



Parcel delivery on a warming planet

The efforts and ambitions of six companies

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Key takeaways

- Transport will be the biggest source of new greenhouse gas emissions in the decades until 2050. According to the World Economic Forum (WEF), delivery vehicles in the 100 largest cities around the world accounted for 19 million metric tonnes of CO₂ emissions in 2019. The number of delivery vehicles is expected to increase by 36 per cent in 2030.
- The negative impacts of last-mile deliveries are felt most prominently in cities. They endure increasing greenhouse gas emissions and also struggle with traffic congestion and air pollution caused by the increasing number of delivery vehicles, their emissions, and second-lane parking. If cities are to reach their decarbonisation targets, it is essential to reduce emissions of the parcel delivery sector.
- The six leading retail, e-commerce, and parcel delivery companies researched for this report are **Amazon, Deutsche Post DHL Group, FedEx, Flipkart, UPS, and Walmart**. Although all six companies demonstrate awareness of the environmental impact of last-mile deliveries and have set targets to reduce their emissions, all companies need to substantially accelerate their efforts to achieve their fleets' electrification and emissions targets. They have generally failed to formulate goals that are sufficiently ambitious and do not provide clear and accessible data on current progress and the measures they are taking.
- Most companies have set company-wide emissions targets, ranging from "zero emissions" (**Walmart**, own operations only), to "net-zero emissions" (**Amazon** and **Deutsche Post DHL Group**), and achieving "carbon neutrality" (**FedEx** and **UPS**). Target years vary as well. While **Amazon, FedEx, and Walmart** aim to achieve zero or net-zero emissions by 2040, **Deutsche Post DHL Group** and **UPS** have set 2050 as their target year.
- In absolute terms, **Amazon** is the largest emitter of greenhouse gases, with total emissions measuring over 60 million metric tonnes of CO₂ equivalents in 2020. **Walmart** is the only company whose emissions in 2020 were lower than those in 2016, while **Amazon** reports an increase of over 30 per cent between 2018 and 2020. The total emissions of **Deutsche Post DHL Group, FedEx, and UPS** appear to have stabilised between 2018 and 2020.
- **Flipkart** and **FedEx** have set target dates (2030 and 2040, respectively) for the full electrification of their delivery vehicle fleets, while **Walmart** plans to eliminate all emissions from its fleet by 2040. **Deutsche Post DHL Group** has set a target year for the partial electrification of its fleet (60 per cent by 2030). **Amazon** has set a partial net-zero fleet emissions target, while **UPS** does not have a concrete fleet-related emissions goal at all.
- **Deutsche Post DHL Group** is currently probably the most advanced in terms of electrifying its fleet. Some of the other companies have introduced smaller numbers of electric vehicles (**Amazon, FedEx** and **Flipkart**), while others have not yet introduced electric vehicles to their current fleet at scale (**UPS** and **Walmart**).
- Several of the selected companies also use two- and three-wheeler vehicles for delivery, such as electric and non-electric bicycles and tricycles. The use of smaller delivery vehicles can help reduce emissions, noise pollution, and congestion issues in cities. Finally, companies are also investing in logistical solutions to reduce both emissions and costs, such as neighbourhood hub systems, more efficient route planning, and joint delivery systems. All companies are investing in aerial delivery drones.
- In addition to these efforts by the six companies to reduce and eliminate greenhouse gas emissions generated by their last-mile deliveries, there are a number of sector-wide issues related to companies' emission reduction efforts, such as the environmental impact of the production of the vehicles and their components. While these issues should not discourage or slow down companies' efforts to eliminate emissions, it is essential to take them into account to ensure a truly sustainable and just transition.

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1 Introduction

Parcel delivery vehicles – whether electric or fossil-fuel driven – have become an integral part of city streets all over the world. Every day, retail, e-commerce, and parcel delivery companies' vehicles drive back and forth, bringing consumers the food, garments, and electronics they ordered online. In the past decade, the "Amazon effect" has determined the features of the delivery sector: shipping and returns have to be fast and free.¹ After the e-commerce sector tripled in size between 2014 and 2019, restrictions related to the Covid-19 pandemic led to a further boom in parcel deliveries in 2020.² This increase has resulted in more packages, more vehicles, more local pollution, more drivers, more waste, and, critically, more CO₂ emissions. The pressure on companies to reduce their negative impact on global warming is increasing.³

Efforts and ambitions of six delivery companies to reduce emissions

In this report, SOMO analyses the efforts and ambitions of Amazon, Deutsche Post DHL Group, FedEx, Flipkart, United Parcel Service (UPS), and Walmart to reduce and eliminate the impact of their "last-mile" deliveries on global warming. Even though the entire delivery chain is much longer and more extensive, this research focuses on a relatively cost- and energy-intensive phase of the delivery process:⁴ the so-called "last mile" a parcel travels from the final company warehouse to the consumer's home address. To what extent are these six companies taking measures to lower the greenhouse gas emissions generated in the last mile of their delivery systems? Given local city authorities' crucial role in local environmental and developmental policymaking, this report also presents three examples of how these authorities can encourage, facilitate, and regulate sustainable last-mile delivery systems.

Beyond greenhouse gas emissions reductions

A more sustainable delivery process would significantly contribute to reducing greenhouse gas emissions and consequently improving air quality in heavily polluted cities. SOMO does not question the need for a transition towards a system of sustainable energy provision, nor the vital role that renewable energy has to play in this transition. However, to make the energy transition in the transport sector truly sustainable, its pathway should include a spectrum of solutions that decarbonise transport and should also make our cities and all communities along the supply chain healthy, safe, and liveable. SOMO therefore applies a systemic perspective and points to relevant issues that go beyond a focus on reducing greenhouse gas emissions.

Report structure

The report starts with outlining the methods in Chapter 2 and an introduction of the last-mile concept and its role in global warming in Chapter 3. This chapter also discusses the role of cities. The examples of Delhi (India), Los Angeles (United States [US]), and London (United Kingdom) are taken to help readers understand the different contexts of cities and give an impression of their possibilities and limitations. In Chapter 4, the ambitions of six logistics, e-commerce, and retail companies to decrease their impact on global warming is discussed. The chapter provides an overview of the targets these companies have set for their emissions at a company-wide level and for their vehicle fleets and also discusses current and future fleets. In Chapter 5, structural issues present in the delivery supply chain are discussed. Finally, Chapter 6 presents the conclusions.

2 Methods

This report investigates the efforts and ambitions of six companies (Amazon, Deutsche Post DHL Group, FedEx, Flipkart, United Parcel Service (UPS), and Walmart) to reduce and eliminate the negative impact of their last-mile deliveries on global warming. The six companies were selected due to their leading positions in retail, e-commerce, and parcel delivery markets in a number of key geographies in North America, Europe, and India. To obtain a clear view on the delivery sector, different kinds of companies were chosen. Therefore, the research does not aim to make general statements about the entire delivery sector. It specifically looked at the companies' efforts regarding their company-wide emissions targets, fleet emission reduction targets, current electric vehicle fleets and investments in the expansion of these fleets, the use of alternative vehicles, improvements in logistics processes, and the use of alternative delivery methods (such as drones and robots).

The key research questions of this report are:

- ❑ What are the efforts and ambitions of six leading companies in the e-commerce, parcel, and delivery sector to reduce and eliminate the negative impact of their last-mile deliveries on global warming?
- ❑ What are examples of solutions currently available to companies to minimise their environmental impact?
- ❑ What are examples of how cities address negative environmental issues related to last-mile deliveries?
- ❑ Which sector-wide issues have an impact on companies' emission reduction efforts?

The data on the six companies' efforts and ambitions was collected from the companies' publicly accessible communications, such as corporate websites, press releases, annual reports, sustainability reports, and investor presentations, as well as media sources and other publicly available information. The emissions data was retrieved from the Refinitiv Eikon, one of the most widely used investor databases worldwide.

It must be noted that the data has limitations in terms of availability and comparability. For example, the companies use different scopes for their emissions targets (Walmart's target applies only to Scope 1 and 2, while Deutsche Post DHL Group also includes Scope 3, for instance; see Section 4.1). Most companies do not report clearly on the total size of their vehicle fleets and the number of electric delivery vehicles within those fleets, or do not report these figures at all. This makes it hard to assess the meaning of certain figures and compare the companies in terms of performance. In addition, not all data is reported per different stage in the delivery chain, such as the emissions generated specifically in the "last mile" phase of the delivery process. The report therefore also uses data pertaining to company-wide levels, which is indicated in the relevant sections.

The six companies were given the opportunity to review a draft version of this report in November 2021. Deutsche Post DHL Group, FedEx, and UPS responded; their comments were incorporated into this report where relevant.

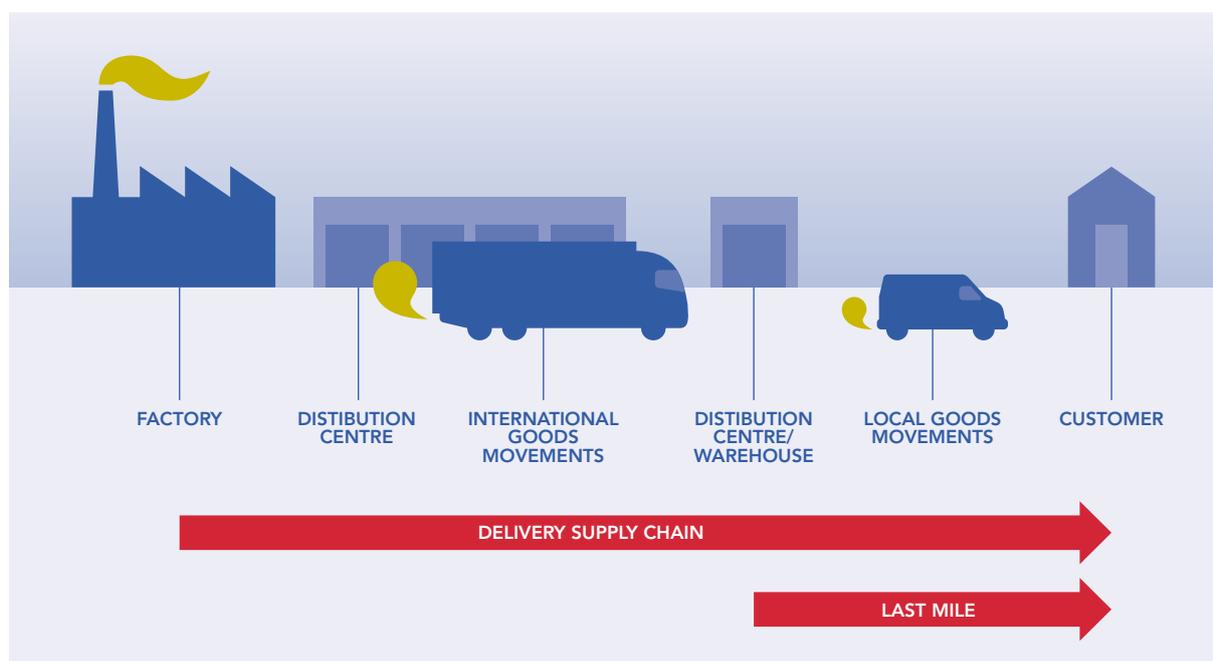
3 The last mile of delivery

Increasingly alarming reports from established institutions such as the Intergovernmental Panel on Climate Change (IPCC) have shown the urgency of addressing the climate crisis.⁵ To meet the goal of limiting global warming to 1.5 °C (2.7 F), set in the Paris Agreement of 2015, emissions need to be reduced drastically. It is clear that the current model of growth in global distribution, production, and consumption is simply not aligned with – and informed by – these climate goals.⁶ Similarly, not only has the e-commerce sector grown larger than ever before, globalised supply chains have also been getting longer and are increasingly associated with negative environmental impacts. Products from the other side of the world are within reach through a couple of clicks and are delivered to consumers' doorsteps through "just-in-time" delivery processes, which ensure that customers do not have to wait too long for an online order to reach their homes.⁷

3.1 The last-mile concept

The "last mile" refers to "the delivery of products along their last leg of transportation from a distribution hub, such as a distribution or fulfilment centre, to the final destination and end user"⁸ (see Figure 1). Although the last mile usually covers only a relatively short segment of the total delivery chain in terms of distance, a study by the World Economic Forum (WEF) finds that approximately one-third of total shipping costs can be attributed to the last mile.⁹ This has already increased companies' motivation to improve the last mile of the delivery process by making it more efficient. Recently, moreover, delivery companies have developed more and more initiatives to make the delivery process more sustainable and reduce their growing share in global warming.¹⁰

Figure 1 Last mile of the delivery supply chain



3.2 Online shopping and the climate crisis

Transportation is expected to be the largest source of new greenhouse gas emissions in the next decades until 2050.¹¹ Moreover, road transport alone is currently responsible for 11.9 per cent of global greenhouse gas emissions.¹² Last-mile delivery systems account for a substantial part of this type of emissions, although exact figures appear to be unavailable. The WEF estimates that last-mile deliveries of freight and parcels accounted for 19 million tonnes of CO₂ emissions in the 100 largest cities around the world in 2019. If there are no policy interventions, the WEF expects this figure to grow to 25 million tonnes (a 32 per cent increase) in 2030, combined with a 36 per cent increase in the number of delivery vehicles in these cities

(to 7.2 million vehicles in 2030).¹³ Societies' ability to reach their emissions targets is therefore strongly influenced by the delivery systems of retail, e-commerce, and parcel delivery companies.

