less emphasis is put on the extension of regional rail networks and subsidy structures for alternatives to air transport compared to the 1.8°C scenario. Thus, higher demand increase can be expected in the 2.7°C scenario. Both the qualitative and quantitative scenario analysis showed that LHG's current strategy already reflects many of these findings with climate-related issues affecting its products and services, its value chain, investments in R&D and its operations focal question 2). Some of its key strategic initiatives are the following: - Investing in fuel-efficient aircraft, - Increasing the use of sustainable aviation fuel, - Expansion of intermodal traffic, - Strengthen innovation & research. The results of the quantitative scenario analysis confirm that LHG's strategic initiatives (see above) are suitable to minimize the respective risks and to create opportunities. Nevertheless, to further improve the resilience of LHG's strategy, measures to strengthen and more closely integrate risk management and strategic planning were identified and discussed. In the next step, LHG will incorporate the most relevant aspects into the established risk management and financial planning structures.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	<p>The LHG recognises a steadily growing stakeholder interest in reducing the GHG emissions of flying as a climate related risk. Over the next 2 to 5 years in order to minimise this risk and, where appropriate, to develop potential opportunities (as reported in C2.3a and C2.4a), the LHG has firmly integrated sustainability and climate protection into its corporate strategy, defined and introduced several measures / mitigation activities. The following are some important strategic decisions with focus on product and service: To offer LHG's customers sustainable choices, LHG has integrated tangible fossil carbon offsetting and/or CO2 mitigation elements: - Extension of CO2 compensation portfolio and integration into all domestic fares for corporate customers. The concept also includes the full CO2-compensation of all continental European flights of all LHG network airlines' Corporate Customers, who have signed a contract starting in 2020. - In 2021 the functionality of COMPENSAID which has been developed by Lufthansa Innovation Hub in 2019 has been further developed and the offer integrated in all LHG network airlines booking platforms. This CO2 compensation/mitigation platform has been the first worldwide possibility for customers to buy Sustainable Aviation Fuel (SAF) via LHG to reduce their carbon footprint directly, regardless if they were flying on LHG Group airlines or on other airlines. They have also the opportunity to buy combination of SAF and CO2 compensation projects. - Improvements on intermodal choices: LHG intermodal strategy continuously expanding intermodal transport and integrating flight-, train- and bus services. This enables a lower number of shorthaul flights and alternative ways for reaching hubs. The LHG, in cooperation with the national railway companies and bus operators in the home markets, offers a variety of other alternatives for travel to and from the hubs in addition to flights. In Germany seven additional destinations to be added to the express rail network in 2021. More than 220 daily connections to and from Frankfurt have been offered at the end of 2021. This will also minimize the risk on the mid to longer term, that climate-related regulatory measures could have an impact on the route network LHG offers their customers - for example, if regulators in Germany ban certain short-haul domestic flights.</p>
Supply chain and/or value chain	Yes	<p>With reference to the supply chain, the activities of LHG's suppliers could pose risks in terms of new climate-related regulations, which affect their costs in the next 1-5 years. Another risk resulting from supply chain could be LHG's access to capital, if investors begin to allocate funds on the basis of which companies are reducing their scope 1-3 emissions. In order to minimise this risk and, where appropriate, to develop potential opportunities (as reported in C2.3a and C2.4a), the LHG has firmly integrated sustainability and climate protection into its corporate strategy, defined and introduced several measures / mitigation activities. In doing so, the LHG increasingly considers the entire value chain of its business activities. The following are some important strategic decisions with focus on supply chain: In 2019 LHG has introduced the "Supplier Code of conduct". In 2021 LHG continued its strategy to engage on sustainability matters with our supply chain and / or value chain. One significant strategic decision in this year related to sustainability supplier risks was to complete initial screening of 100% of suppliers for ESG risks. The next step is to filter out the most potential risk suppliers and develop measures to help minimize and monitor ESG supply chain risks. Most relevant strategic decision for climate related issues within the supply chain is the investment into new fuel efficient aircrafts. These decisions are being taken by the Executive Board as well as the Supervisory Board. In 2021, the LHG took delivery of 10 new aircrafts which are up to 25% more fuel efficient. Despite the crisis, decision to still modernize the fleet with the most efficient aircraft has been taken. In total LHG has fixed orders about 175 new aircrafts between 2022 and 2029. Furthermore, in 2021 the LHG Executive Board took another strategic decision to invest USD 250m (€ 234m) in procuring SAF over the next three years. Because SAF feedstock absorbs CO2 over its lifecycle, use of SAF has a lower net climate impact. LHG intensively cooperates with fuel suppliers and industry consortia to support further development and market readiness for SAF. One example in 2021 was the strategic collaboration of SWISS with Synhelion for market launch of solar fuel. Further details see C12 Engagement and Supply Chain Module within the CDP questionnaire.</p>
Investment in R&D	Yes	<p>LHG recognises that innovation and R&D will be crucial to our decarbonisation efforts over a timeframe to 2050. Investments in R&D and the ability to use SAF and new technologies, will reduce the climate related risks (e.g. compliance cost under existing and emerging climate regulations) and increases the chance to reach competitive advantage. The LHG has firmly integrated sustainability and climate protection into its corporate strategy. The following are some important strategic decisions with focus on investment in R&D and innovation: - In 2021, the LHG launched the Clean-Tech Hub (CTH) with the goal of bundling the latest technologies and advancing innovations for climate protection. The LHG is specifically seeking technology-driven ideas and project partners that can contribute to sustainable aviation. Regular events (pitch days) have offered companies, start-ups and research institutes the opportunity to present their concepts and ideas. If a pitch is received well, LHG will work with the participants to further develop the concepts. So far the CTH has identified over 80 projects. - LHG is involved in various SAF projects and alliances and looks globally for sourcing opportunities. Some examples: o In 2019 LHG closed a LoI with Heide refinery to support the development of Power-to-liquid (PtL) technology for sustainable jet fuel. Heide refinery shall supply LHG with SAF from 2024 of 5% for LHG flights from Hamburg. o In 2021 the climate protection organization Atmosfair inaugurated the world's first production plant for manufacturing PtL-jet fuel from water, CO2 and renewable electricity. LHG is the first customer of this completely CO2-neutral kerosene. o LHG and SWISS agree on strategic collaboration with Synhelion for market launch of solar fuel in 2023. - LHG is partnering with universities (e.g. KIT, RWTH Aachen) and research institutes (e.g. DLR) in climate research projects. For more than 20 years LHG aircrafts has been collecting data for research projects (e.g. IAGOS, CARIBIC) to better understand climate change. - Lufthansa Technik AG cooperates with BASF Coatings GmbH and Airbus to develop a film that resembles the structure of Sharks Skin as their microstructure reduces the frictional resistance which can save up to 3% of fuel. SWISS and Lufthansa Cargo will adopt the coating on its aircrafts as launching "customers" in 2022.</p>
Operations	Yes	<p>Jet Fuel emissions represents 99 % of LHG Scope 1 and Scope 2 emissions. Climate-related regulatory risks lead to increasing compliance costs (e.g. for the EU and CH ETS - the EU Allowance's (EUA) price per tonne of CO2 has increased from around €25 at the end of 2019 to around €80 at the end of 2021 - see also C2.3a). A further tightening of the EU ETS regulation is to be expected (e.g. decreasing of free allowances) and thus further increase of the operational costs for LHG is expected. Besides this, the CO2 reduction targets of the LHG until 2030 and 2050 are based, among other things, on continuous efficiency improvements of the operation. Efficient flight operation e.g. by intelligent route planning, modern approach procedures, weight reduction or the operation of innovative technology, helps to reduce costs, to reach climate protection targets and therefore also offer the opportunity of a competitive advantage. Climate-related risks and opportunities thus influence LHG strategy with regard to the operations. The following are some important strategic decisions within the LHG with focus on operations: In 2021, LHG implemented and monitored a total of 22 fuel-saving projects in 2021. These projects comprise activities relating to performance and procedures, weight reduction, flight route optimisation and technical developments. This enabled another 30.4 thousand tonnes of CO2 emissions permanently to be eliminated in 2021. The quantity of kerosene saved amounted to around 9.6 thousand tonnes – this is equivalent to approximately 113 return flights between Munich and New York with an Airbus A350-900 aircraft. LHG supports actively the European Working group on optimizing the European Airspace in order to fly more directly and to reduce detours which shall save between 5-10% of the European aviation CO2 emissions (SINGLE EUROPEAN SKY (SES)) In 2019 the Executive Board of LHG has decided to become carbon-neutral on the ground operation in LHG home countries (Germany, Austria, Switzerland and Belgium) until 2030, which has led to feasibility studies in 2019, e.g. which apron vehicles (tugs, catering loaders, amount of electricity needed and availability) can be run on alternative fuels or with electricity and will be continued.</p>

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Capital allocation Access to capital Liabilities	LHG financial planning has been influenced by climate-related regulatory risk as well as by climate-related opportunities by creating availability of sustainable energy source. The risk of (cost) increasing climate-related regulation like carbon pricing, energy efficiency standards as well as aviation (and fuel) taxes influenced the financial planning in the element CAPITAL EXPENDITURES for buying new, more fuel efficient aircrafts with lower operational costs than older (less efficient) aircraft. As a case study to reduce the risk of increasing (INDIRECT & DIRECT) COSTS from climate-related regulations looking at the impact of fleet renewal on reducing operational costs in terms of fuel consumption and emissions. Approximately 25% of LHG's CO2 emissions occur from flights within the European Economic Area (EEA) (as of 2019). Flights within the EEA are subject to the EU ETS, and the price per tonne of CO2 was around €80 at the end of 2021 (in 2019 at €25/tonne). In addition, the free allowances allocated in the EU ETS are gradually being reduced and expected to reduce to zero until 2030. Additional tightening is being sought through the EU 'Fitfor55' package. A new Airbus A320/A321neo, of which the LHG has integrated a total of 37 aircraft into its fleet between 2019 and 2021, consumes on average 20% less fuel and thus also produces fewer CO2 emissions than the aircraft it replaces. This also reduces the respective fuel costs and the costs that have to be paid for the purchase of emission certificates. In financial planning, the possible costs for emission certificates and fuel are usually calculated and taken into account for a period of 3 years. Fleet renewal is currently the key driver for reducing CO2 emissions from flight operations. The Lufthansa Group continuously invests in modern, fuel-efficient aircraft and engine technologies, which represent the most important element in reducing CO2 emissions from flight operations in this decade. Financial planning has also been influenced by LHG SAF strategy. On the one hand sustainable alternative fuels poses a climate-related regulatory risk ("Fitfor55 Package": mandatory SAF quota within the EU), because SAF might be more expensive than conventional fuels and this may lead to a potential competitive distortion of a SAF quota for intra EU flights. On the other hand a high engagement and commitment for SAF leads to climate-related opportunities by creating availability of sustainable energy source and possibly contributes to higher customer retention or acquisition and thus better REVENUES. For example, the Lufthansa Group airlines offer Compensaid, a platform developed in the Lufthansa Innovation Hub that enables passengers to offset their CO2 emissions by means of high-quality climate action projects or reduce them by purchasing sustainable aviation fuel (SAF). Lufthansa Cargo customers have also been able to transport their freight in a carbon-neutral manner since September 2021. Further examples of financial planning which has been influenced by climate-related risks and opportunities: CAPITAL ALLOCATION - Funds for voluntary CO2 compensation: Financial funds have been provided to compensate CO2 on a voluntary basis: All LHG employees duty flights are 100% compensated via our partner myclimate since 2019. - Funds for Green electricity: Financial funds have been provided to use 100% green electricity in Germany, Austria, Switzerland and Belgium - the opportunity to reduce fuel consumption and emissions has made aircraft investments comparably more attractive than other investments and alternative options to allocate capital. ACCESS TO CAPITAL: The upcoming EU Taxonomy might influence the accessibility to capital. Until end of 2021 the economic activity "Passenger and Freight air transport" has not been included as a NACE Code. For fiscal year 2022 LHG has only to disclose according to EU Taxonomy its "Non core activities". So the magnitude of a possible impact is still not clear. LIABILITIES: Due to the COVID-19 pandemic, LHG has had to make use of state loans. Germany's government has therefore established the "Economic stabilisation Fund" (ESF) which requires that expenditures out of this loan need to support sustainable investments.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target
Intensity target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number

Abs 1

Year target was set

2019

Target coverage

Business division

Scope(s)

Scope 1

Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

<Not Applicable>

Base year

2018

Base year Scope 1 emissions covered by target (metric tons CO2e)

84394.8

Base year Scope 2 emissions covered by target (metric tons CO2e)

48477.83

Base year Scope 3 emissions covered by target (metric tons CO2e)

<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

132872.63

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2025

Targeted reduction from base year (%)

25

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

99654.4725

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

59711

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

33642.48

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

93353.48

% of target achieved relative to base year [auto-calculated]

118.968518949313

Target status in reporting year

Underway

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

<Not Applicable>

Please explain target coverage and identify any exclusions

Percentage of emissions in scope relates to all production sites Lufthansa Technik AG and its subsidiaries worldwide. Reduction target of Lufthansa Technik AG production sites in metric tons CO2: 33.218,16. Note: special reduction effect caused by the output reduction due to the COVID-19 pandemic and the carve-out of significant production capacities associated with their transfer to Lufthansa (base year was adjusted accordingly). Attention: Lufthansa Technik is a provider of maintenance, repair and overhaul services (MRO) for civilian commercial and governmental aircraft (Total emissions include emissions from miscellaneous MRO activities, like Runups and Test Cell operation) . For this sector no science-based targets methodology could be identified.

Plan for achieving target, and progress made to the end of the reporting year

In the upcoming years, Lufthansa Technik Group will focus on increasing the share of renewable energies in its energy mix (e.g. installation of Solar PVs at Lufthansa Technik Philippines, etc.). In addition, Lufthansa Technik Group will identify unnecessary energy losses when it comes to compressed air and cooling systems, and will introduce more energy-efficient equipment.

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

Target reference number

Abs 2

Year target was set

2009

Target coverage

Other, please specify (All emissions from LHG flight operations)

Scope(s)

Scope 1

Scope 2 accounting method

<Not Applicable>

Scope 3 category(ies)

<Not Applicable>

Base year

2005

Base year Scope 1 emissions covered by target (metric tons CO2e)

21293772

Base year Scope 2 emissions covered by target (metric tons CO2e)

<Not Applicable>

Base year Scope 3 emissions covered by target (metric tons CO2e)

<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

21293772

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

<Not Applicable>

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2050

Targeted reduction from base year (%)

50

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

10646886

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

13724928

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

13724928

% of target achieved relative to base year [auto-calculated]

71.0897439871151

Target status in reporting year

Replaced

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

<Not Applicable>

Please explain target coverage and identify any exclusions

Percentage of emissions in scope relates to the LH Group aircraft fleet (passenger and cargo). Note: special reduction effect caused by the output reduction due to the COVID-19 pandemic. Target aligns with the IATA industry goal of reducing absolute carbon emissions by 50% by 2050, compared to 2005 levels. This target was replaced by IATA in October 2021 by an adopted IATA resolution that commits the global aviation sector (IATA member airlines) to reducing its net carbon emissions to zero by 2050. The Lufthansa Group played a major role in setting the IATA target.

Plan for achieving target, and progress made to the end of the reporting year

<Not Applicable>

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

Target reference number

Abs 3

Year target was set

2019

Target coverage

Country/region

Scope(s)

Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

<Not Applicable>

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

<Not Applicable>

Base year Scope 2 emissions covered by target (metric tons CO2e)

56104

Base year Scope 3 emissions covered by target (metric tons CO2e)

<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

56104

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

<Not Applicable>

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

28

Target year

2021

Targeted reduction from base year (%)

100

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

0

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

0

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

0

% of target achieved relative to base year [auto-calculated]

100

Target status in reporting year

Achieved

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

<Not Applicable>

Please explain target coverage and identify any exclusions

In March 2019 the Lufthansa Group Executive Board adopted the goal of supplying 100% of LHG electricity consumption in fully and directly owned or rented buildings in Germany, Austria, Switzerland and Belgium with 100% green electricity from 2020 onwards. To this end, LHG has acquired renewable energy from renewable power plants (as in Austria, Switzerland and Belgium) or by acquiring green power certificates (HKN Neu 100, in Germany), which guarantee the production of green electricity from 100% new power plants, thus contributing to the expansion of renewable energy.

