

Original Research

## A Case Study of How DHL Practices Carbon Management

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### Abstract

Awareness of the challenges of sustainable development, and in particular the risks of climate change, is leading to inevitable restrictions on Greenhouse gas emissions. True carbon risk management must be introduced into the strategy of companies that will increasingly operate in a global low-carbon economy. Indeed, companies are now called upon to be accountable and transparent about the environmental consequences of their business activities. Carbon risk is one of several new emerging risks for companies associated with climate change risks, regulatory risks from climate policies and the introduction of new markets in which companies trade emission credits. Carbon management requires companies to have a better understanding of their GHG emissions to assess their environmental responsibility and to know their degree of exposure to carbon risk. Once this assessment has been carried out, the company must adopt a carbon risk communication strategy, define targets, and implement abatement practices. Dalsey, Hillblom and Lynn is the world's leading logistics company and emits around 29 million tonnes of CO<sub>2</sub>e per year. DHL prioritises accounting, disclosure, energy efficiency and offsets to reduce its emissions. The company is struggling to reduce its emissions but is limiting the increase in emissions despite the increase in its activity. DHL needs to be more rigorous in developing better carbon management tools and giving itself the means to achieve very high targets.



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## Keywords

ESG; corporate sustainability; DHL; net zero

## 1. Introduction

The overall amount of Greenhouse gas (GHG) emissions is today the highest in history, where human activities' impact on climate change is largely denounced by a global scientific consensus [1, 2]. It is therefore urgent to implement early and stronger mitigation actions through effective instruments to reduce the production of these emissions [3]. That is why greater pressure is put on companies from various stakeholders to decarbonise their activities [4]. Indeed, businesses can play a key role in mitigating GHG emissions, notably through carbon management. Carbon management consists in monitoring an organization's emissions to minimize them in an ongoing and sustainable way. More precisely, it is about integrating and understanding carbon data into the firm's strategic decision-making [5]. In this context, DHL is an interesting example of carbon management to study. Firstly, because it is a large multinational company and a global leader in the logistics and transport sector. Consequently, it would be a relevant example of a firm producing many emissions. Indeed, global logistic companies' production represents 5.5% of global carbon emissions [4]. On another hand, the transport sector contributes to 14% to global GHG emissions [1]. These numbers show that firms like DHL lead to a wide range of environmental issues. The carbon management strategy of an emission-intensive company such as DHL is indeed worth studying to see how the firm is proceeding to reduce its carbon emissions and what are the potential grey areas.

The purpose of this case study is to analyse how global logistics organizations act to face environmental issues and which methods are used to decarbonise their activities. In this paper, the various carbon management strategies implemented within the firm will be highlighted as well as the measures undertaken to reduce its emissions. This report will focus on several aspects of carbon management. First, the emission estimates will be analysed using tables and figures specifically made for this paper. Then, the strategies used by DHL to calculate and monitor carbon emissions will be detailed into reporting, disclosure, and compliance measures, as well as benchmarking activities. Also, this paper will outline which methods have been used by DHL to reduce their emissions and which ones have been prioritized by the firm. Various of their strategies will be analysed, such as their investments in energy efficiency, the modernization of their means of transport, their carbon offsetting activities, as well as their disclosure to become climate neutral by 2050. Finally, a performance appraisal will be conducted using literature, primary and secondary data. The data on CO<sub>2</sub>e emissions was taken from DHL's official documentation and reporting and from the Online Response System of the Carbon Disclosure Project (CDP). This concerns all figures in the body of the document as well as in the tables and figures. If specified, some emissions may have been estimated based on previous years' figures and figures from DHL's competitors.

## 2. Overview of the Firm

DHL is an international logistics company, specialized in international mail, package and freight delivery. Established in 220 countries in the world and delivering over 1.5 billion parcels per year,

the company is a world leader in the logistics sector. The firm offers a large portfolio of logistics products and services, delivers domestic and international parcels, and handles the entire supply chain management. Various transportation modes are used to operate its activities, such as road, air and sea transport, as well as express freight [6].

The firm was founded in 1969 by Adrian Dalsey, Larry Hillblom, and Robert Lynn in San Francisco. Its headquarters are currently in Bonn (Germany) and the CEO is called John Pearson. DHL is a division of the Deutsche Post firm and has itself several specialized divisions: DHL Express (express international and domestic parcel services), DHL Parcel (standard international and domestic parcel services), DHL Global Forwarding (air, ocean, and rail freight), DHL Supply Chain (logistics provider), and DHL Freight (European land transport). The group counted 526,896 employees in 2021 [7].