3.3 The role of cities

The negative impacts of last-mile deliveries are felt most prominently in communities located close to warehouses and cities. Apart from enduring increasing greenhouse gas emissions, (inner) cities across the globe are struggling with traffic congestion and air pollution caused by the increasing number of delivery vehicles, their emissions, and second-lane parking.¹⁴ Congestion in some of the largest cities in the US, including New York, Chicago, and Los Angeles, has increased by 20 to 35 per cent since 2010.¹⁵ Cities are responsible for 70 per cent of global greenhouse gas emissions. Delivery vehicles – both trucks and vans – account for a disproportionately high amount of these compared to passenger cars. According to the WEF, if there are no policy interventions, the growing e-commerce sector and related last-mile traffic will lead to “severe challenges” in cities related to congestion, local pollution, and climate impacts.¹⁶

According to a study by the International Transport Forum at the OECD, “accessing city centres is crucial for vehicles used in last-mile delivery operations and existing experiences show that the prospect of access restrictions sends a strong signal to operators to electrify.”¹⁷ The study also refers to several Chinese cities that already have these access restrictions in place, such as Shenzhen and Chengdu. A French law from 2019 requires all cities that have more than 100,000 inhabitants to research the feasibility of a low-emission zone. In London,¹⁸ electric vehicles are exempt from the congestion charge; Central London should be a zero-emission zone by 2025.

City, state, and provincial authorities play an important role in addressing environmental issues. They can introduce local regulations, facilitate more sustainable solutions, and engage with key players (such as community members and companies). This report provides three examples of how cities have attempted to tackle negative environmental issues related to last-mile deliveries. The case-study cities vary in terms of density and form of urbanisation (from cities with a high degree of urban sprawl, such as Los Angeles, to those with a distinct central district, such as London and Amsterdam). The solutions cities choose to address congestion and pollution issues are highly dependent on these variables.

High density, air pollution, congestion, and two-wheelers. Delhi

Delhi is the second-largest urban agglomeration in India. It has a population of about 20 million, which will likely grow by a factor of 1.4 in the next decade. Its population density is high and approaches 30,000 inhabitants per square kilometre.¹⁹ This is considerably higher than the density of Los Angeles (approx. 3,000/km²) and London (approx. 6,000/km²). As Delhi's population increases, the city's demand for goods is also expected to increase from 68,000 metric tonnes/day in 2015 to 100,000 metric tonnes/day in 2025 and 130,000 metric tonnes/day in 2035.²⁰

Delhi is currently the fourth most-polluted city²¹ in the world, and its air quality ranges from “very low” to “unhealthy”. Vehicular emissions are the largest contributor to this air pollution. Cars, trucks, autorickshaws, two-wheelers, and road traffic are responsible for over 38 per cent of emissions.²² As two-thirds of new vehicle registrations in Delhi are for two-wheelers (that is, motorcycles and scooters),²³ any attempt at electrifying Delhi's vehicle fleet needs to take this specific segment into account if it wants to succeed at significantly reducing air pollution and greenhouse gas emissions.

In 2019, the Transport Department of the Government of Delhi organised a pilot project to kick-start the adoption of electric vehicles. This initiative was followed by the ambitious Delhi Electric Vehicles Policy²⁴ in 2020. This project aims to establish “Delhi as the EV [electric vehicle] capital of India and to accelerate the pace of EV adoption across vehicle segments, especially in the mass category of two-wheelers, public/shared transport vehicles and goods carriers. The policy shall seek to drive

rapid adoption of Battery Electric Vehicles (BEVs) so that they contribute to 25% of all new vehicle registrations by 2024”.

The implementation of the proposed policy will occur through several financial incentives for purchase and scrapping. The government will also provide interest subvention on loans and waive road tax and registration fees for electric vehicles. Furthermore, the Delhi government aims to establish an extensive charging stations and swappable battery stations network.

Delhi’s carbon ambitions are in accordance with India’s ambitions on a national level. On 2 October 2016, India ratified the Paris Agreement. This came a year after it had determined its targets on a national level. India’s targets are to lower the emissions intensity of its GDP by 33 to 35 per cent by 2030, below 2005 levels, to increase the share of non-fossil-based power generation capacity to 40 per cent of installed electric power capacity by 2030 (equivalent to 26 to 30 per cent of generation in 2030), and to create an additional (cumulative) carbon sink of 2,500-3,000 Mt CO₂ through additional forestation by 2030.²⁵

Delivery services have set electric vehicle goals for India as a whole, but not for individual cities specifically: Amazon aims to have 10,000 electric vehicles delivering parcels in India by 2025, while Walmart’s Flipkart has introduced campaigns in big cities, such as Delhi, aimed at deploying more than 25,000 electric vehicles and make the company’s delivery services fully electric by 2030.

Currently, less than 1 per cent of cars sold in India annually consist of electric vehicles, compared to about 6 per cent in China.²⁶ Therefore, despite the high ambitions of the Delhi government and the subsequent Rs 100bn (US\$ 13.4m) incentive programme, it is unlikely that targets will be met at the current pace of implementation. To date, only 19,064 electric three-wheelers and 74,634 two-wheelers have been sold, compared to targets of half a million and a million, respectively.²⁷ Currently available subsidies are still insufficient to bridge the price gap between an average internal combustion vehicle used in commercial fleets and a comparable electric vehicle.²⁸

4 Where are companies on mitigating last-mile delivery greenhouse gas emissions?

This chapter provides an overview of the current state of play and the measures and targets that the six logistics, e-commerce, and retail companies have announced to mitigate the negative environmental impacts of their last-mile delivery systems. It specifically looks at the six companies' current company-wide emissions and emissions targets as well as specific targets for fleet emissions. The chapter then maps a number of key measures the companies are taking to reduce these emissions. These include electrifying the fleet, investing in manufacturers of electric vehicles, using smaller delivery vehicles, improving logistics, and developing alternative delivery methods such as the use of drones and robots.

4.1 Overall emissions

Companies formulate their ambitions to reduce greenhouse gas emissions in different ways:

- ❑ A **"zero emissions"** target is considered to be the most ambitious, as this target implies companies will fully eliminate all greenhouse gas emissions generated by their activities.
- ❑ A **"net-zero emissions"** target, on the other hand, allows companies to continue to generate greenhouse gas emissions, as long as they offset these emissions by investing in measures or projects that supposedly compensate for them, such as renewable energy or forestation projects.
- ❑ The least ambitious type of emissions target is the **"carbon neutrality"** target. Like net-zero ambitions, it allows for offsetting, but it looks at carbon dioxide (CO₂) only and does not include other greenhouse gases that also adversely impact global warming, such as nitrous oxide (N₂O) and methane (CH₄).

In addition to determining the type of emissions target, it is also important to assess whether this target applies to a company's own operations only (Scope 1 and 2) or also to emissions generated in the company's value chain (Scope 3) (Figure 2).

Figure 2 Greenhouse gas emissions: scope 1, 2 and 3

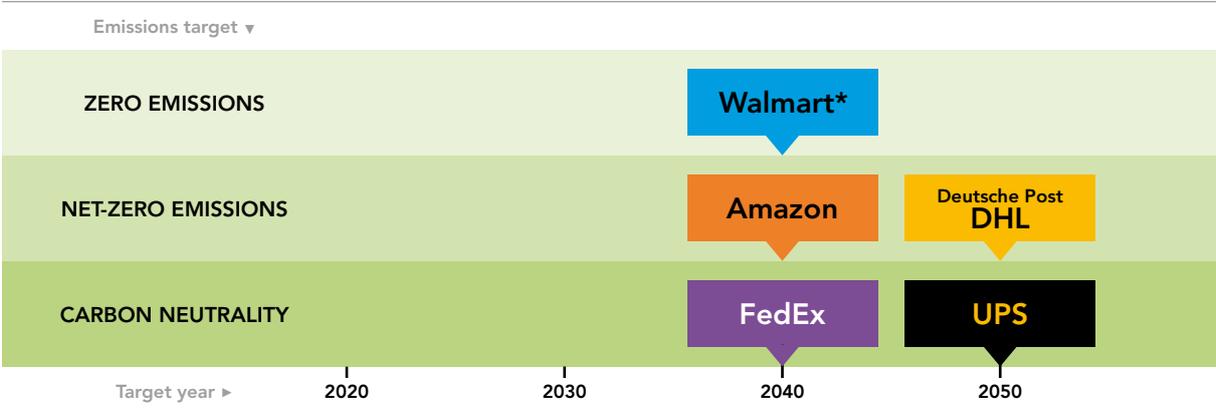
	Scope	Description ²⁹	Examples of emission types related to last-mile deliveries
	Scope 1	Direct emissions from owned or controlled sources	Emissions from fuel burned by delivery fleet
	Scope 2	Indirect emissions from purchased energy consumed by the company	Emissions from energy used to power head offices, distribution centres, and vehicles
	Scope 3	Indirect emissions that occur in the value chain of the company	Emissions from the production of packaging and vehicles; emissions generated by subcontracted delivery companies

Company-wide emissions targets

Five of the six companies examined in this report have set company-wide emissions targets (Figure 3). Walmart is the only company to have set a target for "zero emissions" for its global operations by 2040,³⁰ "without relying on carbon offsets".³¹ However, this target applies only to the emissions Walmart generates in its own operations (Scope 1) and the energy sources used to power these operations (Scope 2). It does not cover the indirect emissions that occur in the company's value chain (Scope 3), which is relevant in case the last mile is outsourced to subcontractors. Walmart's ambitions appear to cover the entire company group, including subsidiaries such as Flipkart, in which Walmart has a controlling stake of 77 per cent (via the Walmart International branch).³² Flipkart itself, however, has not communicated about a company-wide zero emissions goal or any other emissions target.

The other companies have committed to achieving either “net-zero emissions” (Amazon, Deutsche Post DHL Group) or “carbon neutrality” (FedEx, UPS). Target years also vary. While Amazon, FedEx, and Walmart aim to achieve zero or net-zero emissions by 2040, Deutsche Post DHL Group and UPS have set 2050 as their target year.³³

Figure 3 Overall emissions target³⁴



* For Walmart this target applies to Scope 1 and 2 only.