Plan for achieving target, and progress made to the end of the reporting year

<Not Applicable>

List the emissions reduction initiatives which contributed most to achieving this target

Switch energy procurement (electricity) from fossil sources (e.g. coal, gas) to 100% renewable sources (e.g. wind, water, sun). Furthermore, numerous measures were implemented to reduce electricity consumption. The greatest savings potentials result from: - Converting the lighting to more energy-efficient LED technology. - Optimisation of lighting (night shut-off, motion detectors,...) - Adjustment of operating times/ timer catalogues of technical systems to the time of use and demand - Deactivation of humidification and dehumidification - Adjustment of temperature setpoints (e.g. in server rooms)

Target reference number

Abs 4

Year target was set

2019

Target coverage

Country/region

Scope(s)

Scope 1

Scope 2 accounting method

<Not Applicable>

Scope 3 category(ies)

<Not Applicable>

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

12122

Base year Scope 2 emissions covered by target (metric tons CO2e)

<Not Applicable>

Base year Scope 3 emissions covered by target (metric tons CO2e)

<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

12122

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

0.04

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

<Not Applicable>

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2030

Targeted reduction from base year (%)

100

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

0

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

0.04

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

5447

% of target achieved relative to base year [auto-calculated]

55.0651707639004

Target status in reporting year

Underway

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

<Not Applicable>

Please explain target coverage and identify any exclusions

In March 2019, the Lufthansa Group Executive Board adopted the goal of transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030. That means that LHG aims to switch own ground vehicles used at the airports in these countries to a low carbon energy. This is including also the switch to 100 % carbon neutral electricity at all LHG facilities in these home market countries as soon as possible (see target C4.2a Low1). The switch to 100 % carbon neutral electricity has been started in January 2020. Note: special reduction effect caused by the output reduction due to the COVID-19 pandemic.

Plan for achieving target, and progress made to the end of the reporting year

The 10 % share in low-carbon vehicles in the current company fleet mentioned above is a rough estimate. Exact shares are not available at present. Due to the COVID-19 situation no investment in new low-carbon vehicles was possible in 2020 and 2021. An order was placed for two e-powered transporters but delivery is still pending due to delivery problems on the manufacturer's side. The LHG's ground handling company LEOS, a business unit of the LHG, had two hybrid aircraft towing vehicles in service at Frankfurt airport already in 2021. LHG ground handling company LEOS is the launch customer of an all-electric towbar-less aircraft tractor named Phoenix E. Lufthansa will put two of them into service in 2022. The Phoenix E moves aircraft with a take-off weight of up to 352 tons. The first of these new e-vehicles powered by green electricity was already delivered to LEOS this March and will be in operation at Frankfurt airport for up to ten hours a day. The daily energy requirement for up to 20 towing jobs per vehicle is almost twice as high as the battery capacity. The thermo-controlled lithium-ion battery system allows rapid recharging even during short interruptions to work, which is carried out utilizing a dedicated charging infrastructure. Charging is done with green electricity. Further a project has been initiated in 2021 to implement the necessary loading infrastructure, a major prerequisite for the planned expansion of e-mobility on airport-premises and at LHG owned or rented parking lots and garages. These implementation processes are financially and technically complex and there are many stakeholders involved, especially when airport premises are concerned, so a solid road map has to be implemented in regards to the loading infrastructure, before orders for a greater number of e-vehicles can be placed. Next steps: Foster LHG's collaboration with airports to set up charging infrastructure for e-mobility. Project to implement significantly more charging points in LHG's employee parking garages.

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

Target reference number

Abs 5

Year target was set

2020

Target coverage

Company-wide

Scope(s)

Scope 1

Scope 2 accounting method

<Not Applicable>

Scope 3 category(ies)

<Not Applicable>

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

33349293

Base year Scope 2 emissions covered by target (metric tons CO2e)

<Not Applicable>

Base year Scope 3 emissions covered by target (metric tons CO2e)

<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

33349293

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

<Not Applicable>

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

Target year

2030

Targeted reduction from base year (%)

17.65

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

27463142.7855

Scope 1 emissions in reporting year covered by target (metric tons CO2e)

13823320

Scope 2 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Scope 3 emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

13823320

% of target achieved relative to base year [auto-calculated]

331.727398867591

Target status in reporting year

Underway

Is this a science-based target?

No, but we are reporting another target that is science-based

Target ambition

<Not Applicable>

Please explain target coverage and identify any exclusions

As part of LHG's long-term net zero by 2050 commitment, LHG has also set medium-term climate targets. In 2021, Lufthansa Group is committed to mitigate its net Scope 1 emissions by 50 % until 2030 vs. 2019 by a variable ratio of reductions and compensations. The reduction from fleet renewal, operational and air traffic management efficiency and Sustainable Aviation Fuel (SAF) is derived from the Science-based intensity target and depends on the future RTK growth. From today's perspective, the projected growth leads to an absolute reduction of 17,65 %. The remaining 32,35 % to the target will rely on compensation. However, the ratio of reduction and compensation will change with any change in forecasted RTK production growth.

Plan for achieving target, and progress made to the end of the reporting year

To reduce the absolute carbon emissions LHG will rely on fleet renewal, operational and air traffic management efficiency as well as Sustainable Alternative Fuel (SAF). Fleet renewal: LHG develops retrofits to further reduce the emissions of the existing fleet (e.g. Aeroshark). In 2021 ten new, more fuel-efficient aircraft put into operation. In return, a total of 55 older aircraft left the Group fleet. Additionally LHG signed leases/purchased 9 new fuel-efficient long-haul aircraft in 2021 (Airbus A350, Boeing 787-9), which are planned to join the LHG fleet in 2022. The emissions of these aircraft are up to 30% less than with the predecessor models. In total LHG has fixed orders about 175 new aircrafts between 2022 and 2029. Order commitments for aircraft and reserve engines amount to EUR 14.3bn (previous year: EUR 12.9bn). Sustainable Alternative Fuels (SAF): In order to safeguard the supply of SAF in the long term, the LHG has developed a three-pronged strategy: 1. In the short term, up to USD 250m (EUR 234m) has been released for the procurement of SAF on the spot market by decision of the Executive Board. 2. In the medium term, options for long-term supply commitments are under consideration around the world. These offer significant production volumes and security of supply from around 2025 onwards. 3. In the long term, the CleanTech Hub established at the LHG will provide support for innovative supply concepts with the goal of transforming today's start-ups and developers into tomorrow's suppliers. Since 11/2020 Lufthansa Cargo operates weekly a completely CO2-neutral freighter flight between Frankfurt and Shanghai, which is fully covered by SAF. In 03/2022, the 100th flight was celebrated. During this time, 33,500 t CO2 could be saved by this initiative. In addition to the reduction part, LHG will compensate emissions to meet the 50 % net Scope 1 emission target. For this purpose, LHG relies on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and voluntary compensation. The ratio is determined mainly by the extent of CORSIA, i.e. its base year and international air transport growth rates. Note: Due to the COVID-19 pandemic, the passenger load factor of LHG aircraft in 2020/21 was only just over 60% and thus far below the passenger load factor from 2019 (82.6%). LHG does not expect annual average load factors of >80% again until 2023/24.

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

C4.1b**(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).****Target reference number**

Int 1

Year target was set

2021

Target coverage

Company-wide

Scope(s)

Scope 1

Scope 3

Scope 2 accounting method

<Not Applicable>

Scope 3 category(ies)

Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)

Intensity metric

Other, please specify (Grams CO2e per revenue tonne kilometer (g CO2e/RTK))

Base year

2019

Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

0.000826815

Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3 (metric tons CO2e per unit of activity)

0.000210462

Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

0.001037277

% of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

98.57

% of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

<Not Applicable>

% of total base year emissions in Scope 3 (in all Scope 3 categories) covered by this Scope 3 intensity figure

58.13

% of total base year emissions in all selected Scopes covered by this intensity figure

88.09

Target year

2030

Targeted reduction from base year (%)

30.6

Intensity figure in target year for all selected Scopes (metric tons CO2e per unit of activity) [auto-calculated]

0.000719870238

% change anticipated in absolute Scope 1+2 emissions

17.65

% change anticipated in absolute Scope 3 emissions

-10.47

Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

0.0008387123

Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3 (metric tons CO2e per unit of activity)

0.0002134904

Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

0.0010522027

% of target achieved relative to base year [auto-calculated]

-4.70238879157838

Target status in reporting year

New

Is this a science-based target?

Yes, and this target has been approved by the Science Based Targets initiative

Target ambition

Well-below 2°C aligned

Please explain target coverage and identify any exclusions

Lufthansa Group commits to reduce its GHG emissions from the combustion of jet fuel (Scope 1 + Scope 3 Category 3 as per SBTi target template, WTW approach) by 30,60% per Revenue Tonne Kilometer (RTK) by 2030 from a 2019 base year. This intensity target relates to the combustion of jet fuel only (as per SBTi target template 1.037 gCO2e/RTK, absolute 39.655.275 t CO2e in 2019, WTW approach), other sources of emissions are not included (e.g. natural gas in stationary installations). Note: The intensity figures are calculated energetic acc. to SBTi Aviation Tool (TTW = WTW * 71,5 / 89,7). The points "% of total base year emissions in Scope 1 (resp. 3)

covered by this Scope 1 (resp. 3) intensity figure" are calculated acc. to gravimetric emission factors: 3,8 (WTW) = 3,15 (TTW) + 0,65 (WTT). The points "% change anticipated in absolute Scope 1+2 (resp. 3) emissions" are calculated: Scope 1 (resp. 3)emission reduction (acc. to gravimetric emission factors) divided by the sum of scope 1+2 (resp. 3) emissions.

Plan for achieving target, and progress made to the end of the reporting year

There are three big levers to achieve the target: 1. Fleet renewal: The LHG invests continuously in modern, fuel-efficient aircraft and engine technologies, which represent the most important element in reducing CO₂ emissions from flight operations. 10 new aircraft went into service with the LHG airlines in 2021. A total of 55 older aircraft were removed from the Group fleet in exchange. Between 2022 and 2027 LHG will be taking delivery of at least 45 new long-haul aircraft and around 100 new Airbus A320/321neo. Measures to technically modify the existing fleet are also constantly examined and implemented where appropriate. By mid 2020, a new surface coating developed jointly by Lufthansa Technik and BASF Coatings GmbH were tested. This functional film, known as AeroSHARK, optimizes the aerodynamics and saves 1% CO₂ per flight. In May 2021, the decision was made to use the technology for the first time in mass production at a LHG airline. In 2022, Lufthansa Cargo will start to retrofit the entire fleet of Boeing 777 freighters with AeroSHARK. 2. Operational & air traffic management efficiency: The LHG's operational measures for CO₂ reduction comprise the use of efficiently sized aircraft and the optimisation of load factors, as well as reviewing and introducing new flight procedures and navigation technologies, determining optimal routes and speeds, and monitoring the many activities to save fuel. In the year 2021, 22 fuel-saving projects were under way across the LHG. They enabled another 30,400 tonnes of CO₂ emissions to be permanently eliminated in the reporting year. 3. Sustainable Aviation Fuel (SAF): SAF shows an 90% fossil CO₂ mitigation in comparison to fossil fuel. In the reporting year, the LHG became a launching customer for synthetic kerosene from the world's first industrial production facility for PtL fuel in Werlte. Furthermore in the short term (2022-24), up to USD 250m (EUR 234m) has been released for the procurement of SAF on the spot market by decision of the Executive Board. Note: Due to the COVID-19 pandemic, the passenger load factor of LHG aircraft in 2020/21 was only just over 60% and thus far below the passenger load factor from 2019 (82.6%). For this reason, the value stated in the "% of target achieved relative to base year" field is still negative. LHG does not expect annual average load factors of >80% again until 2023/2024.

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to increase low-carbon energy consumption or production

Net-zero target(s)

Other climate-related target(s)

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number

Low 1

Year target was set

2019

Target coverage

Country/region

Target type: energy carrier

Electricity

Target type: activity

Consumption

Target type: energy source

Renewable energy source(s) only

Base year

2019

Consumption or production of selected energy carrier in base year (MWh)

540476

% share of low-carbon or renewable energy in base year

14

Target year

2021

% share of low-carbon or renewable energy in target year

100

% share of low-carbon or renewable energy in reporting year

100

% of target achieved relative to base year [auto-calculated]

100

Target status in reporting year

Achieved

Is this target part of an emissions target?

This target is part of our target to aim for carbon neutral ground operations at LHG in Germany, Austria, Switzerland and Belgium until 2030 (see C4.1a Abs. 4). In March 2019 the Lufthansa Group Executive Board adopted the goal of transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030. This is including the use of 100 % renewable energy sources at all LHG facilities in these home market countries as soon as possible.

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain target coverage and identify any exclusions

In March 2019 the Lufthansa Group Executive Board adopted the goal of transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030. This is including the use of 100 % renewable energy sources at all LHG facilities in these home market countries as soon as possible. The switch to 100 % renewable energy sources was started in Januar 2020. The target is valid for buildings that were fully and directly owned or rented by LHG. Not included in this target are buildings that LHG has rented and has no influence on the choice of electricity supply. In this region this accounted for an residual amount of approximately 8 percent in electricity consumption in the reporting year.

Plan for achieving target, and progress made to the end of the reporting year

<Not Applicable>

List the actions which contributed most to achieving this target

Switch to green electricity and to green electricity certificates HKN neu in Germany.

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number

Oth 1

Year target was set

2019

Target coverage

Country/region

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Low-carbon vehicles	Percentage of low-carbon vehicles in company fleet
---------------------	--

Target denominator (intensity targets only)

<Not Applicable>

Base year

2019

Figure or percentage in base year

10

Target year

2030

Figure or percentage in target year

100

Figure or percentage in reporting year

10

% of target achieved relative to base year [auto-calculated]

0

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes it is part of LHG's target for a transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030.

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain target coverage and identify any exclusions

In March 2019 the Lufthansa Group Executive Board adopted the goal of transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030. That means that LHG aims to switch all own ground vehicles used at the airports in these countries to a low carbon energy. This is including also the use of 100 % renewable energy sources at all LHG facilities in these home countries as soon as possible (see target "C4.2a Low1"). The switch to 100 % renewable energy sources has been started in January 2020. In 2019, LHG has started to draw up a plan for the necessary steps for a transformation to low carbon ground mobility and to hold talks with the relevant system partners. The next step in the process is now to determine how a gradual implementation is to take place.

Plan for achieving target, and progress made to the end of the reporting year

The 10 % share in low-carbon vehicles in the current company fleet mentioned above is a rough estimate. Exact shares are not available at present. Due to the COVID-19 situation no investment in new low-carbon vehicles was possible in 2020 and 2021. An order was placed for two e-powered transporters but delivery is still pending due to delivery problems on the manufacturer's side. The LHG's ground handling company LEOS, a business unit of the LHG, had two hybrid aircraft towing vehicles in service at Frankfurt airport already in 2021. LHG ground handling company LEOS is the launch customer of an all-electric towbar-less aircraft tractor named Phoenix E. Lufthansa will put two of them into service in 2022. The Phoenix E moves aircraft with a take-off weight of up to 352 tons. The first of these new e-vehicles powered by green electricity was already delivered to LEOS this March and will be in operation at Frankfurt airport for up to ten hours a day. The daily energy requirement for up to 20 towing jobs per vehicle is almost twice as high as the battery capacity. The thermo-controlled lithium-ion battery system allows rapid recharging even during short interruptions to work, which is carried out utilizing a dedicated charging infrastructure. Charging is done with green electricity. Further a project has been initiated in 2021 to implement the necessary loading infrastructure, a major prerequisite for the planned expansion of e-mobility on airport-premises and at LHG owned or rented parking lots and garages. These implementation processes are financially and technically complex and there are many stakeholders involved, especially when airport premises are concerned, so a solid road map has to be implemented in regards to the loading infrastructure, before orders for a greater number of e-vehicles can be placed.