As DHL is operating its activities through transport, the firm plays a role in the increase of global GHG emissions. Indeed, the transport sector is a significant source of energy use and air pollution, such as particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>). Noise pollution from road traffic, railways and air traffic, as well as raw material depletion are also other adverse environmental effects [8]. With the e-commerce boom, DHL's operating activities are expected to increase the next years to come, and these environmental threats would tend to be exacerbated.

### 3. Pledges

DHL says it will be carbon neutral by 2050. The multinational also claims to be able to reduce its CO<sub>2</sub> emissions to 29 million tonnes by 2030, knowing that in 2020 they emitted 33 million tonnes. The company has announced an investment of 7 billion euros over 10 years in order to reduce its emissions. For example, their fleet of electric delivery vehicles should increase from the current 18% to 60% by 2030. Among the reasons given for following such a strategy, the first is that in 2017 DHL became the first logistics company in the world to set itself the goal of being carbon neutral by 2050. The group sees itself as a leader in promoting the values of sustainable development and thus in the fight against emissions. The group's strategy is to base itself on the data and targets set by international institutions. DHL states that it is focusing on the objectives set by the Paris Agreements and the UN's Sustainable Development Goals. The group is working with the UN, OCHA and UNDP to implement their different strategies: gogreen, gotrade, gohelp and goteach. In terms of corporate marketing, DHL is still associated with the colour yellow and would like to see itself go green. This strategy can be seen in the following cycle.

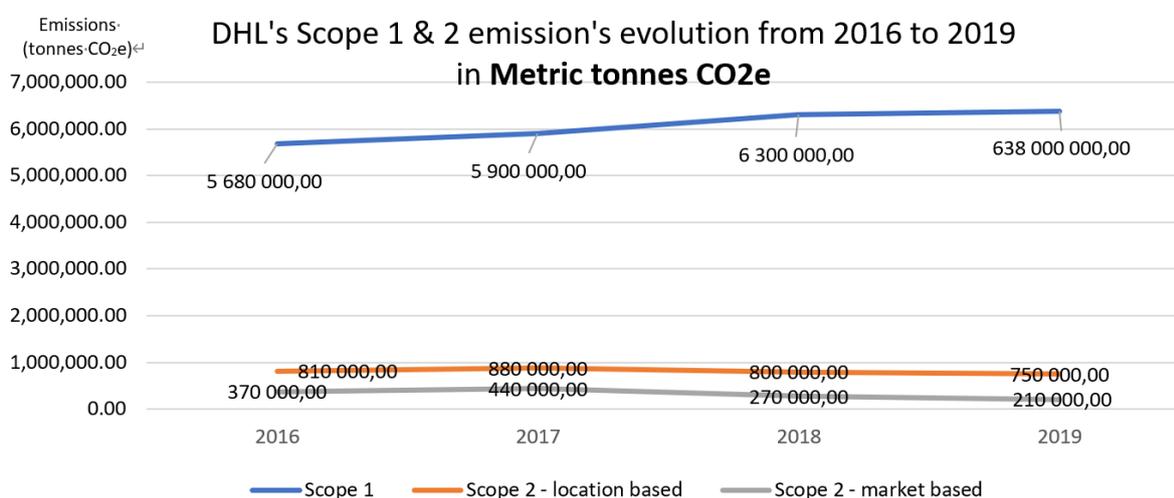


Despite investments in electric aviation, DHL's policy is to become a forerunner in the use of alternative fuels with a focus on biofuels and e-fuels.

### 4. Emissions Estimates

In this section, the data used are from DHL's submissions to the Carbon Disclosure Projects (CDP). CO<sub>2</sub>e emissions are calculated in metric tons and classified according to scopes 1, 2 and 3. Scope 1