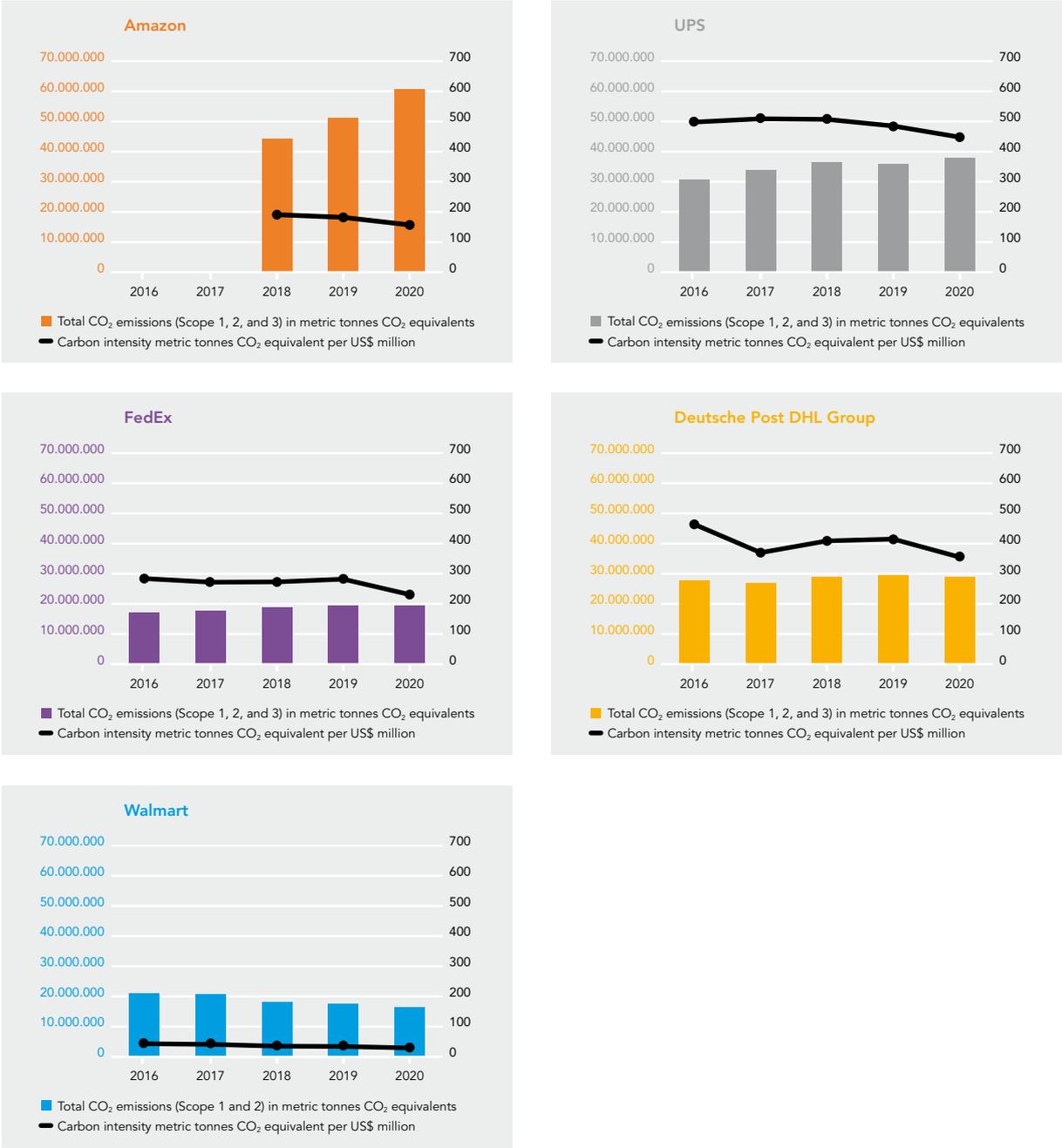
Current reported emissions

All companies except Flipkart report on their total CO₂ equivalent emissions (Figure 4). As Flipkart is a majority-owned subsidiary of Walmart and therefore included in the company’s consolidated financial accounts, it is assumed that Walmart’s figures take its emissions into account. FedEx reports much lower emissions for Scope 3 than its counterparts Deutsche Post DHL Group and UPS. This is due to differences in what types of emissions the different companies include when calculating their Scope 3 emissions.³⁵ Amazon started reporting on its emissions only in 2018, while Deutsche Post DHL Group, FedEx, and UPS have been doing so since at least 2016.

In absolute terms, Amazon is the largest emitter of greenhouse gases, emitting over 60 million metric tonnes of CO₂ equivalents in 2020. UPS and Deutsche Post DHL Group report total emissions of approximately 38 and 29 million metric tonnes of CO₂ equivalents, respectively, followed by FedEx (about 19 million metric tonnes) and Walmart (almost 18 million metric tonnes). Walmart is the only company whose emissions were lower in 2020 than in 2016, while Amazon reports an increase of over 30 per cent between 2018 and 2020. The total emissions of Deutsche Post DHL Group, FedEx, and UPS appear to have stabilised between 2018 and 2020.

In addition to absolute emissions figures, all six companies except Flipkart publish emissions intensity figures. These indicate the amount of CO₂ equivalents a company emits relative to, for example, its revenues. In order to create comparable data, new emissions intensity figures were calculated for this report based on the companies’ reported total emissions and their revenues in US\$ millions. These figures show that the emissions intensity rates of the five companies have decreased between 2016 and 2020.³⁶ This decrease was particularly significant for Deutsche Post DHL Group, FedEx, and UPS in 2020, when total revenues grew strongly but total emissions appeared to remain stable. Yet, while companies use the emissions intensity figures to demonstrate their achievements in reducing negative environmental impact figures, total emissions between 2016 and 2020 merely stabilised for three companies (DHL, FedEx, and Walmart) and are still growing for two (Amazon and UPS). Even though Walmart discloses its Scope 3 emissions in its submission to the Carbon Disclosure Project, it does not report these figures in its own annual report. The figures for Flipkart were not available.

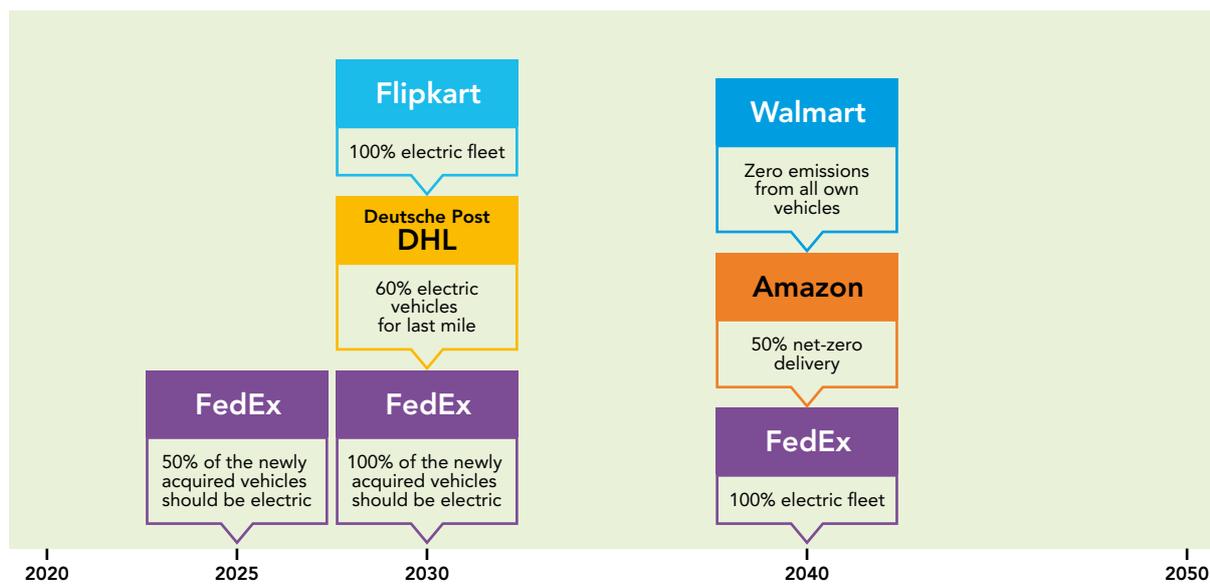
Figure 4 Total emissions and emissions intensity rates³⁷



4.2 Fleet emission reduction targets

In addition to their company-wide greenhouse gas emissions targets, which all fall short of targets needed to avoid the worst of the climate crisis, three companies have set specific zero emissions targets for their last-mile delivery vehicle fleets: Flipkart, FedEx, and Walmart (Figure 5). Flipkart and FedEx are aiming for 100 per cent electrically powered fleets by 2030 and 2040, respectively. For Flipkart, this is part of the company’s commitment to the EV100 initiative of the Climate Group, a UK-based nonprofit climate change organisation. The EV100 initiative brings together companies committed to electrifying their vehicle fleets.³⁸ FedEx has also set intermediate goals for the share of electric vehicles in its purchases of new pickup and delivery vehicles: by 2025, half of the company’s newly acquired vehicles for FedEx Express should be electric. This should increase to 100 per cent by 2030.³⁹ In line with its overall zero emissions target, Walmart aims to have eliminated all emissions from the vehicles it owns by 2040. It wants to achieve this by using only electric and hydrogen-fuelled vehicles.⁴⁰ However, Walmart has also referred to the use of “renewable diesel”,⁴¹ which essentially enables the continued use of fossil-fuel-powered vehicles (see Section 5.3).

Figure 5 Fleet-related emissions targets⁴²



Amazon, Deutsche Post DHL Group, and UPS have set less ambitious fleet emission goals. In March 2021, Deutsche Post DHL Group announced that it aims to have electrified at least 60 per cent of its last-mile delivery fleet by 2030.⁴³ Remarkably, this target seems to be lower than its previous sustainable last-mile delivery target, which was published in 2017. Back then, the company claimed it would operate 70 per cent of its own pickup and last-mile delivery services (Scope 1 and 2) with “clean solutions, such as bicycles and electric vehicles” by 2025.⁴⁴ In March 2020, the company still reported that it had this target, when it published its 2019 Sustainability Report.⁴⁵ Since then, however, Deutsche Post DHL Group seems to have replaced this with the aim to electrify 60 per cent of its fleet by 2030. In response to a draft version of this report, the company stated that its new target is actually more ambitious, as it also applies to subcontractors (Scope 3).⁴⁶ Deutsche Post DHL Group also joined the EV100 initiative,⁴⁷ but stated in response to a draft version of this report that it cancelled its membership of the initiative.⁴⁸

In 2019, Amazon announced that it aims to deliver 50 per cent of its shipments “with net-zero carbon” by 2030, a target it calls “Shipment Zero”.⁴⁹ This target includes the company’s last-mile delivery operations. Amazon does not have a specific fleet electrification target, but did announce several orders of electric vehicles in the US, Europe, and India, amounting to 111,840 electric vehicles to be deployed before 2030.⁵⁰ According to media reports, Amazon had a fleet of approximately 30,000 vans by the end of 2019.⁵¹ As the company continues to expand its own delivery logistics network around the world, it is unclear which portion of its total fleet will be electrically powered after the rollout of orders it has announced so far is completed.

UPS has not formulated a clear fleet emissions or electrification target. The company has stated that it aims to reduce emissions through fleet electrification,⁵² but has set a specific target only for the use of what the company calls “alternative” fuels (which are still highly polluting – see Chapter 5.3) in its “ground operations” (thereby excluding air transport, for example).⁵³ The company aims to use alternative fuels for 40 per cent of its total fuel consumption by 2025.⁵⁴ The usage of alternative fuels such as liquid natural gas (LNG) and compressed natural gas (CNG) is questionable, considering, among other issues, their higher emission of very small particles and methane leakages along the supply chain (see Section 5.2).⁵⁵

UPS has placed an order for 10,000 electric vans with UK-based company Arrival, which will be delivered between 2020 and 2024 (see Section 4.3).⁵⁶ However, it does not specify which portion of its total fleet will be electrified or what share of total emissions generated by last-mile deliveries it aims to have eliminated. UPS has made clear that its targets are “aspirational and not guarantees or promises that all goals will be met”, due to the company’s “dependence on technological innovations and other available resources needed to drive environmental change”.⁵⁷

Flipkart is the only company in this study that has currently committed to the Climate Group's EV100 initiative.⁵⁸

4.3 Electric vehicles in current fleets

Given the current composition of their vehicle fleets, all six companies still have a long way to go to achieve their fleet emissions targets. Based on publicly available data, Deutsche Post DHL Group has currently probably advanced the most in electrifying its fleet (Figure 6). By the end of 2020, the company's fleet comprised just over 15,000 electric vehicles, equalling 14.5 per cent of Deutsche Post DHL Group's entire fleet and 20 per cent of the company's total number of vans. The vast majority of these are StreetScooter delivery vehicles (14,435 vehicles).⁵⁹ In addition, the Group also operates 1,390 hybrid vehicles.

The picture for the other five companies is unclear, as they do not report on either their total fleet size or current number of electric delivery vehicles. FedEx reports on operating about 3,000 electric vehicles in its fleet, but this includes forklifts and airport ground service vehicles.⁶⁰ Neither Amazon nor Walmart report on the current size of their fleets and the different vehicle types these contain. Amazon did state that it added 1,800 electric vehicles to its fleet in Europe in 2021. Walmart has been running various pilot projects for last-mile deliveries. These include projects with electric vehicles, but the company has not yet announced any electric vehicle orders.

Flipkart has stated that its fleet currently contains 2,000 electric vehicles, including two- and three-wheelers, but it is not clear how this relates to the total size of its fleet. In 2019, Flipkart announced it would replace 40 per cent of its last-mile delivery fleet with electric vehicles by March 2020.⁶¹ However, the company has not reported on progress or on achieving this goal. As no data is available on the total size of Flipkart's fleet, it is unclear whether the company met this target with its reported electric vehicle fleet of 2,000 in 2021.

UPS does not report on how many electric vehicles it operates. These are included in a category of 13,000 vehicles that combines those powered by CNG, LNG, ethanol, and propane, as well as hybrid and full-electric vehicles.⁶²

Figure 6 Overview of fleet sizes, currently owned and ordered electric vehicles (EVs), and suppliers

Company	Total fleet size (2020)	Current # EVs (2020)	Current % EVs	# EVs ordered	# EVs planning to order	Target % EVs	Target year	Suppliers of EVs
Amazon ⁶³	(reportedly owned 30,000 delivery vans in 2019) ⁶⁴	1,800	N/A	111,840	N/A	N/A	2030	Rivian, Mercedes-Benz, Mahindra Electric, StreetScooter
Deutsche Post DHL Group ⁶⁵	106,000 vehicles, of which 77,000 vans	15,400	14.5 ⁶⁶	500	80,000 ⁶⁷	60	2030	StreetScooter, Toyota, Fiat
FedEx ⁶⁸	200,000+ motorised vehicles	3,078 ⁶⁹	N/A	1,500 ⁷⁰	N/A	100	2040	BrightDrop (General Motors), Nuro, (formerly: Chanje Energy/ Ryder System)
Flipkart ⁷¹	N/A	2,000 ⁷²	N/A	25,000	N/A	100	2030	Hero Electric, Mahindra Electric, Piaggio
UPS ⁷³	127,000 vehicles	13,000+ 'low emissions vehicles'	N/A	10,000	N/A	N/A	2024	Arrival
Walmart ⁷⁴	N/A	N/A	N/A	N/A	N/A	100 ⁷⁵	2040	Cruise (General Motors), Nuro

4.4 Electric delivery vehicles ordered and investments in manufacturers

The six companies have placed orders for electric delivery vehicles with a wide range of original equipment manufacturers (OEMs), including “conventional” manufacturers in the automotive industry (for example Mercedes-Benz and General Motors) and new start-up companies that specifically focus on the development and manufacturing of electric vehicles (such as Rivian, Arrival, and Cruise) (Figure 6). These deals are often announced as “partnerships” between the delivery companies and vehicle manufacturers, although it is not always clear what such partnerships mean in practice beyond the delivery of an agreed-on number of vehicles. In several cases, the case-study companies have also invested in these vehicle manufacturing companies (for example Amazon in Rivian, UPS in Arrival) or own these companies entirely (such as Deutsche Post DHL Group and StreetScooter GmbH).