List the actions which contributed most to achieving this target

<Not Applicable>

C4.2c

(C4.2c) Provide details of your net-zero target(s).

Target reference number

NZ1

Target coverage

Company-wide

Absolute/intensity emission target(s) linked to this net-zero target

Abs4

Abs5

Int1

Target year for achieving net zero

2050

Is this a science-based target?

No, but we are reporting another target that is science-based

Please explain target coverage and identify any exclusions

LHG is committed to a net zero target by 2050 covering its scope 1 emissions. To achieve this target, LHG will rely on a mixture of reductions, CO2 removals and/or CO2 compensation. It is expected that SAF will become the most important mitigation option anywhere between 2030 and 2040. Against this background, LHG fosters SAF innovation through the clean tech hub, e.g. solar fuels (Synhelion partnership) to increase the number of technologies and suppliers on the market. Electric/hydrogen aircraft may also play a role after 2035. With reference to ground operations from vehicles - LHG has also committed to a separate CO2 target (C4.1a Abs 4).

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?

Yes

Planned milestones and/or near-term investments for neutralization at target year

In the wider context of the net zero target, the medium term targets for 2030 act as milestones. LHG will mitigate its net Scope 1 emissions in 2030 by 50 % vs. 2019 (s. C4.1a Abs 5). Also, a science based intensity target has been validated for 2030 that defines the minimum share of emission reductions embedded in the net emission target for 2030. Some near- to mid-term investments for reaching the target: LHG develops retrofits to further reduce the emissions of the existing fleet (e.g. Aeroshark). In 2021 ten new, more fuel-efficient aircraft put into operation. In return, a total of 55 older aircraft left the Group fleet. Additionally LHG signed leases for four modern and fuel-efficient Airbus A350-900 aircraft in 2021. It also purchased five additional Boeing 787-9 long-haul aeroplanes. These nine jets are planned to join the LHG fleet in 2022. The emissions of these aircraft are up to 30% less than with the predecessor models. In total LHG has fixed orders about 175 new aircrafts between 2022 and 2029. Order commitments for aircraft and reserve engines amount to EUR 14.3bn (previous year: EUR 12.9bn). Furthermore, in order to safeguard the supply of SAF in the long term, the LHG has developed a three-pronged strategy: 1. In the short term (until 2024), up to USD 250m (EUR 234m) has been released for the procurement of SAF on the spot market by decision of the Executive Board (s. C4.1a Abs 5). 2. In the medium term, options for long-term supply commitments are under consideration around the world. These offer significant production volumes and security of supply from around 2025 onwards. 3. In the long term, the CleanTech Hub established at the LHG will provide support for innovative supply concepts with the goal of transforming today's start-ups and developers into tomorrow's suppliers.

Planned actions to mitigate emissions beyond your value chain (optional)

LHG takes action outside the company (CO2 removals or CO2 compensation measures). In the future, we will extend our reporting to mitigate emissions beyond LHG's value chain, e.g. emissions by crew travel between airport and hotel, catering cradle-to-gate emissions and end-of-life emissions caused by scrapping old aircrafts and turbines. LHG plans to demand SAF suppliers to deliver SAF with a constant high emission advantage over fossil jet fuel.

Target reference number

NZ2

Target coverage

Country/region

Absolute/intensity emission target(s) linked to this net-zero target

Abs4

Target year for achieving net zero

2030

Is this a science-based target?

No, but we are reporting another target that is science-based

Please explain target coverage and identify any exclusions

In March 2019 the Lufthansa Group Executive Board adopted the goal of transition into CO2-neutral mobility on the ground in Germany, Austria, Switzerland and Belgium until 2030. That means that LHG aims to switch all own ground vehicles used at the airports in these countries to a low carbon energy. This is including also the use of 100 % renewable energy sources at all LHG facilities in these home market countries as soon as possible (see target "C4.2a Low1"). The switch to 100 % renewable energy sources have been started in January 2020. In 2019, LHG has started to draw up a plan for the necessary steps for a transformation to low carbon ground mobility and to hold talks with the relevant system partners. The next step in the process is now to determine how a gradual implementation is to take place.

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?

Unsure

Planned milestones and/or near-term investments for neutralization at target year

<Not Applicable>

Planned actions to mitigate emissions beyond your value chain (optional)

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	502	
To be implemented*	39	34279
Implementation commenced*	14	20463
Implemented*	8	43004
Not to be implemented	3643	

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

20135

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

2732000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

SESAR - Efficient Flight Profile (EFP) - Low Demand Concept (project by Lufthansa Airlines, a business unit of the LHG). The Efficient Flight Profile (EFP) supports the Continuous Decent Operations (CDO) by a coordination of Top of Decent Point between Cockpit and Air Traffic Control (ATC). It optimizes vertical flight profile, speeds and therefore fuel-burn between upper airspace and Initial Approach Fix (IAF), the beginning of the initial approach.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

11856

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

1757000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Analyzed contingency fuel (ACF) - statistic based contingency fuel (SCF) (project by Lufthansa Cargo, a business unit of the LHG). Contingency fuel is calculated based on statistic analysis according to EASA Air Ops, Annex IV CAT Subpart B AMC & GM to CAT.OP.MPA.150 (b) and is therefore more reliable and mostly lower compared to other calculation methods.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

3468

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

417000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

SESAR - Efficient Flight Profile (EFP) - low demand concept (project by Lufthansa Cargo, a business unit of the LHG). The Efficient Flight Profile (EFP) supports the Continuous Descent Operations (CDO) by a coordination of top of decent point between cockpit and Air Traffic Control (ATC). It optimizes vertical flight profiles, speeds and therefore fuel-burn between upper airspace and Initial Approach Fix (IAF), the beginning of the initial approach.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

4466.99

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

0

Investment required (unit currency – as specified in C0.4)

0

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

Cost index reduction due to crew short time work (project by Lufthansa Airlines, a business unit of the LHG). Due to the COVID-19 crisis the crew costs have been eliminated from the cost index logic. This leads to a reduced cost index with reduced fuel consumption.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

488

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

100000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Adjustment of standard fuel flows of the Airbus fleets (project by Lufthansa Airlines, a business unit of the LHG). Safety department adjusted standard extra fuel flows, which will lead to changes in extra-fuel and transport-fuel. Reductions for A320Neo (2,0 t/h) A350 (5,4t/h) and increases for A330 (5,4t/h) and A346 (8,4t/h) lead to an overall reduction effect.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

725

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

113000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

E195 wheel fairing modification (project by Austrian Airlines, a business unit of the LHG). Development of an improved main landing gear wheel fairing for the E195 fleet to reduce aircraft drag to reduce fuel consumption.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

1727

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

449000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

A32x Engine Swap Program (project by Swiss Airlines, a business unit of the LHG). Swap and install "fittest" engines on airplanes where most fuel burn occurs in combination with a life cycle limit optimization.

Initiative category & Initiative type

Transportation	Company fleet vehicle efficiency
----------------	----------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

137

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

20000

Investment required (unit currency – as specified in C0.4)

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

MODRU Departure ex DUS (project by Eurowings, a business unit of the LHG). Satellite-based RNP departure route (SID) MODRU1T is active since August 2020 and reduces fuel-consumption by on average 25kg per flight.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Financial optimization calculations	The LHG uses an internal carbon price (price range), which is mainly used by environmental-, strategy-, risk controlling-, sales-, fuel- and aircraft procurement-teams, this typically by taking into account the costs of current and (possible) future regulations (e.g. EU ETS, CORSIA). This means that the CO2 price risk is increasingly taken into account in investment- or project-decisions. The risk controlling department prepares monthly reports on the current and forecast development of the CO2 market price and calculates the potential cost impact on the LHG. The LHG is also active in the voluntary carbon market and purchases project-based carbon credits for its corporate and private customer carbon offsetting program. A calculated internal CO2 price is used for this voluntary offer. As part of its green electricity target LHG is also purchasing green energy certificates (scope 2). Therefore LHG calculate an 'implicit carbon price' for carbon free electricity supply.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

No taxonomy used to classify product(s) or service(s) as low carbon

Type of product(s) or service(s)

Biofuels	Other, please specify (Sustainable Aviation Fuel (SAF))
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Description of product(s) or service(s)

The new LHG product „Sustainable Choices“ gives business clients of the Lufthansa Group the option to offset carbon dioxide from individual shipments through climate projects or in combination with sustainable fuel. The sustainable aviation fuel that is already used by the LHG today is produced using materials of biogenic origins, such as used cooking oils and fats. It does not conflict with the farming of food products as only waste from tree plantations and agriculture is used. In the future, sustainable aviation fuel will be made as well by using renewable energies and the power of the sun: Power to liquid (PtL): the LHG is the first customer for the world's first PtL jet fuel made on an industrial scale. It is manufactured based on power from renewable energies, water and carbon dioxide – from the atmosphere, for example. Sun to liquid (StL): it will also be possible to make sustainable aviation fuel from sunlight in the future. The StL process involves sunlight being concentrated using mirrors and combined with water and carbon dioxide from the surrounding air to manufacture carbon-neutral jet fuel. SWISS will be the first customer for this first solar fuel worldwide.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify (SAF CO2 savings vs. fossil fuel)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Cradle-to-gate

Functional unit used

Using SAF in the LHG fleet vs. operating this fleet by fossil jet fuel only.

Reference product/service or baseline scenario used

-90 % carbon emissions compared to fossil fuel thanks to sustainable fuel of biogenic origins – including production and transport (Well-to-Wheel Accounting)

Life cycle stage(s) covered for the reference product/service or baseline scenario

Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

35456

Explain your calculation of avoided emissions, including any assumptions

By using Sustainable Aviation Fuel (SAF) 35,546 tonnes CO₂ were reduced in the year 2021 (Well-to-Wheel Accounting). Every purchased SAF amount has an separate emission certificate with individual emission factor. In aggregate, LHG calculates with this assumption: CO₂ emission of SAF is equal to 1/10 of fossil jet fuel (10% CO₂ emissions of SAF to take account of SAF production and transport acc. to cradle-to-grave approach), 90% CO₂ saving of SAF per unit.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

0.07

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

Yes, a divestment

Name of organization(s) acquired, divested from, or merged with

LSG Group (Europe only)

Details of structural change(s), including completion dates

The European business of the LSG Group was sold to gategroup at the end of 2020. Therefore the European business of the LSG Group is included in the previous year figures. The non-European business of the LSG Group is not sold yet.

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	No	<Not Applicable>

C5.1c

(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	No, because we do not have the data yet and plan to recalculate next year	A base year correction could only be carried out when the whole LSG group would be sold. This, because base year figures cannot be corrected on a site-by-site basis because historic data of the base years 2015 and 2017 is not available on a site-by-site basis in sufficient quality for eventual correction purposes any more, but only for the whole business unit LSG. Therefore unfortunately an ex-post correction would only be possible for the whole business unit LSG, not for parts of it, as it is the business case today, just having sold the European part and sites of LSG only.

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start

January 1 2015

Base year end

December 31 2015

Base year emissions (metric tons CO2e)

28601347

Comment

In the year 2016 the Scope 1 emissions of the year 2015 were external verified for the first time (with high assurance).

Scope 2 (location-based)

Base year start

January 1 2015

Base year end

December 31 2015

Base year emissions (metric tons CO2e)

343438

Comment

In the year 2016 the Scope 2 emissions of the year 2015 were external verified for the first time (with limited assurance)

Scope 2 (market-based)

Base year start

January 1 2017

Base year end

December 31 2017

Base year emissions (metric tons CO2e)

241338

Comment

Base year for Scope 2 market-based emissions is 2017 because Scope 2 market-based emissions were not available for 2015.

Scope 3 category 1: Purchased goods and services

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

1700

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 2: Capital goods

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

1253000

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

6555144

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

759812

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 5: Waste generated in operations

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

77216

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 6: Business travel

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

38175

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 7: Employee commuting

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

29888

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 8: Upstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 10: Processing of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 11: Use of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 12: End of life treatment of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 13: Downstream leased assets

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

59296

Comment

Base year for Scope 3 emissions is 2016 because Scope 3 emissions were not available for 2015.

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3 category 15: Investments

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

not relevant in scope 3 base year 2016

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

European Union Emission Trading System (EU ETS): The Monitoring and Reporting Regulation (MMR) – General guidance for installations

European Union Emissions Trading System (EU ETS): The Monitoring and Reporting Regulation (MMR) – General guidance for aircraft operators

IPCC Guidelines for National Greenhouse Gas Inventories, 2006

ISO 14064-1

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

The Greenhouse Gas Protocol: Scope 2 Guidance

Other, please specify (Airport Carbon Accreditation of the Airport Council International Europe, IEA EMISSION FACTORS 2021)

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

13823320

Start date

January 1 2021

End date

December 31 2021

Comment

Scope 1 emissions data include direct GHG emissions from aviation passengers, freight, as well as ground operation and stationary installations.

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)

11509756

Start date

January 1 2020

End date

December 31 2020

Comment

Scope 1 emissions data include direct GHG emissions from aviation passengers, freight, as well as ground operation and stationary installations.

Past year 2

Gross global Scope 1 emissions (metric tons CO2e)

33349293

Start date

January 1 2019

End date

December 31 2019

Comment

Scope 1 emissions data include direct GHG emissions from aviation passengers, freight, as well as ground operation and stationary installations.

Past year 3

Gross global Scope 1 emissions (metric tons CO2e)

32790778

Start date

January 1 2018

End date

December 31 2018

Comment

Scope 1 emissions data include direct GHG emissions from aviation passengers, freight, as well as ground operation and stationary installations.

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

Scope 2 location-based figure is calculated with location-based factors (IEA EMISSION FACTORS 2021). Scope 2 market-based figure is calculated with market-based factors for electricity delivered by our energy suppliers where available. For all other sites, where market-based-factors were not available, we used location-based factors to complete the market-based figure.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based

205292

Scope 2, market-based (if applicable)

139496

Start date

January 1 2021

End date

December 31 2021

Comment

Scope 2 location-based figure was calculated with location-based factors (IEA EMISSION FACTORS 2021). Scope 2 market-based figure is calculated with market-based factors for electricity delivered by our energy suppliers where available. For all other sites, where market-based-factors weren't available, we used location-based factors to complete the market-based figure. In the CDP-report, we calculated our Scope 2 location-based emissions as instructed in the CDP-guidance. Therefore, we used location-based factors also for sites, where 100 % green power was used.

Past year 1

Scope 2, location-based

222309

Scope 2, market-based (if applicable)

135183

Start date

January 1 2020

End date

December 31 2020

Comment

Scope 2 location-based figure was calculated with location-based factors (IEA EMISSION FACTORS 2019). Scope 2 market-based figure is calculated with market-based factors for electricity delivered by our energy suppliers where available. For all other sites, where market-based-factors weren't available, we used location-based factors to complete the market-based figure. In the CDP-report, we calculated our Scope 2 location-based emissions as instructed in the CDP-guidance. Therefore, we used location-based factors also for sites, where 100 % green power was used.