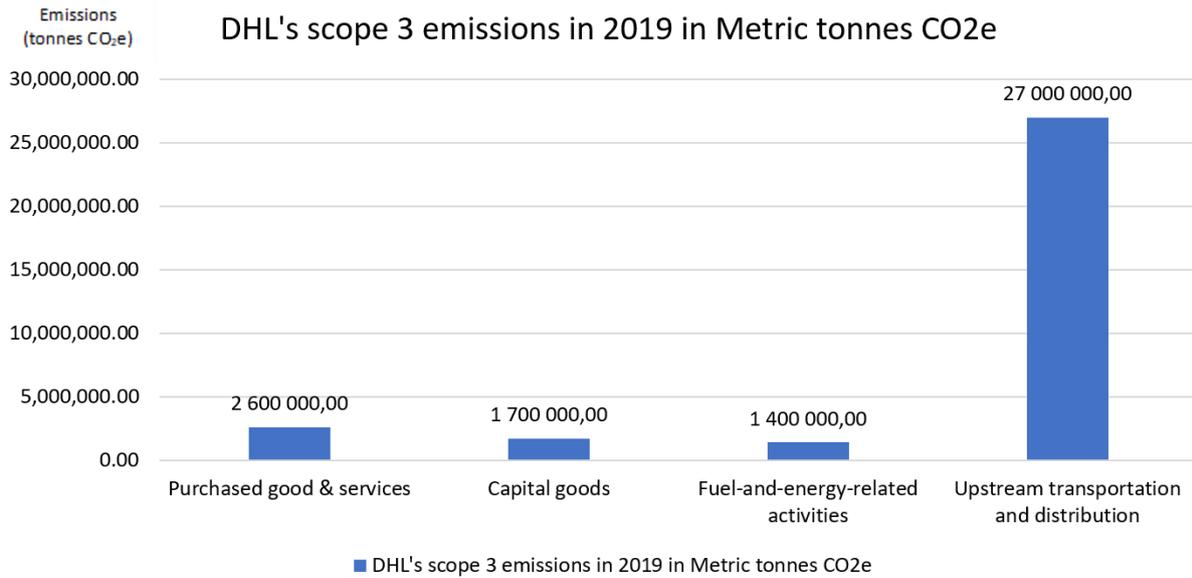
represents direct Greenhouse gas emissions. These are Greenhouse gas emissions that take place directly at the company level. For DHL, Scope 1 is particularly composed of emissions related to infrastructure such as offices and hubs, but especially emissions related to the fuel combustion of company-owned service vehicles. Scope 2 includes indirect energy-related emissions. These are mainly emissions related to electricity, which does not emit directly at the workplace but at the time of its production. Here, DHL distinguishes two branches of Scope 2: Location based, and market based. Scope 3 includes other indirect emissions. Scope 3 is very broad by definition and generally represents the majority of emissions linked to a company's activity. If Scope 3 is not considered, the company's carbon footprint will be very incomplete. It seems that for a company as large as DHL, the calculation of Scope 3 emissions has been missed. Indeed, the CDP evaluation status judged DHL's calculation irrelevant and therefore proceeded, with the financial data and environmentally extended input output (EEIO) they had, to a new calculation. However, these calculations are only shown for 2019. Furthermore, DHL considers the scope 3 categories to be less important for carbon management.



**Figure 1** DHL's scope 1 & 2 emissions from 2016 to 2019 [9-16].

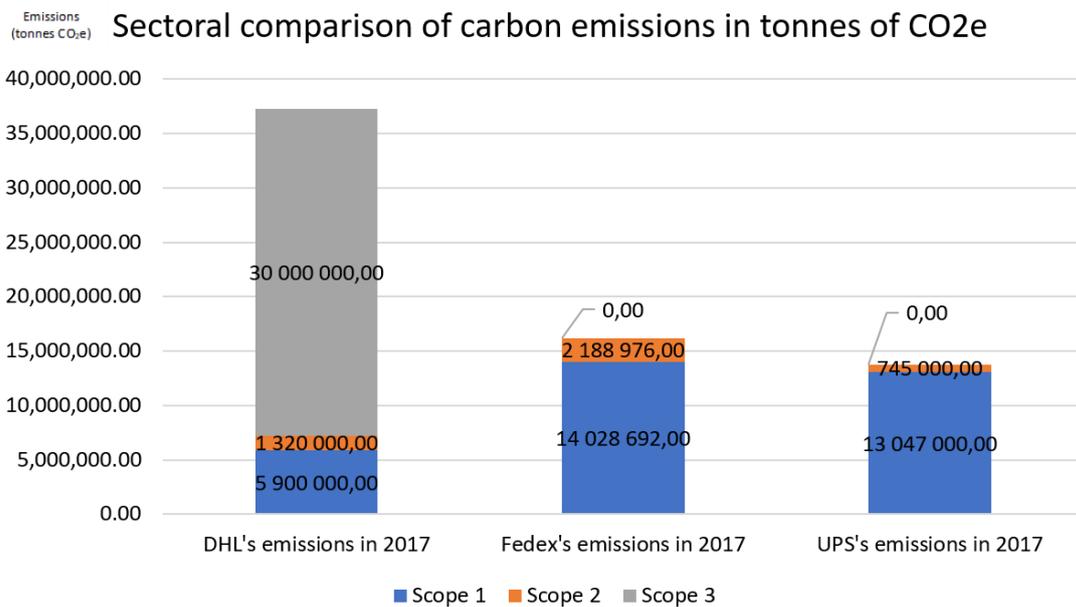
At the level of scope 1, DHL's CO<sub>2</sub>e emissions have increased every year. In the sector, this is the case for all competitors. The increase from 2016 to 2019 is 12.32%, which is lower than the overall increase in the international transport and logistic sector. As for Scope 2, the results are steady and after minor increases, have finally decreased slightly in 2019. The explanation given by DHL for the increase in scope 1 is the slow implementation of new technologies to reduce emissions. These include biofuels, electric aviation, and the modernisation of transfer vehicles. DHL even predicts an exponential increase in their emissions over the next 10 years before achieving significant reductions.