Amazon’s most prominent supplier of electric vans is US-based electric-vehicle manufacturer Rivian, from whom Amazon has ordered 100,000 tailor-made delivery vans. These vans are to be delivered between 2022 and 2030; the first 10,000 before the end of 2022.⁷⁶ In addition to this order, Amazon has also invested in the company itself through multiple funding rounds, resulting in a 20 per cent stake in Rivian.⁷⁷ Amazon’s investment in Rivian amounted to US\$ 1bn⁷⁸ prior to the latest funding round in 2021, which was led by Amazon and Ford and raised another US\$ 2.5bn for the company, coming from multiple investors.⁷⁹ In 2020 and 2021, Amazon added 1,800 electric Mercedes-Benz vans to its fleet for delivery operations in Europe and also announced a partnership with Mercedes-Benz.⁸⁰ Moreover, the company has created a partnership with Mahindra Electric, from which it will purchase 10,000 electric three- and four-wheeler delivery vehicles by 2025 for its operations in India.⁸¹

Most electric vehicles in the fleet of Deutsche Post DHL Group were produced by StreetScooter GmbH, an electric-vehicle manufacturing company that was acquired by the Group in 2014.⁸² StreetScooter also produces electric delivery vehicles for other companies, including 40 StreetScooter vehicles that Amazon ordered in 2020.⁸³ In February 2020, Deutsche Post DHL Group announced its plans to sell StreetScooter, stating that the company had failed to become profitable and that the production of vehicles did not belong to the core activities of the Group.⁸⁴ According to media reports in October 2021, the sale of StreetScooter is expected to be completed soon.⁸⁵ In 2018, StreetScooter and Ford announced a partnership for the production of a new, larger electric delivery vehicle for Deutsche Post DHL Group.⁸⁶ However, this partnership appears to have been discontinued.⁸⁷ The Group has announced it will be purchasing up to 80,000 electric delivery vehicles until 2030.⁸⁸ In 2021, it announced it is purchasing 400 electric vans from Toyota for its operations in the Netherlands and 100 electric vans from Fiat for its DHL Express operations in Europe.⁸⁹ In response to a draft version of this report, Deutsche Post DHL Group confirmed that it expects the total size of its fleet will grow until 2030.⁹⁰ Other orders placed to meet the announced target of 80,000 vehicles have not yet been announced.

FedEx has ordered electric vans from several companies, including BrightDrop, a new General Motors brand that was launched in 2021.⁹¹ Its delivery van model was developed in partnership with FedEx. BrightDrop completed the delivery of 500 EV600 vans to FedEx in September 2021.⁹² In 2018, FedEx and fleet management and logistics company Ryder ordered 100 and 900 electric delivery vehicles from Chanje Energy, respectively. Ryder then leased its vehicles to FedEx for the latter’s operations in California, US. Chanje Energy is a subsidiary of FDG, a Chinese battery and electric-vehicle manufacturer. However, according to media reports and court files that became public in March 2021, Chanje Energy never delivered the vehicles. This, in addition to other issues, prompted Ryder to file a lawsuit against the company.⁹³ FedEx has also announced a partnership with self-driving electric-vehicle manufacturer Nuro in Houston, US.⁹⁴

Flipkart has announced partnerships with India-based Hero Electric, Mahindra Electric, and Italian company Piaggio, all of whom focus on two-, three- and four-wheeler electric vehicles.⁹⁵ Flipkart has stated it aims to develop a “wide network of ecosystem partners”, including OEMs, to work on designing and manufacturing electric vehicles tailored to e-commerce deliveries.⁹⁶

UPS has been working with UK-based electric-vehicle manufacturer Arrival since 2016.⁹⁷ In 2020, UPS committed to purchasing 10,000 electric vans from Arrival between 2021 and 2025 and placed an option for another 10,000 vans.⁹⁸ The company has stated that 70 per cent of these electric vans will be deployed in the US, and the remainder in Europe.⁹⁹ UPS has also made a minority investment in Arrival.¹⁰⁰

Walmart has run several pilot projects focused on last-mile delivery vehicle innovations, although not all of these were aimed specifically at reducing the environmental impact of last-mile deliveries. The company announced that it would start a pilot project with self-driving electric vehicles produced by Cruise in Arizona, US, in 2020.¹⁰¹ In 2021, Walmart also decided to invest in Cruise, which is majority-owned by General Motors.¹⁰² Other projects with electric vehicles include Walmart's partnerships with Udelv (announced in 2019¹⁰³), Ford (2018¹⁰⁴), and Google subsidiary company Waymo (2018¹⁰⁵). However, these partnerships appear to focus mainly on testing self-driving technologies rather than zero emissions delivery. Like FedEx, Walmart has partnered with Nuro to test self-driving electric delivery vehicles in the Houston region in the US.¹⁰⁶

In sum, the overview of the six companies' orders and investments in electric vehicles shows that the majority of the companies in this study have taken only relatively small steps to electrify their fleets. Amazon has placed large orders for new electric delivery vehicles but has failed to indicate what proportion of its total fleet will be electric. Flipkart and Deutsche Post DHL Group have also announced large orders for electric vehicles and are planning to electrify 100 per cent and 60 per cent, respectively, of their last-mile delivery fleets by 2030. UPS has ordered a fairly limited number of electric vehicles vis-à-vis the total size of the company's fleet. Other companies have so far ordered only small numbers of electric vehicles (FedEx) or have not placed any orders at scale at all (Walmart). All companies will need to substantially accelerate their efforts to achieve their fleet electrification and emissions targets.

4.5 Use of smaller delivery vehicles

In addition to vans and other motorised four-wheeler vehicles, several selected companies also use two- and three-wheeler vehicles for delivery, such as electric and nonelectric bicycles and tricycles. The use of smaller delivery vehicles can help reduce emissions, noise pollution, and congestion issues in cities. For example, a major part of Flipkart's current fleet of electric vehicles (2,000 vehicles) consists of two- and three-wheeler delivery vehicles, although specific figures are not publicly available. Deutsche Post DHL Group reports using 28,500 bicycles for its operations – including 8,000 e-bikes, 8,700 e-trikes, and 100 cargo bikes – in Germany.¹⁰⁷

Amazon, UPS, and FedEx do not report on using bicycles for their deliveries at scale, but have run various pilot projects in multiple countries. Amazon, DHL, and UPS all participated in the New York City Department of Transportation's cargo bicycle pilot project, which was launched in December 2019.¹⁰⁸ They were later joined by other companies, including FedEx. Amazon is also experimenting with bike delivery systems in Europe (London)¹⁰⁹ and ran a pilot project in Seattle, US, in 2015, which was terminated unexpectedly in 2016.¹¹⁰ UPS has implemented test projects with e-bike delivery systems in over 30 cities worldwide, including urban areas in Germany (Hamburg), Denmark (Copenhagen), Sweden (Stockholm), Ireland (Dublin), and the US (Seattle).¹¹¹ FedEx has launched pilot projects for e-bike deliveries in several cities, including those located in the United Kingdom (London), the Netherlands (Amsterdam), Germany (Frankfurt), Canada (Toronto), and the US (Madison).¹¹² Many of these pilot projects were carried out in cooperation with city authorities. Walmart has not reported on doing deliveries by bicycle at all.

4.6 Improved logistics

Retail, e-commerce, and parcel delivery companies are also investing in logistical solutions to reduce both emissions and costs. These include developing neighbourhood hub systems (where consumers can pick up their parcels from locker systems), planning more efficient routes based on, among other things, live traffic data, and implementing joint delivery systems among different companies to reduce vehicle movements.¹¹³ Another example is Amazon's offer, available to its Prime customers, to have all orders delivered on one specific day of the week in order to reduce packaging and make shipments more efficient.¹¹⁴

From low emissions to no emissions? London

With a population of around 9.5 million, London is by far the biggest urban agglomeration in the UK. Its traffic congestion and air quality match this status.¹¹⁵ Ever since thousands died within a few weeks in the “great smog” of 1952,¹¹⁶ London has been trying to improve its air quality and tackle congestion. The first official step taken to improve air quality was the Clean Air Act of 1956.¹¹⁷ In more recent years, in addition to bringing down levels of nitrous oxide and particulate matter, goals to reduce CO₂ also shape city policy: London aims to be a zero carbon city by 2030.¹¹⁸

In 2003, London introduced the Congestion Charge, which roughly covers the area of the London Inner Ring Road. At the time, it was the largest ever plan of its kind undertaken by a capital city.¹¹⁹ Five years later, in 2008, the Greater London Authority introduced the London Low Emission Zone (LEZ).¹²⁰ This traffic pollution-charge plan is meant to reduce exhaust emissions of diesel-powered vehicles. It has been rolled out in phases towards an increasingly stricter regime in 2012.¹²¹

The LEZ overlaps with the area in which the Congestion Charge applies.¹²² In a continued effort to reduce pollution, London now has an Ultra-Low Emission Zone (ULEZ).¹²³ This zone is central to the mayor of London’s plans to improve Londoners’ health. It should clean up the city’s toxic air, which leads to the early deaths of thousands of people every year.¹²⁴ The effort has been successful. Since 2016, air pollution has dramatically decreased,¹²⁵ and in October 2021, the zone became 18 times larger.¹²⁶ The current target for London is to be zero emission by 2050.¹²⁷

This requires addressing the “freight challenge” related to the immense increase in online shopping and home deliveries. One issue is that 30 to 60 per cent of deliveries to offices in central London are for personal rather than business recipients.¹²⁸ To reduce such trips, Transport for London is seeking to collaborate with the largest employers in London in order to redirect staff’s personal deliveries to a network of “walk to” collection points and to promote “click and collect” services. If this approach is successful, the mayor could then consider imposing a delivery surcharge so as to encourage more companies and consumers to use local collection points.¹²⁹

In addition, London has been promoting cargo bikes as a preferred mode of transport for deliveries. Smaller businesses but also UPS and DHL have been reported to use these.¹³⁰ DHL is also making use of London’s waterways to avoid congested traffic.¹³¹ Amazon struck a deal with the City of London at the end of 2020 to turn 39 underground parking spaces into a “last-mile logistics hub”. This involves dropping off parcels at the hub and then taking them to their final destination by electric cargo bikes or on foot. In this way, the City of London hopes to remove dozens of vans from its streets every day, reducing pollution and congestion.¹³²

4.7 Alternative delivery technologies

In addition to engaging in more conventional ways of reducing carbon emissions (such as fleet electrification), the delivery sector has been working on other methods to make their last mile more sustainable and efficient. All companies are investing in developing aerial delivery drones and training drone delivery pilots. Flipkart piloted drone delivery of Covid-19 vaccines,¹³³ while the other five companies are running drone delivery testing projects to enable very short delivery times.¹³⁴ Amazon, Deutsche Post DHL Group, and FedEx, among others, are developing and experimenting with delivery robots and drones. Concerns have been raised about how these developments will impact employment in the parcel delivery sector.¹³⁵

5 Sector-wide issues related to mitigating emissions of last-mile deliveries

In addition to the six companies' individual efforts to reduce and eliminate the greenhouse gas emissions generated by their last-mile deliveries, described in Chapter 4, this chapter addresses a number of sector-wide issues related to companies' emission reduction efforts. While these issues should not discourage or slow down companies' efforts to eliminate emissions, it is essential to take them into account if we are to ensure a truly sustainable and just transition.

5.1 Emissions in the production phase of electric vehicles

The large-scale electrification of vehicle fleets is considered an essential part of the transition to sustainable business operations. While electric vehicles eliminate direct tailpipe and fuel-cycle emissions, assessments of the environmental impact of electric vehicles should take into account their entire life cycle as well as how the electricity used to charge these electric vehicles is generated. Research by the European coalition of environmental nonprofit organisations Transport & Environment estimates that the production of electric cars (excluding the battery) is about 11 per cent less carbon-intensive than its conventional equivalent.¹³⁶

CO₂-emissions are, among others, related to the extraction of minerals and metals, and the transportation of the vehicle and vehicle parts. Including the battery production and national energy mixes that produce the electricity these vehicles consume, the Transport & Environment report estimates that in Poland – a country with a coal-dominated energy mix – an electric car emits 29 per cent less CO₂ than its conventional counterpart. In a country like Sweden, where hydropower plays a big role in the energy mix, this goes up to 79 per cent. Electric cars emit less CO₂ and reduce pollution. This makes an important contribution to the overall goal of combatting global warming, particularly when done in combination with robust action to reduce emissions in the production stage, as well as wider action to reduce the overall number of vehicles, which will reduce demand for materials and make cities less congested.