Past year 2

Scope 2, location-based

259527

Scope 2, market-based (if applicable)

199817

Start date

January 1 2019

End date

December 31 2019

Comment

Scope 2 location-based figure was calculated with location-based factors (IEA EMISSION FACTORS 2019). Scope 2 market-based figure is calculated with market-based factors for electricity delivered by our energy suppliers where available. For all other sites, where market-based-factors weren't available, we used location-based factors to complete the market-based figure. In the CDP-report, we calculated our Scope 2 location-based emissions as instructed in the CDP-guidance. Therefore, we used location-based factors also for sites, where 100 % green power was used.

Past year 3

Scope 2, location-based

237771

Scope 2, market-based (if applicable)

194059

Start date

January 1 2018

End date

December 31 2018

Comment

Scope 2 location-based figure is calculated with location-based factors (IEA EMISSION FACTORS 2019). Scope 2 market-based figure is calculated with market-based factors for electricity delivered by our energy suppliers where available. For all other sites, where market-based-factors weren't available, we used location-based factors to complete the market-based figure. In the CDP-report, we calculated our Scope 2 location-based emissions as instructed in the CDP-guidance. Therefore, we used location-based factors also for sites, where 100 % green power was used.

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source

Non-owned offices in countries outside of Europe: Small offices that are used but not owned by LHG. Incomplete information for the period in question.

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source (if applicable)

Emissions are not relevant

Explain why this source is excluded

Emissions from some small non-owned-office buildings which usually have a very small energy consumption and where no energy consumption data is available.

Estimated percentage of total Scope 1+2 emissions this excluded source represents

1

Explain how you estimated the percentage of emissions this excluded source represents

The by far biggest share of the joint scope 1+2 emissions of the LHG are caused by flight fuel burned in aircraft (98,3 % of the combined scope 1 and 2 market based emissions) and further by the great number of the major group companies and their ground facilities that are included in the certified scope 1+2 data. Therefore the emissions from some small non-owned-office buildings which usually have a very small energy consumption and where no energy consumption data is available is most probably even well below 1 percent of total scope 1+2 emission.

Source

Ground vehicles: vehicles used for ground operation at smaller airports. Incomplete information for the period in question. Data gaps exist for certain group airlines, business units and in certain operating destinations.

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source (if applicable)

Emissions are not relevant

Explain why this source is excluded

Incomplete information for the period in question. Data gaps exist for certain group airlines, business units and in certain operating destinations.

Estimated percentage of total Scope 1+2 emissions this excluded source represents

1

Explain how you estimated the percentage of emissions this excluded source represents

The by far biggest share of the joint scope 1+2 emissions of the LHG are caused by flight fuel burned in aircraft (98,3 % of the combined scope 1 and 2 market based emissions) and further by the great number of the major group companies and their ground vehicles that are included in the certified scope 1+2 data. Therefore the emissions from ground vehicles used for ground operation at smaller airports where no energy consumption data is available is most probably even well below 1 percent of total scope 1+2 emission.

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

10910

Emissions calculation methodology

Other, please specify (Based on the assumption that GHG emissions from the production of aircraft and flight simulators are about the same, emissions were estimated in equivalence to the emissions from aircraft manufacturing.)

Percentage of emissions calculated using data obtained from suppliers or value chain partners

30

Please explain

This category includes GHG emissions from the production of flight simulators, which LHG bought in 2021. Based on the assumption that GHG emissions from the production of aircraft and flight simulators are about the same in the first order, emissions were estimated in equivalence to the emissions from aircraft manufacturing. In 2021 LHG has bought five new flight simulators (two small sized aircraft models, one medium and two large sized aircraft models). Emissions from aircraft / engine manufacturing are relevant to LHG. According to the GHG Protocol these can be accounted either for "Purchased goods and services" or "Capital goods" (cp. "Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol, p.23). Hence, GHG emissions from aircraft and engine manufacturing were accounted to capital goods. This category includes GHG emissions from the production of flight simulators, which LHG bought in 2021.

Capital goods

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

245700

Emissions calculation methodology

Other, please specify (Aircraft / Engine manufacturing: GHG emissions which are emitted through the process of aircraft and engine manufacturing. The emission factor derives from a research paper published by the University of California (Berkeley) in 2008.)

Percentage of emissions calculated using data obtained from suppliers or value chain partners

30

Please explain

The emissions calculated reflect the LHG aircraft deliveries in 2021. In 2021 the LHG has entered into service 11 new aircraft (9 medium sized and 1 large sized aircraft in LHG ownership as well as 1 leased aircraft, which is not accounted for here due to its leased status). Aircraft / Engine manufacturing: GHG emissions which are emitted through the process of aircraft and engine manufacturing. The emission factor derives from a research paper published by the University of California (Berkeley) in 2008. Therefore, LHG accounts for the total cradle-to-gate emissions of purchased aircraft/engines in the year of acquisition. Ref: Chester, M./ Horvath, A. (2008): Environmental Life-cycle Assessment of Passenger Transportation: A Detailed Methodology for Energy, Greenhouse Gas, and Criteria Pollutant Inventories of Automobiles, Buses, Light Rail, Heavy Rail and Air. (Working Paper) UC Berkeley Centre for Future Urban Transport: Berkeley. (UCB-ITS-VWP-2008-2).

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

3109427

Emissions calculation methodology

Average data method

Other, please specify (Upstream emissions of purchased fuels: CO₂ emissions that are emitted along the supply chain of kerosene (Well-to-Tank-Process). The calculation is based on the burned kerosene by all aircraft and on the emission factor from the DIN EN Standard 16258)

Percentage of emissions calculated using data obtained from suppliers or value chain partners

70

Please explain

According to Greenhouse Gas Protocol aggregated number from the following subcategories: A) Upstream emissions of purchased fuels: CO₂ emissions which are emitted along the supply chain of kerosene (Well-to-Tank-Process). The calculation is based on the burned kerosene by all aircraft (those emissions are reported in Scope 1) and on the emission factor from the DIN EN Standard 16258. B) Upstream emissions of purchased electricity: The calculation is based on emission factors from the DEFRA 2021 (Government emission conversion factors for greenhouse gas company reporting). The calculation method is based on the average-data method according to the "Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol (p.32 and following). C) transmission and distribution losses: The calculation is based on electric power and district heating transmission and distribution loss rates for the respective country from IEA Emissions factors 2021 (Upstream T&D losses electricity) and DEFRA, 2021 (Government emission conversion factors for greenhouse gas company reporting) . The calculation method is based on the average-data method according to the "Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol (p.34). Estimates for the subcategory "D) Generation of purchased electricity that is sold to end users" were not conducted since it is not applicable to Lufthansa.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

766768

Emissions calculation methodology

Distance-based method

Site-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

80

Please explain

Aggregated number from the following subcategories: - Flights for LHG services operated by third parties documented in our operational data-warehouse systems. These third parties are neither fully owned nor controlled by LHG. Distance based method used to calculate these emissions - The Road Feeder Service, which transports airfreight by trucks from its initial origin to the airport, respectively from the airport to its final destination. Trucks are neither owned nor controlled by LHG. The emissions factor used was derived from the CLECAT-study ("Calculating GHG Emissions for Freight Forwarding and Logistics Services" (2012)) using the distance based method - Airport operation: The GHG emissions which result from airport operation. Site-specific method used. The data was requested from the LHG's main hubs (Frankfurt, Munich, Zurich, Vienna), which also report their emissions according to the GHG Protocol. According to the GHG Protocol life cycle emissions associated with manufacturing vehicles, facilities or infrastructure can be included in this category optionally (cp. "Guidance for Calculating Scope 3 emissions" from the Greenhouse Gas Protocol, p.4). The main part of the emissions in this category are resulting from airport operation. Further in this category emissions from flights by third parties performing flights for the LHG and ground based transportation performed by third parties are included.

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

82237

Emissions calculation methodology

Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

70

Please explain

Waste data for 2021 was only available partly. Waste generated at German locations is available for most of the LHG's companies. For LSG Sky Chefs, which is responsible for the major part of the waste generated, international data is included, originating from 2020. The major part of the waste is generated by LSG, Lufthansa Group's catering company. Since this company operates in countries all over the world, with facilities in big cities, as well as developing countries, tracking down waste precisely can be difficult. Still, we are improving the data coverage every year. Growing numbers do not automatically indicate more waste, they can also be explained by growing data coverage.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

21432

Emissions calculation methodology

Distance-based method

Other, please specify (The emissions for staff accommodation were calculated based on an average crew size and layover duration.)

Percentage of emissions calculated using data obtained from suppliers or value chain partners

30

Please explain

Business travel includes only flights operated by other airlines (using the distance-based method), since flights operated by LHG airlines are already included in Scope 1. Business travel also contains staff accommodation . Please note that all business travel of LHG employees was accounted for with a zero emission factor due to the fact that it was fully compensated in 2020. The emissions for staff accommodation and business flights were not significant for the LHG as they amounted to less than 1% of the Scope 3 emissions in the past two years. The emissions for staff accommodation were calculated based on an average crew size and layover duration with emission factors for hotel stays by hotel type. This category is classified as "not relevant, calculated" if the share of calculated Scope 3 emissions is <1% of total Scope 3 emissions in the reporting year.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

29823

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

50

Please explain

The emissions from employee commuting were calculated based on the "Mikrozensus 2020", a nationwide, governmental study that includes average commuting habits in Germany. Emissions factor actualized by using new data from Umweltbundesamt Germany. Since such data was not available for other countries the data was extrapolated to all LHG employees. Due to the pandemic-related increase of short-time work and the share of employees working from their home-offices, the emissions accounted for 2021 was reduced by 50%.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Emissions from operating leased assets within the Lufthansa Group are accounted for in Scope 1 and Scope 2.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

According to the GHG Protocol "this category includes emissions from transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer in vehicles and facilities not owned or controlled by the reporting company" ("Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol, p.70). Within the LHG mainly transportation, maintenance and IT services are provided. These services are no physical products and hence cannot be sold or processed again. Products sold by LHG's catering service are transported in own vehicles and are therefore accounted for in Scope 1 emissions.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Within the LHG mainly transportation, maintenance and IT services are provided. These services are no physical products and hence cannot be sold or processed again. Therefore, emissions from processing of sold intermediate products by third parties in this category are not relevant to LHG (cp. "Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol, p.72).

Use of sold products

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Within the LHG mainly transportation, maintenance and IT services are provided. These services are not physical products and hence cannot be sold or processed again. Therefore, emissions from the use of sold goods and services by the end user are not relevant to LHG (cp. "Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol, p.77).

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Within the LHG mainly transportation, maintenance and IT services are provided. These services are not physical products and hence cannot be sold or processed again. Therefore, end-of-life emissions from sold products due to waste disposal and treatment are not relevant to LHG (cp. Guidance for Calculating Scope 3 Emissions" from the Greenhouse Gas Protocol, p.88).

Downstream leased assets

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO₂e)

401252

Emissions calculation methodology

Other, please specify (The calculation is based on the Lufthansa Group's respective aircraft's internal fuel consumption of the respective leased aircraft type as a representative figure and extrapolated to the respective number of aircraft and their time of lease-out.)

Percentage of emissions calculated using data obtained from suppliers or value chain partners

80

Please explain

Emissions resulting from aircraft owned by the LHG and leased to other airlines outside the LHG. The calculation is based on the assumption that the leased aircraft have a similar capacity and fuel consumption as the respective aircraft types within the Lufthansa Group. Therefore, the calculation is based on the internal fuel consumption of the respective leased aircraft type as a representative figure and extrapolated to the respective number and time of lease.

Franchises

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

The Lufthansa Group does not operate franchises, therefore this category is not relevant.

Investments

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

LHG has made financial investments, but they only account for a small share of total investments. Within the LHG the main investments are done in transportation infrastructure, maintenance and IT services. Therefore, emissions related to financial investments are not calculated.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

There are no other Scope 3 upstream emissions which need to be accounted for. All relevant upstream emissions are covered by the upstream emission categories above.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO₂e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

There are no other Scope 3 downstream emissions which need to be accounted for. All relevant downstream emissions are covered by the downstream emission categories above.

(C6.5a) Disclose or restate your Scope 3 emissions data for previous years.**Past year 1****Start date**

January 1 2020

End date

December 31 2020

Scope 3: Purchased goods and services (metric tons CO2e)

0

Scope 3: Capital goods (metric tons CO2e)

473200

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

2599885

Scope 3: Upstream transportation and distribution (metric tons CO2e)

158701

Scope 3: Waste generated in operations (metric tons CO2e)

187837

Scope 3: Business travel (metric tons CO2e)

17740

Scope 3: Employee commuting (metric tons CO2e)

20865

Scope 3: Upstream leased assets (metric tons CO2e)**Scope 3: Downstream transportation and distribution (metric tons CO2e)****Scope 3: Processing of sold products (metric tons CO2e)****Scope 3: Use of sold products (metric tons CO2e)****Scope 3: End of life treatment of sold products (metric tons CO2e)****Scope 3: Downstream leased assets (metric tons CO2e)**

33593

Scope 3: Franchises (metric tons CO2e)**Scope 3: Investments (metric tons CO2e)****Scope 3: Other (upstream) (metric tons CO2e)****Scope 3: Other (downstream) (metric tons CO2e)****Comment**

note: all categories left empty were verified as "not relevant" by the auditors in the respective past year.

Past year 2

Start date

January 1 2019

End date

December 31 2019

Scope 3: Purchased goods and services (metric tons CO2e)

12100

Scope 3: Capital goods (metric tons CO2e)

806400

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

7892623

Scope 3: Upstream transportation and distribution (metric tons CO2e)

1441305

Scope 3: Waste generated in operations (metric tons CO2e)

270601

Scope 3: Business travel (metric tons CO2e)

62959

Scope 3: Employee commuting (metric tons CO2e)

37867

Scope 3: Upstream leased assets (metric tons CO2e)

Scope 3: Downstream transportation and distribution (metric tons CO2e)

Scope 3: Processing of sold products (metric tons CO2e)

Scope 3: Use of sold products (metric tons CO2e)

Scope 3: End of life treatment of sold products (metric tons CO2e)

Scope 3: Downstream leased assets (metric tons CO2e)

64854

Scope 3: Franchises (metric tons CO2e)

Scope 3: Investments (metric tons CO2e)

Scope 3: Other (upstream) (metric tons CO2e)

Scope 3: Other (downstream) (metric tons CO2e)

Comment

note: all categories left empty were verified as "not relevant" by the auditors in the respective past year.

Past year 3

Start date

January 1 2018

End date

December 31 2018

Scope 3: Purchased goods and services (metric tons CO2e)

1700

Scope 3: Capital goods (metric tons CO2e)

1236900

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

7322938

Scope 3: Upstream transportation and distribution (metric tons CO2e)

1722371

Scope 3: Waste generated in operations (metric tons CO2e)

310590

Scope 3: Business travel (metric tons CO2e)

353181

Scope 3: Employee commuting (metric tons CO2e)

35677

Scope 3: Upstream leased assets (metric tons CO2e)

Scope 3: Downstream transportation and distribution (metric tons CO2e)

Scope 3: Processing of sold products (metric tons CO2e)

Scope 3: Use of sold products (metric tons CO2e)

Scope 3: End of life treatment of sold products (metric tons CO2e)

Scope 3: Downstream leased assets (metric tons CO2e)

105970

Scope 3: Franchises (metric tons CO2e)

Scope 3: Investments (metric tons CO2e)

Scope 3: Other (upstream) (metric tons CO2e)

Scope 3: Other (downstream) (metric tons CO2e)

Comment

note: all categories left empty were verified as "not relevant" by the auditors in the respective past year.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

No

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.000831

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

13962816

Metric denominator

unit total revenue

Metric denominator: Unit total

1681100000

Scope 2 figure used

Market-based

% change from previous year

2.8

Direction of change

Decreased

Reason for change

Relative increase of combined scope 1 and scope 2 emissions 2021 versus 2020 of the Lufthansa group was smaller than the relative increase of the total revenue of the group. This was due to a more energy efficient operation based on the LHG's annual revenue figure development in 2021 compared to 2020.