While the figures for 2020 and 2021 have not yet been audited, it can be assumed that the increase in scope 1 emissions will rise sharply due to the increase in online shopping during the covid 19 pandemic, while scope 2 emissions are expected to fall as teleworking has been very widespread.



**Figure 2** DHL's scope 3 emissions in 2019.

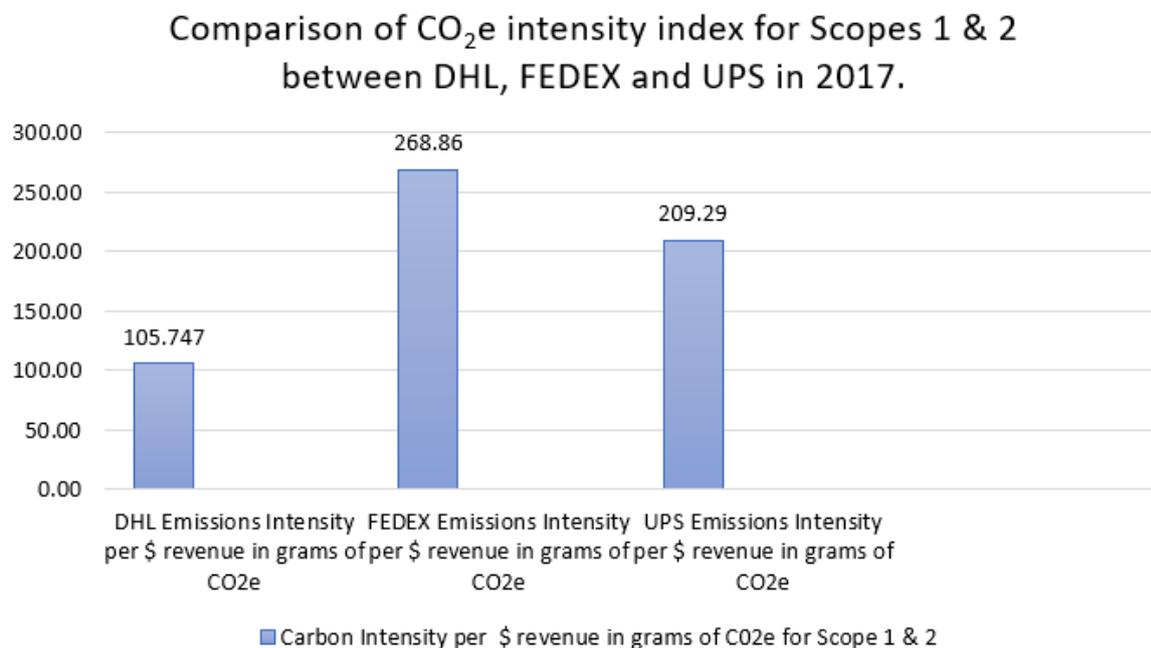
Given DHL's business sector, upstream transportation and distribution is by far the most emissive category. The evolution per year is not known.



**Figure 3** Sectoral comparison of carbon emissions in tonnes of CO<sub>2</sub>e.

By comparing the largest groups in the logistics transport sector, several conclusions could be drawn. Firstly, in terms of the methodology used to calculate emissions, Fedex and UPS did not calculate their emissions for scope 3 [17]. Their reasons are similar, it is because of the complexity of making an estimate for the different categories of scope 3. DHL also made calculation errors but by providing the necessary data, CDP was able to arrive at estimates. The problem is that all three groups claim a carbon footprint that does not include all scopes and categories. In terms of scope 1,

DHL is below its competitors, but with incomplete disclosures from the other groups, it is difficult to get a complete picture of these figures.