Emissions savings per vehicle may be partially undone by the expected growth of the last-mile delivery sector. The WEF expects demand for last-mile deliveries to soar by 78 per cent between 2019 and 2030.¹³⁷ Similarly, Deutsche Post DHL Group expects its last-mile delivery fleet to grow by 70 per cent in 2030 compared to 2020 (Section 4.4). In addition to reducing emissions by electrifying, companies should also reduce the number of vehicles to reduce pressure on materials and reduce congestion in cities. It is therefore important that, when assessing their zero emissions targets, companies also consider the impacts generated in the production phase of electric vehicles. Fleet electrification should be combined with other interventions that reduce the impact of the last mile and decrease the number of vehicles needed, for example by organising sector-wide joint delivery systems¹³⁸ or offering slower shipping options that reduce the need for inefficient delivery routes.¹³⁹

5.2 Impact of the increased demand for minerals

The large-scale uptake of electric vehicles has led to a sharply increasing demand for minerals such as lithium, cobalt, nickel, graphite, and manganese, mainly for the production of batteries for electric vehicles. The extractive sector overall is associated with severe negative social and environmental impacts, including heavy pollution, water shortages, exposure to toxic chemicals, and forced evictions of, and lack of consultation with, local and indigenous communities.¹⁴⁰ These impacts are prevalent in the mining of minerals associated for batteries and are felt most strongly by communities living in proximity to the areas of extraction. While fleet electrification can contribute to reducing global warming, companies that are planning for the large-scale electrification of their vehicle fleets therefore need to take note of the issues related to the extraction of minerals for these vehicles and take measures to mitigate and eliminate these impacts.¹⁴¹ The demand for these materials must also come hand in hand with stronger and binding due diligence rules to trace, prevent and remedy potential social or environmental harm globally.

5.3 Issues related to unsustainable “alternative” fuels

In addition to the strong focus on increasing the use of electric vehicles, several companies – including Deutsche Post, UPS, and FedEx – also refer to the use of “alternative fuels” as a means to reduce the environmental impact of their fleets, although it is not always clear if this specifically relates to their last-mile delivery fleets. UPS, in fact, does not have a target for fleet electrification, but only for the use of “alternative fuels”, in which it includes unsustainable and nonrenewable fossil fuels such as LNG and CNG.¹⁴² Over a 20-year period, methane warms the planet at more than 80 times the rate of CO₂, making it as bad as or worse than burning oil.¹⁴³

Liquid natural gas (LNG) and compressed natural gas (CNG) are predominantly composed of fossil-fuel-derived methane. CNG is produced by compressing gas to less than 1 per cent of its original volume. LNG is produced by cooling natural gas to a liquid. Renewable natural gas (RNG), on the other hand, is methane captured from, among other sources, landfills, livestock, wastewater treatment, and organic waste.

Both UPS and Amazon also refer to another “alternative fuel” in their strategy: RNG, also called biogas or biomethane. Amazon recently signed an agreement which will provide the company with renewable gas,¹⁴⁴ and UPS’s strategy is highly dependent on the increasing use of RNG.¹⁴⁵ According to Transport & Environment, RNG is extremely costly compared to alternatives, the amount of RNG that can realistically be produced is insufficient to realise net-zero emissions goals and is more urgently needed in sectors already reliant on gas (e.g. heating), while in transport RNG exacerbates existing air pollution problems.¹⁴⁶ CNG, LNG, and RNG should therefore not be considered clean solutions or feasible alternatives to vehicles powered by other fossil fuels.

5.4 Subcontracting

In addition to their own delivery networks, the companies included in this research all use subcontractors for their deliveries as well. Subcontractors are independent companies which, among other things, are responsible for their own environmental policies and vehicle fleets. FedEx, for example, currently owns slightly over half of its fleet only.¹⁴⁷ Amazon and Walmart are developing their own delivery networks, but still rely on external delivery companies as well. Walmart, for example, has a parcel delivery partnership with FedEx.¹⁴⁸ None of the six companies in this research state explicitly whether their emission reduction targets and fleet electrification measures also apply to outsourced activities. Walmart explicitly limits its zero emissions goal to its own operations, thereby excluding Scope 3 emissions, such as those generated by outsourced or external deliveries (Section 4.1). In response to a draft version of this report, Deutsche Post DHL Group stated that its environmental targets, including its fleet electrification target, also apply to Scope 3 emissions, and that its fleet electrification target also applies to vehicles owned by subcontractors.¹⁴⁹ In its public communication, the company only states that it aims to achieve its sustainable last-mile delivery targets “in close collaboration” with its subcontractors.¹⁵⁰

Subcontracting practices in the last-mile delivery sector have been associated with poor working conditions and labour rights violations in many countries.¹⁵¹ These issues have been linked to the strong pressure these subcontracting companies face to reduce delivery costs and shorten delivery times. Subcontractors themselves often outsource activities to other subcontractors or independent workers. These subcontracting issues are also relevant to companies’ efforts to reduce the environmental impact of their last-mile deliveries. For example, the strong pressure to reduce costs and the complexity of subcontracting relations in the last-mile delivery sector reduce subcontractor companies’ abilities to mitigate environmental impacts. In fact, when subcontractors are squeezed to deliver at the lowest possible cost, they will likely be unable to make long-term investments in electric vehicles, for instance.

From car capital of the world to warehouse capital of the world? Los Angeles

Los Angeles is one of the most congested cities in the US.¹⁵² It is ranked the worst city for ozone pollution in the country by the American Lung Association.¹⁵³ These are consequences of the logistical position of Los Angeles: it has two large and busy ports and, as a result of the growth of e-commerce, it is on its way to becoming the warehouse capital of the world.¹⁵⁴ Forty per cent of all goods entering the US go through the port of Los Angeles.¹⁵⁵ The air quality is worst along certain corridors close to the ports and warehouses. These regions have been described as “diesel death zones”¹⁵⁶ and are disproportionately impacting low-income communities of colour. Communities and NGOs have been organising to protect their health, mounting substantial campaigns and protests for cleaner air and fewer diesel trucks.¹⁵⁷

In 2019, 19 per cent of greenhouse gases was emitted by road, air, and water transportation. Also, transportation is seen as the main contributor to air pollution.¹⁵⁸ The State of California and the City of Los Angeles have set several targets in order to tackle greenhouse gas emissions and other air pollutants. Los Angeles wants to be a carbon-neutral city by 2050.¹⁵⁹

In addition to addressing congestion from personal vehicles and electrifying public transportation, LA is paying special attention to urban delivery vehicles. The City aims for all delivery vehicles to be zero emission by 2035. In order to reach this goal, it created the Los Angeles Cleantech Incubator, LACI, which in turn launched the Transportation Electrification Partnership. This multiyear partnership among local, regional, and state stakeholders intends to accelerate transportation electrification and the zero emissions goods movement in the Greater Los Angeles region before the 2028 Olympic and Paralympic Games.¹⁶⁰

As part of the LACI programme, Santa Monica created a pilot for a one-square-mile Zero Emission Delivery Zone (ZEDZ).¹⁶¹ One of the main goals of this pilot is “to provide a blueprint for cities to adopt zero emissions delivery zones and provide best practices for other zero emissions zones”. In addition, the pilot enables delivery companies to participate in a certain area and experiment with different new technologies.

In March 2020, Los Angeles and London announced that they would collaborate in transport innovation in order to tackle some of the biggest transportation issues facing cities around the world.¹⁶²

While Deutsche Post DHL Group refers to supporting its subcontractors in reducing their environmental impact, through “standards, education and incentives to invest in green transport solutions”,¹⁶³ it does not clarify what this support entails specifically.¹⁶⁴ The company includes environmental standards and expectations in its Supplier Code of Conduct and expects suppliers to, among other things, support Deutsche Post DHL Group’s environmental and climate protection goals by taking efficient product and service delivery into consideration.¹⁶⁵ The company also requires its subcontractors to provide environmental data upon request and to set and implement their own climate protection goals.¹⁶⁶

To comprehensively address the environmental impacts of their last-mile deliveries, companies will need to extend the scope of their policies and ambitions to include subcontracted activities. They also need to address the issues currently related to these subcontracting practices in order to ensure that all actors are able to invest in reducing their environmental impacts.

5.5 Offsetting

Four of the six companies in this study (Amazon, Deutsche Post DHL Group, FedEx, and UPS) plan to use carbon offsetting to reduce part of their emissions on paper and thereby meet their emission reduction goals. They will do so by acquiring carbon credits, which represent the number of metric tonnes of CO₂ equivalents a company has emitted and compensated for. Publicly available sources so far provide only partial data on the use of carbon offsetting by three of the companies in this study: Deutsche Post DHL Group, FedEx, and UPS.¹⁶⁷ Deutsche Post DHL Group purchased around 250,000 carbon credits annually between 2016 and 2018 (approximately 1 per cent of its total annual emissions). In 2019 and 2020, this figure rose to approximately 450,000 (1.7 per cent of total emissions) (Figure 7). FedEx reports on offsetting around 76,000 metric tonnes of CO₂ equivalents annually between 2016 and 2019 (0.4 per cent of its total emissions), followed by a sharp drop to 11,000 metric tonnes (0.1 per cent) in 2020. UPS compensated for around 118,000 metric tonnes of CO₂ equivalents annually between 2016 and 2019, which represents 0.3 per cent of its total emissions on average.

Offsetting does not provide a viable alternative to reducing actual emissions generated by the six companies. Offsetting and related compensation projects have been criticised extensively for failing to actually compensate for emissions, not leading to permanent emissions reductions, having harmful side effects on nature and local communities, and being based on vague accounting standards.¹⁶⁸ Researchers and civil society organisations have also questioned the additionality of many carbon-compensating projects, that is, whether projects really contribute to additional carbon savings which would not have taken place otherwise.¹⁶⁹

Moreover, given the large scale of the emissions generated by the six companies in this study, offsetting does not appear to be a feasible method to compensate for even a relatively small proportion of these emissions.¹⁷⁰ In a hypothetical situation in which a company reduces its total emissions by 75 per cent, it would be practically impossible to compensate for the remaining 25 per cent by offsetting these emissions through carbon-reducing projects. To compensate for 25 per cent of its current emissions, Deutsche Post DHL Group would have to increase its offsetting by 1,400 per cent in 2020. FedEx and UPS would even need to increase the scale of their offsetting by 22,600 per cent and 6,000 per cent, respectively (2019 figures).

Figure 7 Total CO₂ emissions and the equivalent of CO₂ offsets, credits, and allowances in metric tonnes purchased and/or generated by Deutsche Post DHL Group, FedEx, and UPS

Deutsche Post DHL Group			
Year	Total CO ₂ emissions (metric tonnes of CO ₂ equivalents) ¹⁷¹	Carbon offsets/credits (metric tonnes of CO ₂ equivalents) ¹⁷²	% of total emissions
2016	26,860,000	271,130	1.01%
2017	28,860,000	249,910	0.87%
2018	29,460,000	285,800	0.97%
2019	27,420,000	468,214	1.71%
2020	27,380,000	457,670	1.67%

FedEx			
Year	Total CO ₂ emissions (metric tonnes of CO ₂ equivalents) ¹⁷³	Carbon offsets/credits (metric tonnes of CO ₂ equivalents) ¹⁷⁴	% of total emissions
2016	17,119,066	76,301	0.45%
2017	17,790,123	76,044	0.43%
2018	19,023,335	76,878	0.40%
2019	19,501,454	21,500	0.11%
2020	19,414,510	n/a	n/a

UPS			
Year	Total CO ₂ emissions (metric tonnes of CO ₂ equivalents) ¹⁷⁵	Carbon offsets/credits (metric tonnes of CO ₂ equivalents) ¹⁷⁶	% of total emissions
2016	30,693,000	110,814	0.36%
2017	33,863,000	94,528	0.28%
2018	36,418,000	117,329	0.32%
2019	35,962,000	147,490	0.41%
2020	37,937,000	n/a	n/a

6 Conclusions

The last-mile phase of the delivery of goods from businesses to consumers has a significant environmental and social impact, in particular in cities worldwide, in which last-mile deliveries substantially increase pollution and congestion issues. **This report has studied six major retail, e-commerce, and parcel delivery companies and has found that all show awareness of the environmental impact of last-mile deliveries and have set targets to reduce their emissions. However, they have generally failed to set sufficiently ambitious goals and have not provided clear and accessible data on current progress and the measures they are taking.** Most companies are currently only starting the rollout of their fleet electrification and will need to accelerate and upscale their efforts in order to achieve their own climate goals and realise sustainable last-mile delivery.