C-TS6.15

(C-TS6.15) What are your primary intensity (activity-based) metrics that are appropriate to your emissions from transport activities in Scope 1, 2, and 3?

Aviation

Scopes used for calculation of intensities

Report just Scope 1

Intensity figure

0.000882

Metric numerator: emissions in metric tons CO2e

13823320

Metric denominator: unit

t.km

Metric denominator: unit total

15673900427

% change from previous year

-2.1

Please explain any exclusions in your coverage of transport emissions in selected category, and reasons for change in emissions intensity.

Data include all passenger and freight flights of LHG aircraft. Exclusion of ground based freight transport (all with subcontractors). The intensity figure represents the CO2-emissions in t CO2 per revenue tonne kilometer transported (RTK). The decrease in emission intensity is owed to a better overall flight efficiency in 2021 compared to 2020.

ALL

Scopes used for calculation of intensities

Intensity figure

Metric numerator: emissions in metric tons CO2e

Metric denominator: unit

Metric denominator: unit total

% change from previous year

Please explain any exclusions in your coverage of transport emissions in selected category, and reasons for change in emissions intensity.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

No

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
Other, please specify (International Airspace)	13727945
Germany	40791
Other, please specify (Rest of world)	54583

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By activity

C7.3c

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

Activity	Scope 1 emissions (metric tons CO2e)
Catering	42948
Aircraft Maintenance, repair and overhaul (LHT)	43753
Aircraft & ground operations of passenger airlines	12330411
Cargo	1400363
Services (IT, Flight Training, additional customer services like miles&more)	5845

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions, metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (midstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	13724928	<Not Applicable>	For the LHG, transport service activities as a sector production activity only imply aircraft operations, not ground operations. Therefore, sector-specific Scope 1 emissions include the emissions from the aircraft fleet of LHG (verified with a high assurance).

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Germany	111524	51091
Other, please specify (Rest of the world (without Germany))	93768	88405

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By activity

C7.6c

(C7.6c) Break down your total gross global Scope 2 emissions by business activity.

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Catering (kitchen, storing facilities etc.)	52349	52349
Aircraft Maintenance, repair and overhaul (LHT)	59557	33642
Airline Offices (Administration)	58802	38132
Cargo	19428	10445
Services (IT, Flight Training, additional customer services like miles&more)	15155	4927

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (midstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	78231	48577	For the LHG, sector production activities are transport services activities. Sector-specific location-based and market based Scope 2 emissions include the emissions from the LHG airlines Lufthansa German Airline, Lufthansa City Line, Brussels Airlines, Eurowings, Eurowings Discover, Germanwings, Air Dolomiti, SWISS, Austrian Airlines and Lufthansa Cargo verified with a limited assurance. Sector-specific market-based Scope 2 emissions of LHG airlines include sites in Germany, Austria, Belgium and Switzerland, which provided market-based factors and all other sites, where only location-based factors were available.

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption		<Not Applicable>		
Other emissions reduction activities		<Not Applicable>		
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output	2317877	Increased	19.9	Due to the COVID-19 Pandemic a significantly reduced air transport capacity was still offered by the Lufthansa Group's airlines in 2021. Parts of the fleets were still grounded and the still reduced demand compared to pre-pandemic years was mainly met by employing the most fuel efficient modern aircraft of the LHG fleet. Since air traffic demand nevertheless took up in 2021 compared to 2020, flight production was increased (t.km +22.7 %), leading to a higher kerosene consumption and accordingly to rising emissions (+19,9%). The rise in emissions was nevertheless lower than the rise in production, so production was more CO2-efficient in 2021 compared to 2020. Note: flight fuel emissions account with a share of 98,3% for the major part of the LHG's combined Scope 1+2 emissions. The change in output was calculated as follows: total Scope 1+2 2021 minus total Scope 1+2 2020= +2.317.877 t CO2e (13.962.816 t CO2e - 11.644.939 t CO2e). Calculation of percentage change CO2e: (+2.317.877 t CO2e/11.644.939 t CO2e)*100= +19,9%. The change in flight production (t.km) was calculated as follows: flight production in 2021 minus flight production in 2020= +2.895.426.889 t.km (15.673.900.427 t.km-12.778.473.538 t.km). Calculation of percentage change: (+2.895.426.889 t.km/12.778.473.538)*100= +22,7%
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 10% but less than or equal to 15%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	0	53817971	53817971
Consumption of purchased or acquired electricity	<Not Applicable>	41503	360530	402032
Consumption of purchased or acquired heat	<Not Applicable>	0	119811	119811
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	0	119811	119811
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	41503	54418123	54459626

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Other biomass

Heating value

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Other renewable fuels (e.g. renewable hydrogen)

Heating value

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Coal

Heating value

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Oil**Heating value**

LHV

Total fuel MWh consumed by the organization

4018

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment**Gas****Heating value**

LHV

Total fuel MWh consumed by the organization

301739

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

52212

Comment

In the combined heat and power plant ("BHKW") of Lufthansa Technik in Hamburg 52.212 MWh of natural gas were consumed in 2021 to generate 20.255,64 MWh of electricity and 20.204,76 MWh of heat. It is not possible to split up the overall gas consumption of the combined heat- and powerplant into separate fragments of gas consumed for the electricity production and gas consumed for the heat generation due to different efficiency grades of electricity generation and of heat generation.

Other non-renewable fuels (e.g. non-renewable hydrogen)**Heating value**

LHV

Total fuel MWh consumed by the organization

53510600

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

Total fuel

Heating value

LHV

Total fuel MWh consumed by the organization

53816357

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	20255.64	20255.64	0	0
Heat	20204.76	20204.76	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

Austria

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

19561

Country/area of origin (generation) of the low-carbon energy or energy attribute

Austria

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

Belgium

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

3277

Country/area of origin (generation) of the low-carbon energy or energy attribute

Belgium

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

Germany

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

1867

Country/area of origin (generation) of the low-carbon energy or energy attribute

Germany

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

Ireland

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

9825

Country/area of origin (generation) of the low-carbon energy or energy attribute

Ireland

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

Switzerland

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

1503

Country/area of origin (generation) of the low-carbon energy or energy attribute

Switzerland

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

United Kingdom of Great Britain and Northern Ireland

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

2380

Country/area of origin (generation) of the low-carbon energy or energy attribute

United Kingdom of Great Britain and Northern Ireland

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Low-carbon energy mix, please specify (green electricity mix)

Country/area of low-carbon energy consumption

United States of America

Tracking instrument used

Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

2629

Country/area of origin (generation) of the low-carbon energy or energy attribute

United States of America

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2021

Comment

Since the green electricity sourced usually is a green energy mix from a multitude of different green sources and green energy generation facilities, that further may at least partly not be located in the country of consumption it is not possible to state one specific country of generation or one specific commissioning year in this case of mixed sourcing. Therefore as a default the country of origin is set equal to the country of consumption, since usually this is the predominant regional origin of a green energy mix consumed in one country and the commissioning year is set to match the reporting year alternatively.

Sourcing method

Green electricity products from an energy supplier (e.g. green tariffs)

Energy carrier

Electricity

Low-carbon technology type

Small hydropower (<25 MW)

Country/area of low-carbon energy consumption

Germany

Tracking instrument used

Other, please specify (HKN Neu100 certificate of origin and approval of devaluation of certificates of origin issued by MAINOVA AG. Devaluation confirmed by German Umweltbundesamt (part of German Ministry of Environment) in their register of certificates of origin (HKNR))

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

166023

Country/area of origin (generation) of the low-carbon energy or energy attribute

Norway

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

2018

Comment

C8.2g

(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.

Country/area

Argentina

Consumption of electricity (MWh)

1540

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1540

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Austria

Consumption of electricity (MWh)

19644

Consumption of heat, steam, and cooling (MWh)

32024

Total non-fuel energy consumption (MWh) [Auto-calculated]

51668

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Belgium

Consumption of electricity (MWh)

3737

Consumption of heat, steam, and cooling (MWh)

3659

Total non-fuel energy consumption (MWh) [Auto-calculated]

7396

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Benin

Consumption of electricity (MWh)

42

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

42

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Brazil

Consumption of electricity (MWh)

6972

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

6972

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Bulgaria

Consumption of electricity (MWh)

4931

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

4931

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Burundi

Consumption of electricity (MWh)

11

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

11

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Chile

Consumption of electricity (MWh)

2107

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2107

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

China

Consumption of electricity (MWh)

6851

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

6851

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Democratic Republic of the Congo

Consumption of electricity (MWh)

40

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

40

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Côte d'Ivoire

Consumption of electricity (MWh)

37

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

37

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Egypt

Consumption of electricity (MWh)

4453

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

4453

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Estonia

Consumption of electricity (MWh)

214

Consumption of heat, steam, and cooling (MWh)

211

Total non-fuel energy consumption (MWh) [Auto-calculated]

425

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

France

Consumption of electricity (MWh)

32

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

32

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Gambia

Consumption of electricity (MWh)

36

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

36

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Germany

Consumption of electricity (MWh)

182264

Consumption of heat, steam, and cooling (MWh)

174050

Total non-fuel energy consumption (MWh) [Auto-calculated]

356314

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Ghana

Consumption of electricity (MWh)

35

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

35

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Guam

Consumption of electricity (MWh)

1023

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1023

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Hong Kong SAR, China

Consumption of electricity (MWh)

9789

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

9789

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Hungary

Consumption of electricity (MWh)

1899

Consumption of heat, steam, and cooling (MWh)

8235

Total non-fuel energy consumption (MWh) [Auto-calculated]

10134

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

India

Consumption of electricity (MWh)

2154

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2154

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Ireland

Consumption of electricity (MWh)

9825

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

9825

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Italy

Consumption of electricity (MWh)

1383

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1383

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Kenya

Consumption of electricity (MWh)

843

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

843

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Republic of Korea

Consumption of electricity (MWh)

6162

Consumption of heat, steam, and cooling (MWh)

1400

Total non-fuel energy consumption (MWh) [Auto-calculated]

7562

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Latvia

Consumption of electricity (MWh)

404

Consumption of heat, steam, and cooling (MWh)

147

Total non-fuel energy consumption (MWh) [Auto-calculated]

551

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Malta

Consumption of electricity (MWh)

2144

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

2144

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Mexico

Consumption of electricity (MWh)

395

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

395

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

New Zealand

Consumption of electricity (MWh)

5198

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

5198

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Nigeria

Consumption of electricity (MWh)

823

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

823

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Panama

Consumption of electricity (MWh)

1609

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1609

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Philippines

Consumption of electricity (MWh)

13276

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

13276

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Poland

Consumption of electricity (MWh)

3463

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

3463

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Puerto Rico

Consumption of electricity (MWh)

3245

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

3245

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Russian Federation

Consumption of electricity (MWh)

18094

Consumption of heat, steam, and cooling (MWh)

1048

Total non-fuel energy consumption (MWh) [Auto-calculated]

19142

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Rwanda

Consumption of electricity (MWh)

10

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

10

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Senegal

Consumption of electricity (MWh)

21

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

21

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Sierra Leone

Consumption of electricity (MWh)

6

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

6

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

South Africa

Consumption of electricity (MWh)

318

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

318

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Spain

Consumption of electricity (MWh)

9

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

9

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Switzerland

Consumption of electricity (MWh)

12141

Consumption of heat, steam, and cooling (MWh)

18849

Total non-fuel energy consumption (MWh) [Auto-calculated]

30990

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

United Republic of Tanzania

Consumption of electricity (MWh)

1379

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1379

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Thailand

Consumption of electricity (MWh)

5215

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

5215

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Togo

Consumption of electricity (MWh)

52

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

52

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Uganda

Consumption of electricity (MWh)

10

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

10

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

United Arab Emirates

Consumption of electricity (MWh)

204

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

204

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

United Kingdom of Great Britain and Northern Ireland

Consumption of electricity (MWh)

3377

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

3377

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

United States of America

Consumption of electricity (MWh)

62871

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

62871

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

United States Minor Outlying Islands

Consumption of electricity (MWh)

701

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

701

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

Country/area

Venezuela (Bolivarian Republic of)

Consumption of electricity (MWh)

1044

Consumption of heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

1044

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

C-TS8.5

(C-TS8.5) Provide any efficiency metrics that are appropriate for your organization's transport products and/or services.

Activity

Aviation

Metric figure

0.348

Metric numerator

Liters of fuel

Metric denominator

t.km

Metric numerator: Unit total

5449156785

Metric denominator: Unit total

15673900427

% change from last year

-1.6

Please explain

The main driver of this efficiency gain in aviation fuel consumption was the fact that the LHG succeeded in transporting 22,7% more passengers and freight in 2021 compared to 2020 (expressed by an increase of the metric denominator t.km 2021 versus previous year) whilst burning over-proportionally less aviation fuel (just 20,7 % more versus previous year), leading to a decrease of specific aviation fuel consumption per tonne kilometer of 1,6 %, a significant efficiency gain.

Activity

Please select

Metric figure

Metric numerator

Please select

Metric denominator

<Not Applicable>

Metric numerator: Unit total

Metric denominator: Unit total

% change from last year

Please explain

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description

Energy usage

Metric value

3.73

Metric numerator

MWh electricity in reporting year

Metric denominator (intensity metric only)

Average number of employees in reporting year

% change from previous year

5

Direction of change

Increased

Please explain

With the increasing return of employees from COVID-19 induced home-office work to work in the LHG's premises and the uptake of production in the LHG's operative facilities, the average consumption of electricity per employee - taking into account the total average number of employees in the reporting year group-wide - is increasing, an expected development.

C-TO9.3/C-TS9.3

(C-TO9.3/C-TS9.3) Provide tracking metrics for the implementation of low-carbon transport technology over the reporting year.

Activity

Aviation

Metric

Fleet adoption

Technology

Other, please specify (Company Car Leasing: increase in share of low carbon vehicles)

Metric figure

21

Metric unit

Other, please specify (Percentage point increase of the share of low carbon company cars in reporting year 2021 compared to base year 2019)

Explanation

By incentivizing the use of low carbon company cars in Germany, the utilization of these cars was increased by 21 percentage points from about 7% in 2019 to about 28% in 2020. This represents an increase of the electric and hybrid fleet of about 288% in 2021 compared to 2019.

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	

C-TO9.6a/C-TS9.6a

(C-TO9.6a/C-TS9.6a) Provide details of your organization's investments in low-carbon R&D for transport-related activities over the last three years.

Activity

Aviation

Technology area

Aerodynamics

Stage of development in the reporting year

Full/commercial-scale demonstration

Average % of total R&D investment over the last 3 years

≤20%

R&D investment figure in the reporting year (optional)

Comment

In December 2019, Lufthansa Technik began first large-scale flight trials of a new surface technology jointly developed with BASF Coatings GmbH, in which a modified Boeing 747-400 demonstrated the technology's effectiveness in meanwhile more than 3,000 flight hours collected during regular long-haul operations for Lufthansa. This functional film called AeroSHARK, inspired by the skin of sharks and its microscopic ribs (so-called "riblets"), reduces the frictional resistance of any aircraft. The mentioned Boeing 747-400 was modified with approximately 500 square meters of these riblet films and already validated a drag reduction of up to 0.8 percent. This would equal annual savings of more than 300 metric tons of fuel and more than 900 metric tons of CO₂ emissions for this single aircraft alone. The successful proof of concept with the Boeing 747-400 was met by enormous interest among airlines. With Lufthansa Cargo in May 2021 and SWISS International Air Lines in February 2022, the first Lufthansa Group airlines have already decided to use the technology for their Boeing 777 sub-fleets. Based on a Supplemental Type Certificate (STC) to be developed for this very aircraft type, they will gradually have their entire Boeing 777F or 777-300ER fleets equipped with AeroSHARK. Compared to the aforementioned 747-400, the modification of the 777s will already entail significantly larger surface areas of the aircraft, up to 950 square meters. As a consequence, the savings potential is expected to already surpass the one percent mark here. For the combined fleets of Boeing 777Fs at Lufthansa Cargo and 777-300ERs at SWISS, a cumulative annual saving of approximately 8,000 tons of fuel and more than 25,000 tons of CO₂ could thus be realized with AeroSHARK. Moreover, plans persist to have the energy-saving riblet films authorised to further aircraft types in the future, promoting it more widely across aircraft operators around the world. Therefore, Lufthansa Technik also plans to make the fuel-saving film available to airlines outside the LHG.