**Figure 4** Comparison of CO<sub>2</sub>e intensity index for Scopes 1 & 2 between DHL, FEDEX and UPS in 2017.

To calculate the emissions intensity per unit of revenue in dollars, the following formula was used.

$$\frac{\sum_i^n (tCO_2e)'_{i,t,y}}{\sum_i^n (Rev)'_{i,t,y}}$$

The results obtained in grams of CO<sub>2</sub>e per unit of revenue are not complete as they only consider Scopes 1 & 2. Indeed, the calculation of Scopes 3 for FEDEX and UPS for the year 2017 have not been made public due to calculation errors. In addition, DHL's revenue calculations are not available in dollars but only in euros, so the figures have been converted according to the average exchange rate between euros and dollars in 2017.

In this respect, DHL does a much better job than its competitors. The reason is not the company's revenues, as the three groups generated relatively similar revenues in 2017, between \$60.32 billion for FEDEX and \$68.3 for DHL. The difference in carbon intensity per revenue lies in the decrease in emissions undertaken by DHL for Scopes 1 & 2. As a reminder, these scopes represent about one fifth of total emissions as seen in Figure 3.

### 5. Emissions Reductions

In fact, DHL has not reduced its overall emissions, however, their emissions have been reduced due to the increase in their logistics transport activities. In other words, there has been a limitation in the increase of the carbon footprint. There have been reductions in their emissions only in specific cases that need to be demonstrated.

**Table 1** DHL's Reduction of emissions from scope 1 & 2 in 2019 compared to 2018.

Processes	Emissions reduction in metric tons CO <sub>2</sub> e	Value in percentage	Explanation
Change in renewable energy consumption	60 000,00	0.91	Increase the use of green electricity and other renewable energies in new markets
Other emissions reduction activities	146 000,00	2.22	Increasing energy standards for corporate real estate and heavy transport vehicles. Implementation of energy efficient technologies such as low energy light bulbs, cargo bikes and LED lighting
Divestment	3 900,00	0.06	Divested entities

In terms of carbon management practices, DHL engages in: Compliance and benchmarking practices, measurement practices to estimate emissions, reporting and disclosure practices, evaluation and implementation of emission reduction and minimisation strategies, and strategic and target consideration practices.

### **5.1 Compliance, Benchmarking Practices, Reporting and Disclosure**

DHL has benchmarked best practices for optimising energy consumption and carbon emissions by involving vendors, customers, and suppliers. This includes transport, recycling, storage, and warehousing activities. For example, the company has introduced a carbon reporting tool for customers. This allows customers to measure their carbon impact in relation to the transport and logistics of a DHL operation. These measurements are based on the Greenhouse Gas Protocol's Product Life Cycle Accounting and Reporting Standard (GHG). The targets and measures are also integrated into the company's code of conduct and energy and environment policy. DHL integrates the notion of proof of compliance into their GoGreen strategy. This compliance is established within the respect of standards for new acquisitions of transport vehicles and real estate. Similarly, their maintenance and waste management contracts include compliance with environmentally friendly practices. DHL's sustainability reports and disclosures are annual. The reports are regulated by the European Union and the German Ministry of Economics. The disclosures are made via the CDP.

### **5.2 Measures and Estimates: Carbon Accounting**

DHL's emissions measurements include all three scopes, direct and indirect. They are in line with the GHG protocol. At the performance level, the group uses the carbon efficiency index (CEI). Both types of measures are monitored internally through their internal management system. They are also audited externally by several companies such as KPMG but also verified and disclosed to the CDP. DHL sorts these measures by country and by activities and subsidiaries. Of the 14% of carbon emissions emitted by the transport sector worldwide, DHL accounts for 0.4% of this figure.

According to DHL, their emissions have decreased in 2019 compared to 2018, at least that is what they have communicated in 2019. Nevertheless, their 2018 measurements have been adjusted and it seems that the decrease is real but only for scope 2 and 3. Scope 3 representing 77.24% of their emissions in 2019. However, these figures showing a decrease in emissions are not validated by the CDP.