Most companies analysed in this report have committed to reducing their emissions to either zero or net-zero by either 2040 or 2050, but **the concrete translation of these commitments into companies' delivery operations is generally not clearly visible.** Although Flipkart is a Walmart subsidiary, it has not committed to emissions targets itself. Flipkart and FedEx have set target dates (2030 and 2040, respectively) for the full electrification of their delivery vehicle fleets, while Walmart plans to eliminate all emissions from its fleet by 2040. Deutsche Post DHL Group has set a target year for the partial electrification of its fleet (60 per cent by 2030). Amazon has set a partial net-zero fleet emissions target, while UPS does not have a concrete fleet-related emissions goal at all.

Large differences can also be observed between the six companies' actions taken to eliminate the environmental impact of their fleets to date. The available data show that 14.5 per cent of Deutsche Post DHL Group's fleet consisted of electric vehicles in 2020. FedEx, Amazon, and Flipkart currently use smaller numbers of electric vehicles (500, 1,800, and 2,000, respectively). However, Amazon and Flipkart do not clarify how this relates to the total size of their fleets. For UPS, it is unclear how many electric vehicles the company currently uses. Walmart has so far reported on pilot projects only and has not published any information on its current use of electric vehicles at a larger scale. Several companies have announced plans to purchase electric vehicles in the next five to 10 years (including Amazon, Deutsche Post DHL Group, and UPS). However, given the small size of their current electric vehicle fleets and the expected growth of the global parcel delivery sector, **most of the six companies in this report will need to substantially accelerate their efforts to achieve their fleet electrification or emissions targets.**

Local government authorities can play a leading role in accelerating the last-mile emissions reduction efforts of retail, e-commerce, and parcel delivery companies. City, state, and provincial authorities can introduce local policies and regulations, facilitate more sustainable solutions, and engage with key players (such as community members and companies) to address air pollution and congestion issues. Place-based interventions are essential complements to the measures taken by companies themselves, such as electrifying fleets and using smaller delivery vehicles. It is therefore crucial that local authorities, in collaboration with local stakeholders, take up a leading role in addressing the negative environmental impacts of last-mile deliveries.

A major issue that emerges when analysing current activities and future ambitions is **the availability of clear and comparable data on emissions, measures taken to address environmental impacts, and the monitoring of the impact of these measures.** Only one of the six companies in this report produces specific and accessible data on the size of its current fleet and the different types of vehicles therein (Deutsche Post DHL Group). The other companies fail to report on either the size of their entire vehicle fleet or the specific number of electric vehicles, or both. Companies often do not provide these figures in dedicated reports or data files either, but rather publish them in press releases, website articles, or communications to media outlets.



In addition to the company-specific analysis, this report has also flagged a number of structural, sector-wide issues related to companies' efforts to eliminate emissions generated by last-mile deliveries. These issues include the environmental and social impacts of the production of electric vehicles, including CO₂ emissions and environmental impacts. Another important dimension is the sustainability of the energy sources used to produce the electricity that powers electric vehicles (conventional vs. renewable). Companies' reliance on carbon offsetting to achieve net-zero emissions targets is insufficient as well, as the sheer size of the six companies' emissions implies that offsetting could realistically compensate for only a relatively small portion of their emissions. Finally, the extensive use of subcontracting in the global delivery sector raises questions as to how the six companies will achieve their sustainability goals, both in their own operations and in outsourced activities, and to what extent they will support these subcontractors to transition to zero emissions.

Annex Company profiles

Amazon.com, Inc.

Amazon.com, Inc. is a multinational e-commerce, data storage, and information technology company headquartered in the US. Its business activities include online retailing, manufacturing and selling electronic devices, developing and producing media content, and offering digital technology services.¹⁷⁷ Amazon Logistics (AMZL) is the company branch responsible for the company's own delivery logistics network. In 2018, Amazon launched its Delivery Service Partner programme in order to reduce its dependency on third-party delivery companies.¹⁷⁸ Amazon's Delivery Service Partners are subcontracted to deliver packages to Amazon clients and have access to, among other things, a leasing programme for electric vans, and vehicle maintenance and insurance services.¹⁷⁹

- ❑ Overall emissions target:¹⁸⁰ net-zero emissions by 2040
- ❑ Fleet-related emission target: 2040: 50% net-zero delivery
- ❑ Electric vehicles in current fleet: 1,800

CEO	Jeff Bezos
Founded	1994
Headquarters	Seattle, Washington, US
Type	Publicly listed company
Number of employees	1,298,000 ¹⁸¹
Area of operations	Worldwide
Revenue (2020)	US\$ 386.1bn
Net profit (2020)	US\$ 21.3bn
Market capitalisation (October 2021)	US\$ 1.709tn ¹⁸²

Deutsche Post DHL Group

Deutsche Post DHL Group (Deutsche Post AG), is a multinational logistics, supply chain, and postal and parcel services company headquartered in Germany.¹⁸³ The company offers postal services in Germany as well as courier, express, and parcel shipment services worldwide. It also offers global freight forwarding services (through DHL Global Forwarding) and warehousing and warehouse transport services (through DHL Supply Chain). Deutsche Post DHL Group also owns StreetScooter GmbH, a German manufacturer of electric delivery vehicles, although it is planning to sell this company.¹⁸⁴ Deutsche Post DHL Group has its own last-mile delivery network but also works with subcontractors.

- ❑ Overall emissions target:¹⁸⁵ net-zero emissions by 2050
- ❑ Fleet-related emission target: 2030: 60% electric vehicles for last-mile
- ❑ Electric vehicles in current fleet: 15,000

CEO	Frank Appel
Founded	1995 (Deutsche Post was founded in 1490)
Headquarters	Bonn, Germany
Type	Publicly listed company (the German government is the company's largest shareholder, owning 20.5 per cent of the company's equity)
Number of employees	571,974 ¹⁸⁶
Area of operations	Worldwide
Revenue (2020)	US\$ 76.1bn (€ 66.8m)
Net profit (2020)	US\$ 3.6bn (€ 3.2bn)
Market capitalisation (October 2021)	US\$ 67.64bn ¹⁸⁷

FedEx Corporation

FedEx is a globally operating transportation, e-commerce, and business services company headquartered in the US.¹⁸⁸ FedEx offers a range of logistics, e-commerce, business, and parcel delivery services worldwide, including last-mile delivery through FedEx Ground and FedEx Express.¹⁸⁹ While FedEx Express employs its own drivers, FedEx Ground outsources routes to smaller companies through a network of delivery subcontractors.¹⁹⁰ FedEx owns about half of the 200,000 vehicles it uses in its operations.¹⁹¹

- ❑ Overall emissions target:¹⁹² carbon neutrality by 2040
- ❑ Fleet-related emission target: 2025: 50% of the newly acquired vehicles should be electric; 2030: 100% of newly acquired vehicles should be electric; 2040: 100% electric fleet
- ❑ Electric vehicles in current fleet: 500

CEO	Frederick W. Smith
Headquarters	Memphis, Tennessee, US
Type	Publicly listed company
Number of employees	600,000 ¹⁹³
Area of operations	Worldwide
Revenue (2020)	US\$ 69.2bn ¹⁹⁴
Net profit (2020)	US\$ 5.2bn
Market capitalisation (October 2021)	US\$ 63.18bn ¹⁹⁵

Flipkart Private Limited

Flipkart is an e-commerce company operating in India, headquartered in India, and incorporated in Singapore.¹⁹⁶ The company offers a wide range of products, including consumer electronics, books, fashion products, groceries, and home essentials. In August 2018, Walmart acquired a 77 per cent stake in Flipkart, becoming its largest shareholder.¹⁹⁷ Flipkart has its own delivery logistics network and fleet, including its logistics branch Ekart.¹⁹⁸

- ❑ Overall emissions target:¹⁹⁹ unknown
- ❑ Fleet-related emission target: 2030: 100% electric fleet
- ❑ Electric vehicles in current fleet: 2,000

CEO	Kalyan Krishnamurthy
Founded	2007
Headquarters	Bangalore, Karnataka, India
Type	Privately owned (subsidiary of Walmart, which holds 77 per cent of shares)
Number of employees	N/A
Area of operations	India
Revenue (2020)	US\$ 4.7bn (Rs 346.1bn) ²⁰⁰
Net loss (2020)	US\$ 0.4bn (Rs 31.5bn)
Market capitalisation (October 2021)	N/A

United Parcel Service, Inc. (UPS)

United Parcel Service, Inc. (UPS) is a globally operating parcel delivery, logistics, and supply chain management company headquartered in the US.²⁰¹ In addition to delivering packages in the US and worldwide, the company also offers supply chain services, such as freight transport, warehousing services, and supply chain technology. UPS outsources part of its delivery operations to subcontractor companies, although it appears to do this at a smaller scale than some of its competitors.²⁰²

- ❑ Overall emissions target: ²⁰³ carbon neutrality by 2050
- ❑ Fleet-related emission target: undefined
- ❑ Electric vehicles in current fleet: unclear

CEO	Carol Tomé
Founded	1907
Headquarters	Sandy Springs, Georgia, US
Type	Publicly listed company
Number of employees	543,000 ²⁰⁴
Area of operations	Worldwide
Revenue (2020)	US\$ 84.6bn ²⁰⁵
Net profit (2020)	US\$ 1.3bn
Market capitalisation (October 2021)	US\$ 189.9bn ²⁰⁶

Walmart Inc.

Walmart Inc. is a globally operating retail company headquartered in the US.²⁰⁷ It operates hypermarkets, department stores, and grocery stores in 24 countries. It offers home delivery of grocery and other products in several countries. Walmart acquired last-mile delivery company Parcel in 2017²⁰⁸ and launched its own delivery operations in 2018.²⁰⁹ In 2021, Walmart announced that it will be setting up its own parcel delivery service, which is also open to use by other retailers.²¹⁰ Walmart owns 77 per cent of Flipkart's shares.²¹¹

- ❑ Overall emissions target:²¹² zero emissions by 2040 (for Walmart this target applies to Scope 1 and 2 only)
- ❑ Fleet-related emission target: 2040: zero emissions from all own vehicles
- ❑ Electric vehicles in current fleet: unclear

CEO	Doug McMillon
Founded	1962
Headquarters	Betonville, Arkansas, US
Type	Publicly listed company
Number of employees	2,300,000
Area of operations	24 countries
Revenue (2020)	US\$ 559.1bn ²¹³
Net profit (2020)	US\$ 13.7bn
Market capitalisation (October 2021)	US\$ 414.8bn ²¹⁴