Activity

Aviation

Technology area

Operations

Stage of development in the reporting year

Small scale commercial deployment

Average % of total R&D investment over the last 3 years

≤20%

R&D investment figure in the reporting year (optional)

Comment

The optimal use of the aircraft fleet to particular routes depending on demand on these routes is an ongoing task in every flight operation, and it leads to the optimisation of the overall passenger load factor of each flight. In addition, in the financial year 2021, 22 fuel-saving projects were under way across the LHG. These projects comprise activities relating to performance and procedures, weight reduction, flight route optimisation and technical developments. This enabled another 30.4 thousand tonnes of CO₂ emissions to be permanently eliminated in 2021. Three of these projects are explained below. In 2021, Lufthansa German Airlines partnered with German air traffic control

(DFS) to save approximately 2,800 tonnes of fuel, which translates into about 8,800 tonnes of CO₂, on approaches to its home bases in Frankfurt and Munich using the Efficient Flight Profile concept (EFP), which was introduced in 2020. This measure optimises lateral and vertical flight efficiency during periods of low traffic volume. Some of the measures can even be used at peak traffic volumes. A new departure route introduced at Dusseldorf Airport in August 2020 based on satellite navigation technology reduced the fuel consumption of Eurowings aircraft by 11 tonnes in 2021 by shortening the departure route, which prevented 35 tonnes of CO₂ emissions. The LHG is collaborating with DFS on various projects to introduce this technology at other airports in Germany as well. The LHG was able to generate additional savings through improvements in flight path planning, which lead to a reduction in the amount of fuel used in refuelling. The optimisation of planned flight paths for arrivals and departures reduced fuel consumption in Frankfurt and Munich by 560 tonnes (around 1,800 tonnes of CO₂) in 2021. Jointly with DFS, the LHG is seeking new possibilities for flight track analysis based on artificial intelligence methods as part of a research and development project. The first-time application of this innovative concept should allow for "greener flying" in the future through the development of new airspace structure measures. The first data analyses were carried out in 2021.

Activity

Aviation

Technology area

Alternative fuels

Stage of development in the reporting year

Large scale commercial deployment

Average % of total R&D investment over the last 3 years

≤20%

R&D investment figure in the reporting year (optional)

Comment

In developing SAF, the LHG focuses on renewable fuels of non-biogenic origin (e.g. power-to-liquid – PtL and sun-to-liquid - StL) as well as advanced biofuels, mainly from wastes and residue feedstock. The partnership with the Swiss Federal Institute of Technology (ETH) Zurich and its two spin-offs Synhelion and Climeworks was intensified in 2021. In November 2021, a conference was held in Zurich with representatives of the management board of SWISS and the Lufthansa Group on further cooperation. SWISS signed a letter of intent expressing its interest in becoming the launch customer for Synhelion's solar aviation fuel. The pilot project will be supported by the CleanTech Hub, which was founded by the LHG in 2021 and provided with required resources to promote innovative projects in the field of sustainability and now bundles most of the SAF innovation projects. In 2021, the LHG became a launching customer for synthetic kerosene from the world's first industrial production facility for PtL fuel in Werlte. In collaboration with a major globally operating customer, Lufthansa Cargo made a commitment to purchase the equivalent of 20 tonnes per year – or about 25,000 litres – of PtL fuel for the next five years. The ability to scale this technology is of paramount importance to the aviation sector. The LHG has also supported the Lausitz power-to-X centre of excellence since 2019 and participated as a founding member at the virtual founding event in March 2021. "Green hydrogen" is vitally important for all synthetic fuels. This is why the LHG is taking part in the HySupply initiative launched by the BDI as well as acatech. The aim is to develop a supply chain for green hydrogen for the German economy from Australia. The World Economic Forum (WEF) is also driving the market launch of SAF. The LHG is a member of several WEF working groups. Demand for SAF from corporate customers rose significantly in 2021. A major driver for this demand was the nearly 40 cargo flights between Frankfurt and Shanghai that Lufthansa Cargo operated for a customer and whose fuel requirements were completely substituted with SAF. LHG implemented a third party audited process to pass on the emission reduction from SAF use to its customers enabling a claim in scope 3 in GHGP.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

High assurance

Attach the statement

2

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Relevant standard

European Union Emissions Trading System (EU ETS)

Proportion of reported emissions verified (%)

100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach

Scope 2 location-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 2 approach

Scope 2 market-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category

Scope 3: Purchased goods and services

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Capital goods

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Upstream transportation and distribution

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Waste generated in operations

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Business travel

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Employee commuting

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Downstream leased assets

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

2

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Relevant standard

Other, please specify (The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC)

Proportion of reported emissions verified (%)

100

C10.2**(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?**

Yes

C10.2a**(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?**

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C6. Emissions data	Other, please specify (Relative decrease of scope 1 and scope 2 emissions 2021 versus 2020 related to LHG's total annual revenue in Euro)	The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC	LHG has chosen to verify the selected data points with the mentioned standard in order to provide verified data to our interested stakeholders. All data mentioned in questions C6.10 were verified by third party . The verification was carried out on a yearly basis via the entire LHG organization. Lufthansa Verifizierungserklärung CDP_EN_2022_sign.pdf Lufthansa Group 2022 CDP-verification-statement_sign.pdf
C7. Emissions breakdown	Other, please specify (Scope 1 and 2 emissions by country /region, as well as by business activity)	The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC	LHG has chosen to verify the selected data points with the mentioned standard in order to provide verified data to our interested stakeholders. - all data mentioned in questions C7.2, C7.3c, C-TS7.4, C7.5, C7.6c, C-TS7.7 and C7.9a were verified by third party . The verification was carried out on a yearly basis via the entire LHG organization Lufthansa Verifizierungserklärung CDP_EN_2022_sign.pdf Lufthansa Group 2022 CDP-verification-statement_sign.pdf
C8. Energy	Energy consumption	The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC	LHG has chosen to verify the selected data points with the mentioned standard in order to provide verified data to our interested stakeholders. - all data mentioned in questions C8.1, C8.2a, C8.2c , C8.2d, C8.2e and C8.2g were verified by third party . The verification was carried out on a yearly basis via the entire LHG organization. Lufthansa Verifizierungserklärung CDP_EN_2022_sign.pdf Lufthansa Group 2022 CDP-verification-statement_sign.pdf
C8. Energy	Other, please specify (Efficiency metric appropriate to organization's transport products and services)	The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard (Revised Edition); IPCC Guidelines for National Greenhouse Gas Inventories, 2006; ISO 14064-1:2019; EU Regulations 2018/2066-67; EU Directives 2009/28/EG 2003/87/EG 2003/87/EC	LHG has chosen to verify the selected data points with the mentioned standard in order to provide verified data to our interested stakeholders. - all data mentioned in question C-TS8.5 was verified by third party . The verification was carried out on a yearly basis via the entire LHG organization. Lufthansa Verifizierungserklärung CDP_EN_2022_sign.pdf Lufthansa Group 2022 CDP-verification-statement_sign.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

EU ETS

Switzerland ETS

UK ETS

Other ETS, please specify (CORSA)

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

EU ETS

% of Scope 1 emissions covered by the ETS

26

% of Scope 2 emissions covered by the ETS

26

Period start date

January 1 2021

Period end date

December 31 2021

Allowances allocated

2726782

Allowances purchased

854848

Verified Scope 1 emissions in metric tons CO₂e

3581630

Verified Scope 2 emissions in metric tons CO₂e

0

Details of ownership

Facilities we own and operate

Comment

Switzerland ETS

% of Scope 1 emissions covered by the ETS

2

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1 2021

Period end date

December 31 2021

Allowances allocated

286759

Allowances purchased

0

Verified Scope 1 emissions in metric tons CO2e

286759

Verified Scope 2 emissions in metric tons CO2e

Details of ownership

Facilities we own and operate

Comment

UK ETS

% of Scope 1 emissions covered by the ETS

1

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1 2021

Period end date

December 31 2021

Allowances allocated

62848

Allowances purchased

27

Verified Scope 1 emissions in metric tons CO2e

62875

Verified Scope 2 emissions in metric tons CO2e

0

Details of ownership

Facilities we own and operate

Comment

Other ETS, please specify

% of Scope 1 emissions covered by the ETS

0

% of Scope 2 emissions covered by the ETS

0

Period start date

January 1 2021

Period end date

December 31 2021

Allowances allocated

0

Allowances purchased

0

Verified Scope 1 emissions in metric tons CO2e

0

Verified Scope 2 emissions in metric tons CO2e

Details of ownership

Facilities we own and operate

Comment

CORSIA active accounting period starts in 2021. LHG has prepared everything necessary to start the relevant processes. The LHG Airlines have submitted their CORSIA monitoring concepts, all of which have been agreed upon. Furthermore, LHG airlines have submitted their first CORSIA reporting together with the EU ETS Reporting to the relevant competent authorities.

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

LHG's 4-pillar climate protection strategy defines market-based measures (e.g. ETS) as an important instrument to reduce carbon emissions in a cost-effective manner, as long as these measures treat airlines equally. LHG's strategy for complying with the existing / emerging systems is to ensure legal compliance through closely monitoring and reporting externally verified emissions and through a close cooperation with the respective (national) emission authority.

To be able to fulfill the obligation to surrender allowances to cover the emission debts, LHG purchases CO2 allowances on a regular basis and takes thereby into account the planned emissions of not only the current year but also the two following business years. LHG employs a hedging strategy for the ETS allowances - similar to fuel hedging - to protect against price volatility.

Overall strategy for compliance with EU ETS, Switzerland ETS and the CORSIA scheme is co-ordinated at Group level. Nevertheless, LHG also has dedicated persons responsible for emissions compliance requirements in each business unit managing the detailed monitoring, reporting and verification aspects. In addition, LHG has engaged third party verifiers to check and review the compliance reporting prior to annual submission to respective regulators.

LHG strategy also foresees to use all opportunities to reduce fuel consumption and with this the CO2 emissions (e.g. investment in fuel efficient aircraft, operational fuel efficiency or in SAF) in order to minimize LHG climate impact and exposure to compliance costs.

Various teams have been set up for this purpose (e.g. on emissions regulations, emissions management, fuel efficiency, SAF, ETS risks), which regularly exchange information on an interdisciplinary basis and also coordinate short- to long-term action strategies.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit purchase

Project type

Forests

Project identification

Afforestation Coffee Nicaragua

Verified to which standard

Plan Vivo

Number of credits (metric tonnes CO2e)

47570

Number of credits (metric tonnes CO2e): Risk adjusted volume

47570

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

Credit origination or credit purchase

Credit purchase

Project type

Solar

Project identification

Stove Solar ADES Madagascar

Verified to which standard

Gold Standard

Number of credits (metric tonnes CO2e)

10000

Number of credits (metric tonnes CO2e): Risk adjusted volume

10000

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

Credit origination or credit purchase

Credit purchase

Project type

Biomass energy

Project identification

Biodigester National Program Vietnam

Verified to which standard

Gold Standard

Number of credits (metric tonnes CO2e)

4578

Number of credits (metric tonnes CO2e): Risk adjusted volume

4578

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

Credit origination or credit purchase

Credit purchase

Project type

Please select

Project identification

DE Renaturierung Königsmoor

Verified to which standard

Other, please specify (MoorFutures)

Number of credits (metric tonnes CO2e)

411

Number of credits (metric tonnes CO2e): Risk adjusted volume

411

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

Credit origination or credit purchase

Credit purchase

Project type

Energy efficiency: households

Project identification

Stove Efficient Tembea Kenya

Verified to which standard

Gold Standard

Number of credits (metric tonnes CO2e)

10000

Number of credits (metric tonnes CO2e): Risk adjusted volume

10000

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Navigate GHG regulations
Stakeholder expectations
Drive low-carbon investment
Other, please specify (GHG Scope)

GHG Scope

Scope 1
Scope 2

Application

The LHG uses an internal carbon price (price range), which is mainly used by environmental-, strategy-, risk controlling-, sales-, fuel- and aircraft procurement-teams - typically taking into account the costs of current and (possible) future regulations (e.g. EU ETS, CORSIA). This means that the CO2 price risk is increasingly taken into account in investment or project decisions. The Risk Controlling department prepares monthly reports on the current and forecast development of the CO2 market price and calculates the potential cost impact on the LHG. LHG is also active in the voluntary carbon market and purchases project-based carbon credits for its corporate and private customer carbon offsetting programme. A calculated internal CO2 price is used for this voluntary offer. As part of its green electricity target LHG is purchasing green energy certificates (scope 2). Therefore LHG calculates an 'implicit carbon price' for carbon free electricity supply.

Actual price(s) used (Currency /metric ton)

25

Variance of price(s) used

Between 8-80 EUR per ton, based on the different price ranges currently in discussion for carbon credits.

Type of internal carbon price

Shadow price
Implicit price
Offsets

Impact & implication

The use of the internal CO2 price for existing and future regulations as a shadow price has helped to raise awareness of the major risks associated with kerosene (98% of the LHG's direct CO2 footprint). In addition it has helped to push the conversation on low-carbon investment that have the potential to reduce fuel/energy use and thus to limit carbon emissions. It has further contributed to the establishment of the LHG CleanTech Hub, whose mission is to push and support innovative, promising initiatives and technologies to reduce LHG's environmental and climate impact.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers
Yes, our customers/clients
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Collaborate with suppliers on innovative business models to source renewable energy
Other, please specify (Joint product development with suppliers)

% of suppliers by number

3

% total procurement spend (direct and indirect)

78

% of supplier-related Scope 3 emissions as reported in C6.5

75

Rationale for the coverage of your engagement

Major parts of LHG CO₂ emissions are related to jet fuel consumption. Therefore a special focus lies on suppliers and business partners which are directly involved in flight operations to improve fuel efficiency and fuel related climate impact: - Jet Fuel Suppliers: LHG's largest source of climate relevant emissions is related to the consumption, production and supplying of jet fuel. To support the development and production of SAF to replace fossil based jet fuel, LHG is engaged with jet fuel suppliers in producing more SAF and also optimizing sustainable logistics. Jet fuel represents 99 % of LHG's scope 1 and 65 % of LHG's scope 3 emissions and is some of our largest suppliers by spend in 2021. The LHG is engaged in more than ten SAF developing cooperations, which specialized mostly on power-to-liquid and solar technologies, without disregarding SAF of biogenic origins. With these multitude of cooperations the LHG has committed to off-take agreements. - Aircraft, aircraft equipment and engine manufacturers (Scope 1 & 3 impact): LHG is highly involved and encourages suppliers when developing new aircraft models and/or retrofits or aircraft equipment, to support aircraft are getting more fuel efficient. LHG pilots and LHT are usually involved in the development and introduction of new aircraft technologies, which in the best case contributes to a reduction in climate impact both during the production and end-of-life phase (Scope3 emissions) and during the operational phase (LHG Scope 1 emissions). Aircraft and equipment is also some of LHG's largest suppliers by spend in 2021. - Airports and ATC/ATM providers are LHG most relevant suppliers to minimize the climate impacts of aviation during start and landing procedures as well as on ground operation at airport (Scope 1, 2 & 3 impact). LHG has a close cooperation with its main airports and ground service providers to have the necessary infrastructure e.g. to power aircraft using electricity instead of fuel while parked at the gate. With ATC/ATM providers LHG has developed landing procedures to reduce noise and fuel consumption during descent and are working together in the SESAR (Single European Sky ATM Research) program for many years with the clear expectation that measurable operational improvements in ATM are implemented. In 2021 LHG has spend more than € 2 bn for fees and charges.