### **5.3 Evaluation and Implementation of Reduction Strategies**

In assessing abatement options in terms of cost, DHL communicates very little. There is no externally available abatement cost curve. However, DHL tells the CDP that 13.7% of its supplier spend was allocated to supplier training and incentives in 2019. DHL submits that its suppliers account for 77% of their transport emissions and that it is therefore crucial to implement tools to evaluate environmentally friendly behaviour. They award the best carriers for their efforts towards the environment and emissions. DHL also has a monthly scorecard system for its main suppliers. This improves the CO<sub>2</sub> efficiency of these freight companies. DHL mainly uses two methods to reduce its emissions. Firstly, and this is the argument most used by the group as the cornerstone of abatement, is energy efficiency. The second method is the use of offsets.

#### **5.3.1 Energy Efficiency**

DHL's main internal action for carbon management is to become more energy efficient. This involves several steps and investments that are being implemented by the group. In fact, the group has announced a 35% increase in efficiency since 2007. DHL says it will reduce its environmental impact by improving the energy efficiency of its fleets (including air, sea, and road transport) and infrastructure. The company intends to continue to modernise these sectors through new technologies and an inclusive management system. This includes major investments in new technology acquisitions. The strategy adopted is twofold, the group intends to burn less fuel, using alternative driving systems, but also to burn "clean" by focusing on sustainable fuels and thus reduce their dependence on fossil fuels and pollutants.

The multinational is clearly positioning itself in synthetic fuels with a view to long-term sustainability. The e-commerce boom is increasing DHL's business and therefore its emissions. The group wants to deconstruct this paradigm by significantly increasing efficiency. For example, from 2018 to 2019, logistical transport activity increased significantly but efficiency remained the same, due to the increased use of renewable energy. The Carbon Efficiency Index (CEX) in 2019, was 35% for DHL [18]. Their goal is to get to 50% by 2025. In 2018, DHL ordered 14 new, more fuel-efficient aircraft. Four of these were put into service in 2019, generating an 18% reduction in fuel consumption. At the level of the company's buildings, this represents 2% of the carbon footprint and 83% of the electricity in these buildings is already green. In terms of road transport and the so-called last mile, the group has significantly increased its purchase of electric vehicles over the past 10 years, saving 39,600 tonnes of CO<sub>2</sub>e. In Germany, 41% of their deliveries are carbon neutral. Also in Germany, the implementation of LED technology in mail sorting centres in 2019 cost €15,800,000 and allows savings of €7,500,000 per year, with a lifetime diagnosed at over 11 years. In parallel, this project will reduce CO<sub>2</sub>e emissions by 450 metric tons per year.

### 5.3.2 Carbon Offsetting

DHL is very involved in offsets projects and considers this mechanism as one of the central pillars of its carbon management. To offer voluntary offsets, DHL is involved in projects in the least developed countries. These projects address renewable energy in rural areas, waste management and household devices. DHL's portfolio contains mainly small local projects. The group buys offsets in countries with the lowest development rankings according to the World Bank. The portfolio shows 9 main projects including one in Lesotho which is the spearhead for DHL as it won the Energy Globe Award in 2018. DHL considers Voluntary Emission Reduction credits for their offsets, complying with the Gold Standard. Projects following the Clean Development Mechanism (CDM) standard are sometimes chosen as suitable alternatives. For example, the Lesotho offset project provided 28,654 credits in metric tonnes of CO<sub>2</sub>e. These are credit organisation, but DHL also purchases credits such as the 122,140 credits of a landfill gas project in Chile.

Regarding mandatory offsets, DHL is subject to the legislation of the European Union Emissions Trading Scheme (EU-ETS). 15.2% of their scope 1 emissions are covered by the ETS since 2009.

### 5.4 Strategies for Emission Reductions Targets

DHL follows the International Energy Agency's (IEA) two-degree scenario (2DS) and its mobility model. In addition, the company is interested in the sectoral information provided by IATA. Together with other transport giants, DHL builds a target model to anticipate the company's behaviour within the IEA scenario.

### 5.5 Position on Legislation and Policies

DHL supports cap and trade mechanisms and values market-based instruments. Their support is softer when it comes to carbon reporting and carbon taxes. DHL believes that such practices should be regulated internationally to avoid unfair competition. The company prefers the use of carbon pricing rather than localised taxes. Regarding clean energy generation and energy efficiency, DHL supports the EU regulations but asks for longer timeframes to audit their results.

DHL participated in COP26 and advocated for more incentives from governments. According to DHL, governments and the international community are slow changemakers. The company supports individual initiatives but insists on the importance of companies' responsibility to achieving the COP targets. DHL has become a founding member of The First Movers Coalition (DHLb, n.d). This organisation advocates innovation and investment in new technologies. According to them and DHL, half of DHL's reductions to become carbon neutral by 2050 will come from technologies that do not yet exist or are not yet widely available. This strategy is encouraging but at the same time dangerous, in the manner of the optimistic paradigms of Nobel Prize laureate William Nordhaus (DHLb, n.d).