Endnotes

- 1 FreightWaves (2020). Final Mile Report. Retrieved from <https://www.freightwaves.com/wp-content/uploads/2020/06/Final-mile-whitepaper.pdf>
- 2 Nowlan, A. & Usmani, S. (2021). Accelerating Zero-Emissions Delivery: An innovative approach to transforming the last mile. Environmental Defense Fund. Retrieved from <https://business.edf.org/insights/accelerating-zero-emissions-delivery-an-innovative-approach-to-transforming-the-last-mile/>
- 3 See for example: Coppola, M. (2019, 12 December). Feeling the heat? Companies under pressure on climate change and need to do more. Deloitte. Retrieved from <https://www2.deloitte.com/us/en/insights/topics/strategy/impact-and-opportunities-of-climate-change-on-business.html>
- 4 FreightWaves (2020). Final Mile Report. Retrieved from <https://www.freightwaves.com/wp-content/uploads/2020/06/Final-mile-whitepaper.pdf>
- 5 IPCC (2021). AR6 Climate Change 2021: The Physical Science Basis. Retrieved from <https://www.ipcc.ch/report/ar6/wg1/#SPM>
- 6 See also: Hickel, J. & Kallis, G. (2019, 17 April). Is Green Growth Possible? New Political Economy. Retrieved from: <https://www.tandfonline.com/doi/abs/10.1080/13563467.2019.1598964>
- 7 Hildeyard, N. (2020). Corridors as factories: supply chains, logistics and labour. Is this the world we want? Counter Balance. Retrieved from <https://counter-balance.org/uploads/files/Reports/Flagship-Reports-Files/2020-Logistics-Report.pdf>
- 8 FreightWaves (2020). Final Mile Report. Retrieved from <https://www.freightwaves.com/wp-content/uploads/2020/06/Final-mile-whitepaper.pdf>
- 9 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 10 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 11 Wang, S. & Ge, M. (2019, 16 October). Everything You Need to Know About the Fastest-Growing Source of Global Emissions: Transport. World Resources Institute. Retrieved from <https://www.wri.org/insights/everything-you-need-know-about-fastest-growing-source-global-emissions-transport>
- 12 Ritchie, H. & Roser, M. (n.d.). Emissions per sector. Our world in data. Retrieved from <https://ourworldindata.org/emissions-by-sector>
- 13 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 14 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 15 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 16 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 17 International Transport Forum (2020). *How Urban Delivery Vehicles can Boost Electric Mobility*. Retrieved from <https://www.itf-oecd.org/sites/default/files/docs/urban-delivery-vehicles-boost-electric-mobility.pdf>
- 18 International Transport Forum (2020). *How Urban Delivery Vehicles can Boost Electric Mobility*. Retrieved from <https://www.itf-oecd.org/sites/default/files/docs/urban-delivery-vehicles-boost-electric-mobility.pdf>
- 19 World Population Review (2021). Delhi Population 2021. Retrieved from <https://worldpopulationreview.com/world-cities/delhi-population>
- 20 Rocky Mountain Institute (2020). Deliver Electric Delhi. Retrieved from <https://rmi.org/insight/deliver-electric-delhi/>
- 21 IQAir (2021). Air quality and pollution city ranking. Retrieved from <https://www.iqair.com/us/world-air-quality-ranking>
- 22 SmartAir (2021, 30 April). Where does Delhi's air pollution come from? Retrieved from <https://smartairfilters.com/en/blog/where-delhis-air-pollution-come-from/>
- 23 Government of National Capital Territory of Delhi (2020, 7 August). Delhi Electric Vehicles Policy, p. 3. Retrieved from https://transport.delhi.gov.in/sites/default/files/All-PDF/Delhi%20Electric%20Vehicles%20Policy%2C%202020_0.pdf
- 24 Government of National Capital Territory of Delhi (2020, 7 August). Delhi Electric Vehicles Policy. Retrieved from https://transport.delhi.gov.in/sites/default/files/All-PDF/Delhi%20Electric%20Vehicles%20Policy%2C%202020_0.pdf
- 25 Timperley, J. (2019, 14 March). The Carbon Brief Profile: India. Retrieved from: <https://www.carbonbrief.org/the-carbon-brief-profile-india>
- 26 IEA (2020, June). Global EV Outlook 2020. Retrieved from <https://www.iea.org/reports/global-ev-outlook-2020>
- 27 Saxena, R. (2021, 6 August). 'Not plug and play': Amazon, Flipkart struggle to meet EV goal in India. Business Standard. Retrieved from https://www.business-standard.com/article/companies/amazon-flipkart-struggle-to-meet-electric-vehicle-goal-in-india-121080600216_1.html
- 28 The Economic Times (2021, 29 September). Flipkart to deploy over 2,000 electric vehicles in delivery fleet ahead of festive season. Retrieved from https://economictimes.indiatimes.com/industry/renewables/flipkart-to-deploy-over-2000-electric-vehicles-in-delivery-fleet-ahead-of-festive-eason/articleshow/86619425.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- 29 World Resources Institute and World Business Council for Sustainable Development (2004). The Greenhouse Gas Protocol – Revised Edition. Retrieved from <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>
- 30 Walmart Sustainability Hub (n.d.). Walmart's pathway to a zero-emissions future. Retrieved from https://www.walmartsustainabilityhub.com/media-library/document/zero-emissions-by-2040-white-paper/_proxyDocument?id=00000174-ad59-d343-a17d-bffd7bba0000
- 31 Walmart Website (n.d.). Climate Change. Retrieved from <https://corporate.walmart.com/global-responsibility/sustainability/planet/climate-change>
- 32 Walmart Website (2018, 18 August). Walmart and Flipkart Announce Completion of Walmart Investment in Flipkart, India's Leading Marketplace eCommerce Platform. Retrieved from <https://corporate.walmart.com/newsroom/2018/08/18/walmart-and-flipkart-announce-completion-of-walmart-investment-in-flipkart-indias-leading-marketplace-e-commerce-platform>
- 33 Walmart (2021). Form 10-K 2021, p. 33. Retrieved from <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000104169/598c8825-536a-4371-ab8a-98b9ee761c43.pdf>
- 33 Deutsche Post DHL Group (2021). Sustainability Roadmap Facts & Figures, p.1. Retrieved from <https://www.dpdl.com/content/dam/dpdl/en/media-center/responsibility/dpdl-sustainability-roadmap-facts-figures.pdf>
- Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdl.com/en/media-relations/press-releases/2021/dpdl-accelerated-roadmap-to-decarbonization.html>
- 34 Although Walmart includes its subsidiaries in its emissions target, Flipkart itself does not communicate on an emissions target. Flipkart is therefore not included in this figure.
- Amazon (2021). Amazon 2020 Sustainability Report, p.11. Retrieved from <https://sustainability.aboutamazon.com/pdfBuilderDownload?name=amazon-sustainability-2020-report>
- Amazon Website (n.d.). Delivering Shipment Zero. Retrieved from <https://sustainability.aboutamazon.com/environment/sustainable-operations/shipment-zero>
- Deutsche Post DHL Group (2021). Sustainability Roadmap Facts & Figures, p.1. Retrieved from <https://www.dpdl.com/content/dam/dpdl/en/media-center/responsibility/dpdl-sustainability-roadmap-facts-figures.pdf>
- Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdl.com/en/media-relations/press-releases/2021/dpdl-accelerated-roadmap-to-decarbonization.html>

- FedEx (2021). 2021 ESG Report, p. 11. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
- Flipkart Website (2020, 25 August). 100% Electric Mobility. Flipkart Drives to Sustainability with EV100. Retrieved from <https://stories.flipkart.com/100-electric-mobility-by-2030-flipkart-drives-towards-sustainability-with-ev100/>
- UPS (2021). UPS Sustainability Highlights. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- Walmart Sustainability Hub (n.d.). Walmart's pathway to a zero-emissions future. Retrieved from https://www.walmartsustainabilityhub.com/media-library/document/zero-emissions-by-2040-white-paper/_proxyDocument?id=00000174-ad59-d343-a17d-bffd7bba0000
- 35 Based on the companies' reporting for the Carbon Disclosure Project. See: CDP (n.d). Retrieved from <https://www.cdp.net/en>
- 36 Walmart's emissions intensity rates are much lower than those of the other four companies, as Walmart does not report on its Scope 3 emissions in their annual report.
- 37 Data for Amazon, FedEx, UPS, and Walmart was retrieved from Refinitiv Eikon on 15 October 2021. Data for Deutsche Post DHL Group was retrieved from: Deutsche Post DHL Group (2021). 2020 Annual report. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/annual-reports/DPDHL-2020-Annual-Report.pdf>
- Emissions data for Walmart was retrieved from: Carbon Disclosure Project (2021). Walmart, Inc. – Climate Change 2020. Carbon Disclosure Project (2020). Walmart, Inc. – Climate Change 2019.
- 38 ClimateGroup Website (2021). EV100 members. Retrieved from <https://www.theclimategroup.org/ev100-members>
- ClimateGroup website (2021). About EV100. Retrieved from <https://www.theclimategroup.org/about-ev100>
- 39 FedEx (2021). ESG Report 2021. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
- 40 Walmart (2020, 20 September). Zero Emissions by 2040. Retrieved from <https://corporate.walmart.com/newsroom/videos/zero-emissions-by-2040>
- 41 Walmart Sustainability Hub (n.d.). Walmart's pathway to a zero-emissions future. Retrieved from https://www.walmartsustainabilityhub.com/media-library/document/zero-emissions-by-2040-white-paper/_proxyDocument?id=00000174-ad59-d343-a17d-bffd7bba0000
- 42 UPS' goal is 40% "alternative" fuel in ground operations, but it includes natural gas, which cannot be considered renewable or sustainable; therefore, it is not included in this figure.
- Amazon (2021). Amazon 2020 Sustainability Report, p.11. Retrieved from <https://sustainability.aboutamazon.com/pdfBuilderDownload?name=amazon-sustainability-2020-report>
- Amazon Website (n.d.). Delivering Shipment Zero. Retrieved from <https://sustainability.aboutamazon.com/environment/sustainable-operations/shipment-zero>
- Deutsche Post DHL Group (2021). Sustainability Roadmap Facts & Figures, p.1. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/responsibility/dpdhl-sustainability-roadmap-facts-figures.pdf>
- Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dpdhl-accelerated-roadmap-to-decarbonization.html>
- FedEx (2021). 2021 ESG Report, p. 11. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
- Flipkart Website (2020, 25 August). 100% Electric Mobility. Flipkart Drives to Sustainability with EV100. Retrieved from <https://stories.flipkart.com/100-electric-mobility-by-2030-flipkart-drives-towards-sustainability-with-ev100/>
- UPS (2021). UPS Sustainability Highlights. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- Walmart Sustainability Hub (n.d.). Walmart's pathway to a zero-emissions future. Retrieved from https://www.walmartsustainabilityhub.com/media-library/document/zero-emissions-by-2040-white-paper/_proxyDocument?id=00000174-ad59-d343-a17d-bffd7bba0000
- 43 Deutsche Post DHL Group (2021). Sustainability Roadmap Facts & Figures, p.1. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/responsibility/dpdhl-sustainability-roadmap-facts-figures.pdf>
- 44 Deutsche Post DHL Group (2017). Mission 2050: Zero emissions. Retrieved from <https://www.dhl.com/content/dam/dhl/global/core/documents/pdf/dhl-partnerships-gogreen-2017.pdf>
- 45 Deutsche Post DHL Group (2020). 2019 Sustainability Report, p. 93. Retrieved from <https://www.dhl.com/content/dam/dhl/global/core/documents/pdf/sustainability-report.pdf>
- 46 Deutsche Post DHL Group, communication to SOMO, 5 November 2021.
- 47 ClimateGroup EV100 (2021). Progress and Insights Report. Retrieved from <https://www.theclimategroup.org/sites/default/files/2021-02/EV100%20Progress%20and%20Insights%20Report.pdf>
- 48 Deutsche Post DHL Group, communication to SOMO, 5 November 2021.
- 49 Amazon Website (n.d.). Delivering Shipment Zero. Retrieved from <https://sustainability.aboutamazon.com/environment/sustainable-operations/shipment-zero>
- Amazon Website (2019). Delivering Shipment Zero, a vision for net zero carbon shipments. Retrieved from <https://www.aboutamazon.com/news/sustainability/delivering-shipment-zero-a-vision-for-net-zero-carbon-shipments>
- 50 In a Bloomberg report on Amazon's order of 100,000 Rivian vans, it was suggested that this order would be grossly insufficient to cover Amazon's entire fleet, although this statement was not specified: Ludlow, E. & Naughton, K. (2021, 6 October). Rivian's Electric Truck Gets All the Attention, But Its Fate Is Tied to Amazon. Bloomberg. Retrieved from <https://www.bloomberg.com/news/articles/2021-10-06/how-amazon-pushed-rivian-s-van-into-the-fast-lane>
- 51 Coppola, G. (2019, 19 December). Amazon's Van-Buying Spree Delivers a Gift to Auto Industry. Bloomberg. Retrieved from <https://www.bloomberg.com/news/articles/2019-12-19/amazon-van-buying-supports-banner-year-for-auto-fleet-business>
- 52 UPS (2021). 2020 | GRI Content Index, p. 32. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/2020_UPS_GRI_Content_Index_081921v2.pdf
- 53 UPS (2021). UPS Sustainability Highlights, p. 2. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- 54 UPS Website (2021, 8 April). Renewed focus on renewable energy. Retrieved from <https://about.ups.com/us/en/social-impact/environment/climate/renewed-focus-on-renewable-energy.html>
- 55 Oil Change International (2019, 30 May). Burning the gas 'bridge fuel' myth: why gas is not clean, cheap, or necessary. Retrieved from <http://priceofoil.org/2019/05/30/gas-is-not-a-bridge-fuel/>
- 56 Arrival Website (2020, 24 April). UPS invests in Arrival and orders 10,000 Generation 2 Electric Vehicles. Retrieved from <https://arrival.com/eu/en/news/ups-invests-in-arrival-and-orders-10000-generation-2-electric-vehicles>
- 57 UPS (2021). UPS Sustainability Highlights, p. 2. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- 58 ClimateGroup EV100 (2021). Progress and Insights Report. Retrieved from <https://www.theclimategroup.org/sites/default/files/2021-02/EV100%20Progress%20and%20Insights%20Report.pdf>
- 59 Deutsche Post DHL Group (2021). ESG Statbook including GRI and SASB index 2020. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/statbooks/2021/DPDHL-ESG-Statbook-2020.xls>
- 60 This figure includes electric forklifts and airport ground service equipment: Motavelli, J. (2020). Soon, the Kitty Litter Will Come by Electric Truck. The New York Times. Retrieved from <https://www.nytimes.com/2020/08/27/business/electric-delivery-vehicles-ups-fedex-amazon.html>
- 61 Rajamanickam, V. (2019, 2 July). Indian e-commerce major Flipkart to replace 40 percent of its fleet with electric vehicles. FreightWaves. Retrieved from <https://www.freightwaves.com/news/indian-e-commerce-major-flipkart-to-replace-40-percent-of-its-fleet-with-electric-vehicles>