Impact of engagement, including measures of success

There are several positive impacts of LHG's supplier engagement with regard to a joint product development. Its success can be measured in many ways: o LHG has build up a very high level of expertise in the topics of SAF, options and measures of emission reductions in flight operations as well as at airport ground operations. Several suppliers and system partners such as aircraft or engine manufacturers, airports or Air Navigation Service Providers (ANSP's) increasingly appreciate this expertise and actively approach the LHG as partner for testing and implementing innovative technologies for emission reductions. LHG experts and board members are often speakers or panel participants at supplier events with focus on climate impact reduction. Furthermore LHG regularly organises own events for its suppliers and customers with a focus on climate protection (e.g. Lufthansa Cargo Sustainability Conference at Frankfurt Airport on 14 July 2022). o The establishment of the LHG Clean Tech Hub (CTH) in 2021 and the high interest of (potential) suppliers in contributing their concepts and innovative ideas on clean technologies and possibly receiving a partnership or support from the LHG represents another milestone in the LHG's supplier commitment. Measurable successes of joint product development so far: o ATM /SESAR: Together with ANSPs, Airports and some other European airlines the LHG have been brought a total of 229 SESAR projects to fruition. A further 112 projects are in preparation with all partners. The aim is to save 1.1 million tons of fuel and to avoid 3.4 million tons of CO₂ throughout the EU by 2030. o LHG CTH has identified over 80 clean technology projects which are being further analysed for implementation, accelerate and scale. o Lufthansa Technik and BASF are bringing the innovative AeroSHARK surface technology to standard production; this will be in use on the Lufthansa Cargo (LCAG) and SWISS fleet from 2022. Aero-SHARK will improve the aerodynamics of LCAG's entire Boeing 777 fleet by 2026 - with annual CO₂ reduction of more than 10,000 tons. o LHG is engaged in more than 10 SAF developing co-cooperations with (potential) suppliers, specialized mostly on power-to-liquid and solar technologies, without disregarding SAF of biogenic origins. LHG cooperates i.e. with the first PtL production site worldwide in Werlte.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Education/information sharing	Run an engagement campaign to education customers about your climate change performance and strategy
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% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

100

Please explain the rationale for selecting this group of customers and scope of engagement

To sensitize customers about GHG emissions of their flights with LHG aircraft and show possibilities to mitigate this climate change impact, Lufthansa Group Airlines offer voluntary programs to their customers to offset the CO2 emissions associated with their air travel through the purchase of carbon offsets. In cooperation with myclimate, an experienced non-profit organization that operates carbon offsets, Lufthansa and SWISS passengers can pay the carbon offsetting since 2007. Austrian Airlines has been cooperating with Climate Austria and Kommunalkredit Public Consulting since 2008 to offer customers the opportunity of voluntary offsetting their carbon emissions. Furthermore, Miles & More has started voluntary carbon offsetting option in 2019. Lufthansa Innovation Hub has developed an online CO2 offsetting platform COMPENSAID for customers who wish either to buy Sustainable Aviation Fuel (SAF) for their flights or to compensate with CO2 reducing projects or a combination of both. With this innovation LHG offers as first airline worldwide its customers to buy SAF directly. LHG ensures the purchase and logistics of the sustainable aviation fuel for the customer. The customer has the possibility to choose the amount of SAF and will pay the additional cost incurred to close the gap between fossil fuel and SAF. The online platform COMPENSAID has been launched in 2019. In 2020 COMPENSAID has been rolled out to all LHG airlines. In the reporting year 2021 LHG further pushed the communication about voluntary offsets via various channels: The individual airlines' homepages, interviews and addresses of the LHG's CEO, in which he pointed out the option to compensate on a voluntary basis as LHG is also compensating 100% of the duty trips of its employees worldwide. Since spring 2021 LHG has also been offering companies the option of using SAF for their flights.

Impact of engagement, including measures of success

The success for this engagement is measured by the amount of credits purchased as well as the total monetary value invested in carbon credits by customers. In 2021, the amount of credits of B2C (individual customers) adds up to ca. 10.600 tons of CO2. In total, individual customers have spent more than EUR 200.000 EUR on voluntary carbon offsetting. Additionally 1760 tonnes of CO2 were mitigated by B2C customers with the purchase of SAF. Furthermore, LHG has spent around 225.000 EUR for their employees' duty trips. Due to the COVID-19 pandemic figures are lower than in 2019, as air travel has reduced significantly.

Type of engagement & Details of engagement

Collaboration & innovation	Other, please specify (Innovative product development - Corporate Value Fares / Corporate Customer SAF Contracts)
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% of customers by number

25

% of customer - related Scope 3 emissions as reported in C6.5

25

Please explain the rationale for selecting this group of customers and scope of engagement

As more and more companies are looking for ways to reduce the carbon footprint (CF) in their value chain (Scope 3) – and thus also in relation to business travel and/or goods transport. Accordingly, the demand for options to minimize the CF of business-related air travel grew continuously. With the input from the corporate customers LHG has set up in 2019 a corresponding program based on the option of voluntary CO2 compensation that has already existed for individual travellers since 2007. Initially, selected corporate customers were offered the opportunity to completely offset the CO2 emissions of their air travel on all intra-European flights with the LHG for a one-year test phase as part of the so-called "Corporate Value Fares" program. This offer was very well received and the demand for an extension was high so that LHG continued the program and extend it to a much larger corporate customer base. To this end, the LHG expanded its cooperation with myclimate, one of the leading non-profit carbon offsetting provider. In addition, LHG offers the possibility to its corporate customers reduce CO2 emissions with the purchase of Sustainable Alternative Fuel (SAF). SAF is a synthetically produced fossil-free jet fuel and is considered to be the first real alternative to fossil jet fuels. In April 2021, the offsetting platform "COMPENSAID," which was already launched in 2019 by the Lufthansa Innovation Hub, was expanded to include a special program for corporate customers. Since then B2B customers have had the opportunity to offset the CO2 emissions caused by their employees' flights en bloc and to use SAF for this in full or on a pro rata basis. LHG ensures the purchase and logistics of the sustainable aviation fuel for the customer. LHG has developed a proprietary process together with a neutral external auditor to certify the customer's SAF purchase, which can be used by the customer to reduce their respective Scope 3 carbon emissions. Lufthansa Cargo has also launched a corresponding offer via their online booking portal and by direct contracts with their cargo customers. LHG is willing to further support the program's endeavor to make SAF more broadly available to the aviation in general and increasing demand and thereby promoting awareness, availability and profitability of alternative fuels.

Impact of engagement, including measures of success

LHG's commitment to voluntary CO2 offsetting for corporate customers has met with a very positive response from customers. The offer was very well received and in 2021 a total of 47,570 tonnes of CO2 were offset by B2B customers through climate protection projects (myclimate foundation ensures that the individual projects are carried out sustainably and according to the highest standards (Gold Standard, Clean Development Mechanism [CDM]). In addition, 434 t CO2 were neutralised by SAF purchasing through B2B customers with LHG passenger airlines. Furthermore, with regard to the SAF offer, especially Lufthansa Cargo has initiated first contracts with DB Schenker a worldwide cargo customer in 2020. Since November 2020 Lufthansa Cargo have been regularly offering freighter flights between Frankfurt and Shanghai, which will be accounted for 100% SAF usage (not physical on that particular flight, but SAF purchased for the amount of fuel needed for that flight). The cargo customer receives the audited certificate for reducing its Scope 3 emissions. Also in 2021 another customer has signed up to the initiative. Through this cooperation, a total of 10.8 million litres of conventional kerosene were replaced with SAF between Nov. 2020 and March 2022, additionally saving 33,500 tons of CO2. The SAF for the program is not derived from palm oil or palm fatty acid distillates. The fuel manufacturer is certified according to EU-ISCC and complies with the requirements of the RED II and the certification system ISCC EU which is approved by the European Commission. By replacing fossil jet fuel with SAF, aviation's carbon emissions can be significantly reduced by 80% to 90 %. As the prices for SAF are currently significantly higher than those of fossil kerosene, Lufthansa is willing to support the program's endeavor to make SAF more broadly available to the aviation in general. Therefore through the larger B2B SAF-volumes, LHG are increasing demand and thereby promoting awareness, availability and profitability of alternative fuels. Therefore LHG has committed to purchase SAF for a quarter of a billion US-Dollars between 2022 and 2024 in order to be able to meet the foreseeable increase in demand in the coming years. This is the largest pure sustainability investment in the history of the LHG to date.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

Engagement with German, Austrian and Swiss railways to expand intermodal transport

The LHG seeks to persuade as many of the passengers as possible who travel via its hubs to make intermodal arrivals or departures to open up additional potential for reducing emissions. By offering appealing and convenient intermodal services, arriving and departing by long-distance train or bus should become just as natural as connecting flights. In cooperation with the national railway companies (Deutsche Bahn, Österreichische Bundesbahnen and Schweizerische Bundesbahnen) and some bus operators in the home markets, LHG offers a variety of other alternatives for travel to and from the hubs in addition to flights. These intermodal options are integrated into the LHG's range of services via a flight number and are treated as largely equivalent to a flight in terms of the service package for the customer

The joint services on offer are continuously being expanded and optimised. Three national destinations in each country are linked to the hubs in Vienna and Zurich by rail.

Germany: Expanding the partnership with Deutsche Bahn (established in 2001) enabled seven additional destinations to be added to the express rail network in 2021. The network of Lufthansa Express Rail connections from/to Frankfurt Airport grows to 24 cities. Among other things, Lufthansa German Airlines passengers can now book an Express Rail connection to their flights on almost all domestic German destinations served from Frankfurt. More than 220 daily connections to and from Frankfurt have been offered since the end of 2021. In 2021 a working group was set up with DB, Fraport and the LHG to optimise the customer experience in the joint services with a focus on transfer processes in Frankfurt. These developed joint proposals for improvement in the areas of routing and transfer acceleration with particular priority on pragmatic simplification and acceleration of the baggage process. In the course of these measures, the Airrail Terminal in Frankfurt was reopened in June 2021.

Switzerland: The SWISS, together with Swiss Federal Railways (SBB), is also expanding its intermodal services (from 2022 onward under the new name "SWISS Air Rail"). In a move designed to further enhance passengers' access to the SWISS hub at Zurich Airport by rail, SWISS is adding Munich Central Station to its intermodal network for the first time as an international SWISS Air Rail route. Munich thus complements the Air Rail services from the Basel SBB, Lugano and Geneva stations to Zurich Airport, which have been gradually introduced over the past few years and were previously known as "Flugzug".

Austrian: In cooperation with the ÖBB-Austrian cooperation "AIRail", the route from Vienna Airport to Linz was transferred to rail in December 2014. In 2017, the cooperation was extended to the Vienna Airport-Salzburg route, and the flight connection between Salzburg and Vienna was finally discontinued in 2020 and completely transferred to rail. In 2021, Austrian Airlines additionally extended the cooperation to the Vienna Airport - Graz route.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, climate-related requirements are included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement

Other, please specify (Complying with legal/regulatory requirements as well as expectation to adhere to the principles of the UN Global Compact)

Description of this climate related requirement

Within the LHG Supplier Code of Conduct, which will be handed out to every (potential) supplier, LHG considers legal compliance to be one of their primary duties. As part of LHG's corporate responsibility, the group also expects from their suppliers a similar behavior. Of course this includes that the supplier complies with the applicable climate related laws and regulations of the country in which it offers, manufactures or supplies products or services. The LHG's Supplier Code of Conduct also states that LHG is a member of the UN Global Compact and expects its suppliers to adhere to the principles of the UN Global Compact. This also includes the supplier duties: - supports a precautionary approach to environmental challenges; - supports initiatives to promote greater environmental responsibility; - encourages the development and diffusion of environmentally friendly technologies; LHG generally prefers to cooperate with such suppliers who make and demonstrate an active contribution to sustainability and environmental/ climate protection and constantly strives to improve the efficiency and sustainability of its operations. In order to ensure and demonstrate compliance with this Code of Conduct, the supplier shall keep record of all respective documentation, and provide to Lufthansa Group supporting documentation upon request. To verify suppliers' compliance, LHG expects that the supplier support the right to audit and inspect supplier's operations and facilities.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Supplier self-assessment

Other, please specify (1. keep record of all respective documentation, 2. provide to LHG supporting documentation upon request, 3. To verify suppliers' compliance, LHG expects that the supplier support the right to audit and inspect supplier's operations and facilities.)

Response to supplier non-compliance with this climate-related requirement

Suspend and engage

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?**Row 1****Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate**

Yes, we engage directly with policy makers

Yes, we engage indirectly through trade associations

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

Yes

Attach commitment or position statement(s)

- SBTI Commitment Letter.pdf - Screenshot SBT.org - LHG Commitment.pdf - "Climate protection goals - Lufthansa Group Webpage.pdf (see:

<https://www.lufthansagroup.com/en/responsibility/climate-and-environment/climate-protection-goals.html#cid14710>)

Website Climate protection goals - Lufthansa Group.pdf

SBT-Commitment-Letter LHG 2021.pdf

Screenshot SBT.org - LHG Commitment.pdf

Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

The processes at LHG to manage the multiple activities around climate change across business units (BU's) and geographies to ensure that LHG has a common approach that is consistent with LHG's strategy on climate change, is as follows: At Lufthansa Group the Executive Board has ultimate oversight of climate-related issues and has been responsible for reviewing LHG's climate related risks and opportunities, strategy, measures and target setting. At the Executive Board level, the Chief Customer Officer (CCO) takes over the responsibility for the company's environmental, climate and social effects. The definition of priorities and the further development of sustainability-relevant activities within the Lufthansa Group took place during the reporting year in the context of the Group Executive Board's meetings, as well as in the Group Executive Committee (GEC). The GEC, which is chaired by the Chief Executive Officer, is a senior management level entity and consists of the Executive Board of Deutsche Lufthansa AG, the CEOs of the segment parent companies, the senior executives of the Network Airlines and the heads of the Group's Strategy, Controlling and Communications departments. The Corporate Responsibility (CR) department is responsible for developing appropriate measures to manage the multiple activities around climate change across business units, also to ensure that a common approach upon LHG's strategy on climate change were followed. The CR department is working closely with the various departments and business units of the LHG. In addition, the LHG Sustainability Circle, led by the CR department, was established within the reporting year. Its objective of this monthly meeting is to promote a Group-wide exchange on sustainability topics, which also include climate-related topics and engagements. The members of this circle are the Corporate Responsibility Officers of the Group companies and relevant Group Functions. To address the growing importance of carbon accounting and environmental legislation and to provide relevant information such as regulations and interpretations to the potentially affected divisions and employees, the Corporate Responsibility and Group Controlling divisions have also established the Emissions Management Committee. This committee regularly discusses current developments in national and supranational emissions legislation and estimates their financial impacts.

Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?**Focus of policy, law, or regulation that may impact the climate**

Emissions trading schemes

Specify the policy, law, or regulation on which your organization is engaging with policy makers

EU ETS Revision (as part of the EU Fit for 55 regulation)

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with major exceptions

Description of engagement with policy makers

LHG has been engaging directly with national, EU and international policy makers to encourage the adoption of a global market based measure for reducing carbon emissions from aviation. Due to its restricted geographic scope, current legislation (EU ETS) and Switzerland ETS) is only limitedly effective and leads to competitive distortions to the detriment of participating airlines. A global offsetting mechanism would improve effectiveness and eliminate any competitive distortions. LHG has been promoting this opinion in previous years and also in 2021 through active participation in several national, European and international discussion meetings, congresses and debates with a climate change (CC) background. Furthermore, LHG has addressed the issue in its "Policy Brief", which is being sent to politicians and media contacts several times a year LHG is member and an active participant in the various trade associations such as BDL in Germany, A4E (Airlines for Europe) and IATA, where all the Policy issues are being discussed and position papers are being drafted.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

LHG considers the adoption of market-based measures as an effective mean for reducing carbon emissions from aviation if they fulfill the following criteria: 1. ensure environmental integrity, 2. minimize administrative complexity, and 3. minimize competitive distortions. LHG sees these criteria very much fulfilled by a globally harmonized approach and therefore proposes the implementation of market-based measures at the global level. In October 2016, the UN Aviation Organization ICAO passed a resolution calling for a CO2 compensation system from 2020 onwards called CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation). LHG fully supports the CORSIA system for international aviation. In 2019 discussions started about alignment between EU ETS and CORSIA on different levels and organizations such as A4E, BDL (Bündnis der Deutschen Luftverkehrswirtschaft), IATA, which were ongoing in 2021 when a revision of the EU ETS and consultation papers on EU level took place. LHG is and will be deeply involved in all associations' discussions. In July 2021 the EU Commissions has announced several legislative initiatives within the "FIT FOR 55 Package" which foresees a harmonization of EU ETS and CORSIA. LHG would support that any funds received via such tools should be used to support the needed technological innovative transformation to make the de-carbonisation of air transport possible. For the revision of the EU ETS within Fit for 55 Package, LHG's alternative approach foresees the following: The current ETS is limited to EU flights and already disadvantages European network airlines and airports: Intercontinental transfer passengers travelling to or from the EU are subject to the ETS on feeder flights to European hubs. In contrast, a transfer at a non-EU hub implies that the feeder

flight to this airport is not included. Instead of using the chance to correct this distortive element in competition, the European Parliament has tightened the proposal. An extension of the ETS scope to any flight departing the EU has been submitted. Furthermore LHG supports the idea of a SAF allowance to be included into the EU ETS mechanism at a meaningful level.

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Mandatory climate-related reporting

Specify the policy, law, or regulation on which your organization is engaging with policy makers

EU Taxonomy, Technical Screening Criteria (TSC) for "Passenger and Freight Air Transportation" and EU Taxonomy in general In summer 2021 the first draft of the EU Taxonomy Technical Screening Criteria for aviation have been published. Parts of Technical Screening Criteria are technical not feasible i.e. such as data collection of direct usage/ drop in of SAF in a specific aircraft (per tail-sign) and routing. Others are not clearly defined which makes it not understandable for the airline industry, so that we requested to get more information and explanation how the usage of the TSC is meant to be.

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with major exceptions

Description of engagement with policy makers

LHG took directly part in the official EU consultation on the TSC of the EU Taxonomy for aviation in September 2021. Additionally LHG got invited in November 2021 to a clarification call with other industry experts with DG Move, DG Fisma, T&E and other EU bodies to raise questions and to give technical input to the TSCs what is operational do-able and to better understand the draft TSC and how to use it and how to derive the KPIs. LHG also provides feedback and took part in the prior Steer Study workshop in autumn 2020, which has been commissioned by the EU. LHG is also engaged via the airline associations BDL, A4E and IATA and it's working groups to deliver constructive consolidated feedback of the airline industry to the EU bodies.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

The economic activity for "Passenger and Freight Air Transport" inclusive of the Technical Screening Criteria has not been finalized by the EU Commission yet but some of our input such as: no information of SAF direct usage on a single aircraft operation which is technically not feasible has been taken into account. The actual draft prohibits a taxonomy-aligned growth even if best-in-class aircraft - as defined by the taxonomy- are purchased as per newly entered aircraft into the fleet another aircraft of similar size as defined by the taxonomy has to leave the fleet within a short period of time. The industry see this as a strong intervention into the individual business strategy especially for LHG as it's CO2 mitigation path is aligned with SBTi until 2030 which even foresees growth.

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

New fossil fuel energy generation capacity

Specify the policy, law, or regulation on which your organization is engaging with policy makers

ReFuel EU as part of Fit For 55

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with minor exceptions

Description of engagement with policy makers

LHG has developed a position paper which has been directly and indirectly via industry associations circulated with policy makers. Additionally the Fit for 55 package and the ReFuel EU Proposal has been part in nearly each of the environmental working groups of A4E to come up with consolidated positions which A4E then discusses with the respective EU bodies.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

LHG in general supports efforts to increase the scalability of Sustainable Aviation Fuels (SAF). But the ReFuel EU draft does not adequately address prevailing problems of carbon leakage and distortion of competition in aviation. LHG advocates for a level playing field as the airline industry is a global industry. Any policies affecting only EU carriers will have a negative effect in comparison to Non EU carriers and might even lead to carbon leakage. The SAF blending mandate unilaterally disadvantages European aviation as it will unilaterally increase fuel costs due to the significantly more expensive green kerosene. As a result, the price of airline tickets in Europe will rise. Passengers can easily avoid the major part of this price increase by travelling via a non-EU hub since the SAF mandate only applies to flights departing the EU. As a result, significant levels of carbon leakage and distortion of competition occur. In its current design, the proposal does not provide any mechanism, which could compensate for these unwanted effects. With regard to the SAF mandate, a competition-neutral solution that prevents carbon leakage must be found. To ensure full compliance with the ETS and CORSIA, the future rules need to align with REDIII and ICAO rules on criteria for eligibility. Furthermore LHG propose to install a book-and-claim system for the usage of SAF (Sustainable Aviation Fuel) in order to facilitate and to grow it's usage. Once the ReFuel EU legislation has been passed, it should not be allowed to have different mandates in single EU countries which would lead to an enormous complexity. Due to the still very limited availability of SAF and the raising quota proposal within ReFuel EU, a regular revision of the law will be necessary.

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Renewable energy generation

Specify the policy, law, or regulation on which your organization is engaging with policy makers

PtL Roadmap of German government and PtL Quota in Germany

Policy, law, or regulation geographic coverage

National

Country/region the policy, law, or regulation applies to

Germany

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

LHG via BDL supports the PtL Roadmap in Germany. The BDL has signed the PtL Roadmap which has been a project of the German government to scale up Power-to-Liquid fuels until 2030. The PtL quota for kerosin shall be 2% in 2030.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Verification and audits

Specify the policy, law, or regulation on which your organization is engaging with policy makers

ICAO aircraft CO2 certification standard

Policy, law, or regulation geographic coverage

Global

Country/region the policy, law, or regulation applies to

<Not Applicable>

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

LHG has been promoting the new CO2 standard at national and international policy making levels and via participation in the respective ICAO working groups in which also relevant members of national ministries have been taking part. Furthermore LHG has taken also position via BDL, A4E and IATA where these policies are being discussed and position papers are drafted. LHG supports the implementation of an appropriate ICAO aircraft CO2 certification standard in future policy making related to carbon management from aviation.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Adaptation and/or resilience to climate change

Specify the policy, law, or regulation on which your organization is engaging with policy makers

ACARE (:Advisory Council for Aviation Research and Innovation in Europe : "Fly the Green Deal, Europe's Vision for Sustainable Aviation" and ACARE Flightpath 2050 - Europe's vision for Aviation, the master plan and policy for future climate research projects on European Union level. By 2050, achieve climate neutral aviation based on validated and globally accepted tools and models, in the full sustainability context (environmental, economic and societal) in line with United Nations (UN) Sustainable Development Goals (SDGs), integrating the circular economy concept to be an equitable contributor, with other transport modes, to fully climate neutral mobility. Ensure the sustainability and other needs of citizens not only as travelers and as customers but also as recipients of aviation's external impacts, such as noise and other disturbances. This goal also includes meeting the needs of the education system and skilled workforce. Design and apply the necessary instruments to maintain the European aviation industry's global leadership and competitiveness all along the supply chain, including researchers, manufacturers, infrastructure and aircraft operators, and service providers, by providing the highest quality, cost efficient, innovative products and services and developing and sustaining the required human capital, knowledge and skills.

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

LHG has been engaging directly with policy makers at European Union Level to discuss the research agenda of the EU.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Other, please specify (Energy efficiency)

Specify the policy, law, or regulation on which your organization is engaging with policy makers

Single European Sky (SES) - air traffic management modernization EU policy project to support also the net zero goal of aviation in 2050.

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

LHG is a member of the European program Single European Sky Air traffic (SESAR) which is the technological pillar of the Single European Sky (SES) providing a number of staff to the program. LHG promotes the inclusion of the SES into European legislation especially into the EU Green Deal, to realize the related environment and economic benefits. Throughout the various working group LHG has been engaged with EU policy makers in this area to improve the modernization and harmonization of European Air traffic management in order to reduce unnecessary longer routes and holding patterns.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Focus of policy, law, or regulation that may impact the climate

Renewable energy generation

Specify the policy, law, or regulation on which your organization is engaging with policy makers

EU Flightpath 2020 - policy for the creation and functioning of a supply chain for biogenetic fuel (SAF)

Policy, law, or regulation geographic coverage

Regional

Country/region the policy, law, or regulation applies to

EU27

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

LHG is amongst other airlines a member of the "Flightpath 2020" which is a joint initiative of the aviation industry, the biofuel industry and the EU Commission so that there is a direct engagement with policy makers from the EU Commission.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.3b

(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association

International Air Transport Association

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

At the 77th IATA Annual General Meeting in Boston, USA, on 4 October 2021, a resolution was passed by IATA member airlines committing them to achieving net-zero carbon emissions from their operations by 2050. This pledge brings air transport in line with the objectives of the Paris agreement to limit global warming to 1.5°C. To succeed, it will require the coordinated efforts of the entire industry (airlines, airports, air navigation service providers, manufacturers) and significant government support. The net-zero objective will be met through a combination of maximum elimination of emissions at source and the use of approved offsetting and carbon capture technologies. The key elements of the emissions reduction strategy are: ▪ The use of Sustainable Aviation Fuel (SAF), sourced from feedstocks that do not degrade the environment or compete with food or water ▪ Investment in new aircraft technology, including radical new aerodynamic and alternative propulsion (electric or hydrogen) solutions ▪ Continued improvement in infrastructure and operational efficiency, with a particular focus on improved air traffic management ▪ The use of approved offsets including carbon capture and storage technology IATA engages with different regulatory bodies i.e. ICAO to advocate the adoption of a global regulatory approach for mitigating carbon emissions from aviation, which does not distort competition among airlines. Furthermore, IATA proposes the implementation of its 4-pillar-strategy that includes 1) investing in technology, 2) improving operational efficiency, 3) building and using efficient infrastructure, and 4) using market-based measures to address climate change. In 2020 ATAG - in cooperation with IATA - has published the Waypoint 2050 Report which has been closely developed with the Airlines like LHG. "Waypoint 2050" describes via manifold assumptions possibilities to become net zero CO2 emissions in 2050 respectively 2060, which will be very challenging and is only possible with the cooperation of the entire aviation industry and with governmental support and structures. IATA together with ATAG is promoting the Long Term Aspirational Goal for aviation of net zero in 2050 to be included in ICAO strategy.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify (Association of German Aviation Industry (BDL))

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

The German aviation industry supports the goals of the Paris Climate Agreement and is making an active and ambitious contribution to achieve these goals. With its 2020 "BDL Master plan - climate protection in aviation", the German aviation industry set itself the goal of making flying and airport operations carbon neutral. The master plan identifies the fields where the aviation industry is making progress on climate protection and where it also intends to take further steps together with policymakers: (1) Investments in the use of lower-emission aircraft will result in the modernization of aircraft fleets and a reduction in CO2 emissions from German aircraft fleets (minus 43% since 1990). (2) Substituting fossil jet fuel with sustainable aviation fuels can lead to significant progress towards achieving carbon-neutral flight operations. (3) By investing in structural and energy modernization at airports and utilizing the corresponding funding programmes, companies will implement carbon neutral airport operations. (4) More efficient air traffic management in European airspace will enable air traffic control service providers to make a further contribution to reducing emissions. (5) Aviation industry companies are working together with the German Aerospace Center (DLR) on ways to reduce non-CO2 effects of flying (e.g. due to contrails). (6) The aviation industry is working together with policymakers and rail transport companies to ensure that more traffic can be shifted to rail by expanding rail connections and enhancing rail links to airports. (7) The aviation industry supports the instruments of a competitive neutral carbon pricing system which can be used to limit carbon emissions (ETS, CORSIA). These goals and instruments of the industry's master plan are in line with the agreements reached by an alliance of approximately 20 countries, including Germany, at the recent COP26 UN Climate Change Conference for increased internationally coordinated climate protection in aviation. In addition, the German aviation industry's master plan is aligned with the European aviation sector's sustainability initiative ("Destination 2050"), which was unveiled in February 2021.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Trade association

Other, please specify (Airlines for Europe (A4E))

Is your organization's position on climate change consistent with theirs?

Consistent

Has your organization influenced, or is your organization attempting to influence their position?

We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)

A4E airlines are determined to address the climate challenge that faces all of mankind. By minimizing our environmental impact we can contribute to a more sustainable European economy as envisioned in the European Green Deal. Europe's airlines have committed to decarbonize air transport and accelerate their efforts to make Europe the world's first carbon neutral continent by 2050 through the reduction of CO2 emissions in absolute terms, and through CO2 mitigation. Acknowledging its responsibilities despite the COVID-19 crisis, in 2021 the EU aviation sector published its "Destination 2050 — A route to net zero European aviation" roadmap showing a clear pathway to reaching net zero CO2 emissions for intra-European and departing flights by 2050. A4E promotes efforts to include carbon dioxide emissions from aviation in a robust global climate change framework. To be both environmentally effective and economically efficient and to minimize the risk of competitive distortions and carbon leakage, policy action must be taken at a global not national or regional level.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding

<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In mainstream reports

Status

Complete

Attach the document

LH-AR-2021-e.pdf

Page/Section reference

Pages 31-32, 80-81, 89-90, 94-111,

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

Publication

In mainstream reports, incorporating the TCFD recommendations

Status

Complete

Attach the document
LH-TCFD-Report-2021.pdf

Page/Section reference
Whole report

Content elements
Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets

Comment

Publication
Other, please specify (SASB Report 2021)

Status
Complete

Attach the document
LH-SASB-Report-2021.pdf

Page/Section reference
pages 1-5

Content elements
Strategy
Emissions figures
Emission targets

Comment

Publication
In voluntary sustainability report

Status
Complete

Attach the document
LH-Factsheet-Sustainability-2021.pdf

Page/Section reference
Pages 1-25

Content elements
Governance
Strategy
Emissions figures
Emission targets
Other metrics

Comment

Publication
In voluntary communications

Status
Complete

Attach the document
UNGC_Communication on progress_2021.pdf

Page/Section reference
P. 7-22

Content elements
Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment
UN Global Compact Communication on Progress As LHG has been a participant with UN GLOBAL Compact since 2002, we report on a yearly basis the Communication On Progress report (COP).

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	No, and we do not plan to have both within the next two years	<Not Applicable>	<Not Applicable>

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have endorsed initiatives only	<Not Applicable>	Other, please specify (The LHG has a long standing cooperation with NABU (Naturschutzbund Deutschland e.V.). As a partner of Kranichschutz Deutschland gGmbH, the Group will support the protection of the endangered bird species.)

C15.3

(C15.3) Does your organization assess the impact of its value chain on biodiversity?

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	No, and we do not plan to assess biodiversity-related impacts within the next two years	<Not Applicable>

C15.4

(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity-related commitments
Row 1	No, we are not taking any actions to progress our biodiversity-related commitments	<Not Applicable>

C15.5

(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	Please select

C15.6

(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments	Webpage: https://www.lufthansagroup.com/en/responsibility/social-responsibility/corporate-citizenship/other-commitments.html Commitment Crane Foundation - Lufthansa Group.pdf

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

No further comments

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Senior Director Corporate Responsibility, Head of ESG Rating and Reporting, Lufthansa Group	Business unit manager

SC. Supply chain module

SC0.0