Finally, during COP26, DHL announced that it would invest €60 million in Sustainable Aviation Fuel, saving 70,000 tonnes of CO<sub>2</sub>e. The company recognises that this is a small amount and describes this investment as the first step towards their target of 30% sustainable fuel by 2030 (DHLb, n.d). Despite significant advocacy during the last COPs, DHL is not yet at a sufficient level of investment to reach their targets.

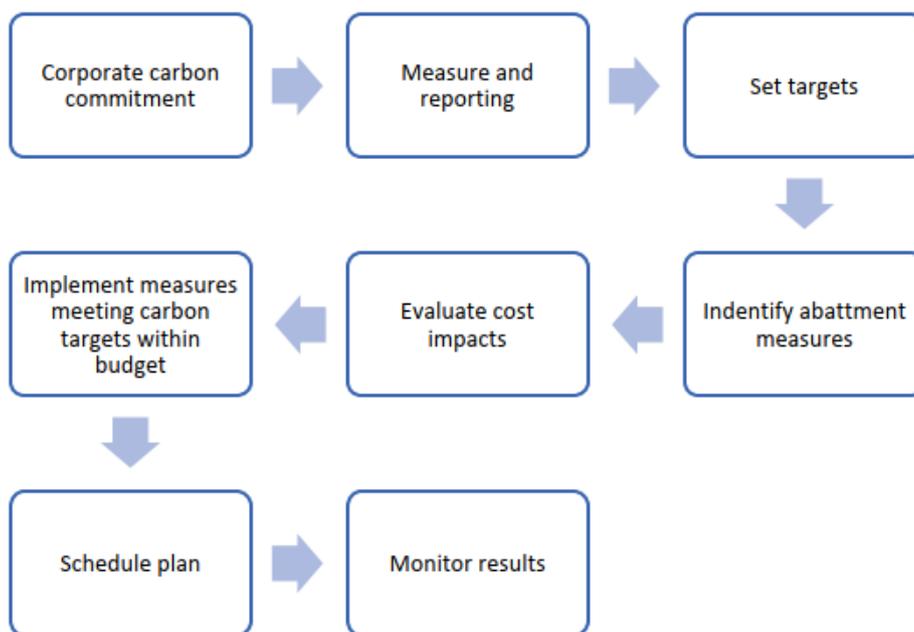
## 6. Discussion

DHL's carbon management practices would benefit from increased rigor. Compared to competitors in the sector, DHL is doing a good job of positioning itself as a forerunner and leader [19]. Nevertheless, the company is focusing on optimising energy efficiency to optimise costs [20]. DHL is also trying to extend its reach to consumers and suppliers. This is important as the company is based on an international customer base and therefore has a huge network of suppliers which it tries to influence in a restrictive way. This is achieved through monthly evaluations, benchmarks, and corporate marketing. It is a crucial component of good carbon management practices [21].

DHL's estimates and measurements are rigorous because they are based on sound and recognised protocols such as the GHG [22]. The measurements are monitored through an internal company system and audited by external institutions. The disclosure of this data within the CDP has allowed in 2018, the revision of their figures within Scope 2 and 3. Compared to Fedex and Ups, DHL is a good performer as they consider Scope 3 more strongly [4]. This is crucial because in the logistics transport sector, Scope 3 is the largest emitter of CO<sub>2</sub>e. DHL's weakness in the measures is undoubtedly the conclusions drawn from the figures. The company communicates on the reasons why certain emissions are increasing or decreasing but does not base itself sufficiently on scientific evidence [23]. Furthermore, DHL does not adequately link its economic measures to its emissions management. The only positive link made is between the Carbon efficiency Index, emissions, and investments. The reporting of these figures is lacking in rigour as the 2018 data revised by the CDP in 2020 has not been changed in the DHL sustainability report. This can lead to misinterpretation and errors.

Regarding the establishment of targets for 2050 and the mid-term objectives, the idea of transforming the company's activity with sustainable Carbon Management is relevant [24]. Through their programmes and milestones, DHL is taking on the pillars of sustainability. Nevertheless, there are stages in the implementation of these practices that are not fully respected by DHL.

These stages are one of the foundations of carbon management in companies [25]. These steps can reveal what is missing in DHL's processes. In terms of emission reduction initiatives, DHL is limited to internal investments in new energy technologies and external offsets. DHL's investment is poorly communicated when it comes to the relationship between costs and consequences. This is because their investment is too low given the targets set. As for offsets, they represent a very small percentage of the company's emissions. Marginal Abatement Cost Curves are not disclosed, and it is impossible to know whether the group uses this process, which is essential for a concrete action plan [26]. Thus, in terms of the budget allocated to emissions reduction, DHL is blurring the lines. The group announced that it would invest 7 billion euros over 10 years but did not detail these investments. The company will invest in new air and road vehicles, but more details are needed. In 2019, only three processes are described by DHL in the fight against emissions (figure 5). They represent a little more than 3% of emission savings on scopes 1 and 2, which are in the minority compared to scope 3.



**Figure 5** Stages in decarbonization and targets.

The efforts made by DHL are therefore more about limiting the increase in emissions rather than reducing them. The company has also announced that its emissions will inevitably increase in the coming years due to the e-commerce boom. The company predicts a decrease by 2030 but does not disclose any supporting scientific or strategic data. The question then arises regarding the legitimacy of the targets expressed by DHL. In 2007, the company was outpaced by UPS, which was the first to announce a strategy towards a more sustainable and less polluting future. In 2013, DHL responded to this marketing by being the first to set targets and talk about carbon neutrality [4].

The perception of a company working for sustainable development is a clear competitive advantage in business intelligence [27]. Given the vagueness around the actual methods used by DHL to achieve abatement, and their promises made on their publications with strong persuasion [4], it is possible that the group is engaging in greenwashing practices [28]. All these characteristics suggest that DHL has a top-down approach to targets even though the company tends to use more rigorous methods that reflect a bottom-up approach [25]. DHL does have some successes such as compliance and best practice benchmarking. The offset project in Lesotho is a recognised achievement and climate risk management is informed by reliable resources and scenarios [29].

## 7. Conclusion

DHL's carbon management has been analysed using measures disclosed by the company in its sustainability reports and CDP reports. Relevant strategies and information were analysed according to known carbon management practices and compared with similar information from DHL's competitors. The analysis showed DHL's practices in terms of compliance, benchmarking, disclosure, carbon emissions measurement, cost management, energy efficiency practices and offsetting. These practices were linked to the targets set by the company. This analysis was then supplemented by a performance appraisal using information from the relevant literature. This analysis was limited by the critical lack of information such as details of investments specifically aimed at reducing CO<sub>2</sub>e

emissions and the lack of review and clarity of some of the company's carbon accounting measures. This was the case for scope 3 emissions from 2015 to 2018. Comparison with DHL's competitors in the transport and logistics sector was also limited due to a lack of information and disclosure on companies such as UPS. The conclusions of this analysis can lead to some recommendations on carbon management techniques within DHL. Firstly, the company should develop, implement, communicate, and monitor a real emission reduction action plan with a precise milestone monitoring as seen in figure 2. Secondly, the company should deepen its carbon accounting to evaluate more options and to carry out a Marginal Abatement Cost Curve. Finally, DHL needs to consider other carbon management and emissions reduction tools, given the 2050 carbon neutrality target, the company needs to be more careful and rigorous in the choice of these tools.

### **Glossary of Terms, Abbreviation and Acronyms**

<b>CDM</b>	Clean Development Mechanisms
<b>CDP</b>	Carbon Disclosure Project
<b>CEX</b>	Carbon Efficiency Index
<b>COP</b>	Conference Of the Parties
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CO<sub>2e</sub></b>	Carbon Dioxide Equivalent
<b>DHL</b>	Deutsche Post DHL
<b>EEIO</b>	Environmentally Extended Input-Output
<b>ETS</b>	Emissions Trading Schemes
<b>FEDEX</b>	Federal Express
<b>GHG</b>	Greenhouse Gases
<b>IATA</b>	International Air Transport Association
<b>IEA</b>	International Energy Agency
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>KPMG</b>	Klynveld, Peat, Marwick & Goerdeler
<b>NO<sub>2</sub></b>	Nitrogen Dioxide
<b>OCHA</b>	United Nations Office for the Coordination of Humanitarian Affairs
<b>PM</b>	Particulate Matter
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Programme
<b>UPS</b>	United Parcel Service
<b>2DS</b>	2 Degrees Scenario

### **Author Contributions**

TD – writing (draft, editing), PD – conceptualization, writing (editing), GH – writing (editing), administration

### **Competing Interests**

The authors have declared that no competing interests exist.

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