- 62 UPS (2021). 2020 | GRI Content Index, p. 33. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/2020_UPS_GRI_Content_Index_081921v2.pdf
- 63 Amazon Website (2020). Go behind the scenes as Amazon develops a new electric vehicle. Retrieved from <https://www.aboutamazon.com/news/sustainability/go-behind-the-scenes-as-amazon-develops-a-new-electric-vehicle>
Amazon Website (2020, 28 August). Mercedes-Benz joins The Climate Pledge. Retrieved from <https://www.aboutamazon.com/news/sustainability/mercedes-benz-joins-the-climate-pledge>
Amazon Website (2021, 23 February). Amazon India partners with Mahindra Electric to help fulfil its commitment towards electric mobility. Retrieved from <https://www.aboutamazon.in/news/operations/amazon-india-partners-with-mahindra-electric-to-help-fulfil-its-commitment-towards-electric-mobility>
Reuters (2020, 15 January). Amazon orders electric vans from Deutsche Post's StreetScooter. Retrieved from <https://www.reuters.com/article/us-amazon-com-deutsche-post-streetscoote-idUSKBN1ZE17T>
- 64 Figure for December 2019, from media reports:
Coppola, G. (2019, 19 December). Amazon's Van-Buying Spree Delivers a Gift to Auto Industry. Bloomberg. Retrieved from <https://www.bloomberg.com/news/articles/2019-12-19/amazon-van-buying-supports-banner-year-for-auto-fleet-business>
- 65 Deutsche Post DHL Group (2021). ESG Statbook including GRI and SASB index 2020. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/statbooks/2021/DPDHL-ESG-Statbook-2020.xls>
Toyota Website (2021). 400 elektrische Toyota's voor DHL. Retrieved from <https://www.toyota.nl/over-toyota/toyota-world/400-stuks-Toyota-Proace-Electric-voor-DHL-Parcel.json> (in Dutch)
Deutsche Post DHL Group (2021). DHL Express partners with Fiat Professional for further electrification of last-mile delivery. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dhl-express-partners-with-fiat-professional.html>
- 66 Calculation based on the figures in Deutsche Post DHL Group's ESG Statbook 2020. Deutsche Post DHL Group itself has stated the share of e-vehicles in its fleet was 18 per cent by the end of 2020:
Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dpdhl-accelerated-roadmap-to-decarbonization.html>
- 67 Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dpdhl-accelerated-roadmap-to-decarbonization.html>
- 68 FedEx (2021). 2021 ESG Report, p. 13 and p. 35. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
FedEx Website (2021). FedEx fleet electrification. Retrieved from <https://www.fedex.com/en-us/sustainability/electric-vehicles.html>
- 69 This figure includes electric forklifts and airport ground service equipment:
Motavelli, J. (2020). Soon, the Kitty Litter Will Come by Electric Truck. The New York Times. Retrieved from <https://www.nytimes.com/2020/08/27/business/electric-delivery-vehicles-ups-fedex-amazon.html>
- 70 This figure includes 1,000 vehicles FedEx and Ryder planned to purchase from Chanje Energy, but the delivery of these vehicles is uncertain (see Section 4.4 for more details).
- 71 Flipkart Website (2020, 25 August). 100% Electric Mobility. Flipkart Drives to Sustainability with EV100. Retrieved from <https://stories.flipkart.com/100-electric-mobility-by-2030-flipkart-drives-towards-sustainability-with-ev100/>
- 72 Figure for 2021: Dash, C. (2021, 30 September). Flipkart Big Billion Days Sale: Over 2,000 Electric Vehicles Added To Delivery Fleet. Sambaad English. Retrieved from <https://sambadenglish.com/flipkart-big-billion-days-sale-over-2000-electric-vehicles-added-to-delivery-fleet/>
- 73 UPS (2021). UPS Fact Sheet. Retrieved from https://about.ups.com/content/dam/upsstories/assets/fact-sheets/ups-global/UPS_Fact_Sheet.pdf
Arrival Website (2020, 24 April). UPS invests in Arrival and orders 10,000 Generation 2 Electric Vehicles. Retrieved from <https://arrival.com/eu/en/news/ups-invests-in-arrival-and-orders-10000-generation-2-electric-vehicles>
- 74 Walmart Website (2020, 10 November). Walmart Teams Up with Cruise to Pilot All-Electric Self-Driving Delivery Powered by 100% Renewable Energy. Retrieved from <https://corporate.walmart.com/newsroom/2020/11/10/walmart-teams-up-with-cruise-to-pilot-all-electric-self-driving-delivery-powered-by-100-renewable-energy>
Walmart Website (2019, 10 December). Walmart to Test-Drive Autonomous Grocery Deliveries with Nuro. Retrieved from <https://corporate.walmart.com/newsroom/2019/12/10/walmart-to-test-drive-autonomous-grocery-deliveries-with-nuro>
- 75 Walmart aims to eliminate all emissions generated by its vehicles by 2040, but leaves room for options other than fleet electrification to achieve this goal.
- 76 Amazon Website (2020). Go behind the scenes as Amazon develops a new electric vehicle. Retrieved from <https://www.aboutamazon.com/news/sustainability/go-behind-the-scenes-as-amazon-develops-a-new-electric-vehicle>
- 77 CNBC (2021, 29 October). Amazon reveals 20% stake in electric-vehicle maker Rivian. Retrieved from <https://www.cnbc.com/2021/10/29/amazon-reveals-20percent-stake-in-electric-vehicle-maker-rivian.html>
- 78 Amazon (2021). 2020 Annual report, p. 6. Retrieved from https://s2.q4cdn.com/299287126/files/doc_financials/2021/ar/Amazon-2020-Annual-Report.pdf
- 79 Bustos, C. (2021, 26 July). Ford, Amazon to Invest \$2.5 Billion in Start-Up Rivian. Yahoo! Finance. Retrieved from <https://finance.yahoo.com/news/ford-amazon-invest-2-5-154225710.html>
- 80 Amazon Website (2020, 28 August). Mercedes-Benz joins The Climate Pledge. Retrieved from <https://www.aboutamazon.com/news/sustainability/mercedes-benz-joins-the-climate-pledge>
- 81 Amazon Website (2021, 23 February). Amazon India partners with Mahindra Electric to help fulfil its commitment towards electric mobility. Retrieved from <https://www.aboutamazon.in/news/operations/amazon-india-partners-with-mahindra-electric-to-help-fulfil-its-commitment-towards-electric-mobility>
- 82 StreetScooter GmbH Website (n.d.). Historie. Retrieved from <https://www.streetscooter.com/de/#historie> (in German)
- 83 Reuters (2020, 15 January). Amazon orders electric vans from Deutsche Post's StreetScooter. Retrieved from <https://www.reuters.com/article/us-amazon-com-deutsche-post-streetscoote-idUSKBN1ZE17T>
- 84 Deutsche Post DHL Group (2020, 28 February). Ad hoc: Impact of Coronavirus and decision on StreetScooter. Retrieved from <https://www.dpdhl.com/en/investors/announcements/ad-hoc-announcements/ad-hoc-dpdhl-20200228.html>
- 85 Hegmann, G. (2021, 5 October). Sieben Jahre Elektro-Odyssee – Post verkauft verlustreichen StreetScooter. Die Welt. Retrieved from <https://www.welt.de/wirtschaft/article234219594/Streetscooter-Deutsche-Post-verkauft-ihre-verlustreichen-Elektro-Transporter-Geschaef.html> (in German)
- 86 Ford (2018, 9 October). Ford starts production of Deutsche Post StreetScooter WORK XL Electric Delivery Van. Retrieved from <https://media.ford.com/content/fordmedia/feu/en/news/2018/10/09/ford-starts-production-of-deutsche-post-streetscooter-work-xl-el.html>
- 87 Ecomento.de (2021, 18 March). StreetScooter soll noch „mehrere Tausend“ Elektro-Transporter für die Post bauen. Retrieved from <https://ecomento.de/2021/03/18/streetscooter-soll-noch-mehrere-tausend-elektro-transporter-bauen/> (in German)
- 88 Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dpdhl-accelerated-roadmap-to-decarbonization.html>
- 89 Toyota Website (2021). 400 elektrische Toyota's voor DHL. Retrieved from <https://www.toyota.nl/over-toyota/toyota-world/400-stuks-Toyota-Proace-Electric-voor-DHL-Parcel.json> (in Dutch)

- Deutsche Post DHL Group (2021). DHL Express partners with Fiat Professional for further electrification of last-mile delivery. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dhl-express-partners-with-fiat-professional.html>
- 90 Deutsche Post DHL Group, communication to SOMO, 26 November 2021.
- 91 General Motors Website (2021, 12 January). GM Launches BrightDrop, a New Business That Will Electrify and Improve the Delivery of Goods and Services. Retrieved from <https://plants.gm.com/media/us/en/gm/home.detail.html/content/Pages/news/us/en/2021/jan/ces/0112-brightdrop.html>
- 92 Abuelsamid, S. (2021, 28 September). Brightdrop Completes First Of 500 Electric Fedex Vans, Adds Smaller EV410 For 2023. Forbes. Retrieved from <https://www.forbes.com/sites/samabuelsamid/2021/09/28/brightdrop-completes-first-of-500-electric-fedex-vans-adds-smaller-ev410-for-2023/?sh=6e7f3167616c>
- 93 Kingston, J. (2021, 19 March). Once-ambitious Ryder plans for electric vehicles with Chanje dissolves into lawsuit. FreightWaves. Retrieved from <https://www.freightwaves.com/news/once-ambitious-ryder-plans-for-electric-vehicles-with-chanje-dissolves-into-lawsuit>
- O’Kane, S. (2021, 17 March). Ryder says EV startup Chanje owes millions for undelivered vans. *The Verge*. Retrieved from <https://www.theverge.com/2021/3/17/22337230/ryder-chanje-lawsuit-fedex-electric-vans-startup-delivery>
- United States District Court Southern District of Florida Miami Division (2021, 17 March). *Ryder Truck Rental, Inc., vs. Chanje Energy and FDG Electric Vehicles Limited*. Retrieved from <https://storage.courtlistener.com/recap/gov.uscourts.flsd.589122/gov.uscourts.flsd.589122.1.0.pdf>
- 94 FedEx Website (2021, 15 June). FedEx and Nuro Team Up to Advance Last-Mile Logistics with Autonomous Vehicles. Retrieved from <https://newsroom.fedex.com/newsroom/nuro/>
- 95 Indian Transport and Logistics News website (2021, 24 February). Flipkart partners with Hero, Mahindra, Piaggio for 25k EVs by 2030. Retrieved from <https://www.itln.in/flipkart-partners-with-hero-mahindra-piaggio-for-25k-evs-by-2030-trade-e-commerce>
- 96 Flipkart Website (2020, 25 August). 100% Electric Mobility. Flipkart Drives to Sustainability with EV100. Retrieved from <https://stories.flipkart.com/100-electric-mobility-by-2030-flipkart-drives-towards-sustainability-with-ev100/>
- 97 UPS Website (2020, 29 January). UPS invests in Arrival, accelerates fleet electrification with a commitment to purchase up to 10,000 electric vehicles. Retrieved from <https://about.ups.com/be/en/newsroom/press-releases/sustainable-services/ups-invests-in-arrival-accelerates-fleet-electrification-with-order-of-10-000-electric-delivery-vehicles.html>
- 98 Arrival (2021). SEC Annual report, p. 43. Retrieved from <https://sec.report/Document/0001193125-21-145066/>
- 99 Motavelli, J. (2020). Soon, the Kitty Litter Will Come by Electric Truck. *The New York Times*. Retrieved from <https://www.nytimes.com/2020/08/27/business/electric-delivery-vehicles-ups-fedex-amazon.html>
- 100 UPS Website (2020, 29 January). UPS invests in Arrival, accelerates fleet electrification with a commitment to purchase up to 10,000 electric vehicles. Retrieved from <https://about.ups.com/be/en/newsroom/press-releases/sustainable-services/ups-invests-in-arrival-accelerates-fleet-electrification-with-order-of-10-000-electric-delivery-vehicles.html>
- 101 Walmart Website (2020, 10 November). Walmart Teams Up with Cruise to Pilot All-Electric Self-Driving Delivery Powered by 100% Renewable Energy. Retrieved from <https://corporate.walmart.com/newsroom/2020/11/10/walmart-teams-up-with-cruise-to-pilot-all-electric-self-driving-delivery-powered-by-100-renewable-energy>
- 102 Walmart Website (2021, 15 April). Walmart Invests in Cruise, the All-Electric Self-Driving Company. Retrieved from <https://corporate.walmart.com/newsroom/2021/04/15/walmart-invests-in-cruise-the-all-electric-self-driving-company>
- 103 Walmart Website (2019). Custom Autonomous Cargo Vans to Deliver Groceries in Walmart’s Pilot with Udelv. Retrieved from <https://corporate.walmart.com/newsroom/2019/01/08/custom-autonomous-cargo-vans-to-deliver-groceries-in-walmarts-pilot-with-udelv>
- 104 Walmart Website (2018). Walmart and Ford to Test Grocery Delivery with Self-Driving Cars. Retrieved from <https://corporate.walmart.com/newsroom/2018/11/14/walmart-and-ford-to-test-grocery-delivery-with-self-driving-cars>
- 105 Walmart Website (2018, 25 July). Meet Waymo, Your New Self-Driving Grocery Chauffeur. Retrieved from <https://corporate.walmart.com/newsroom/innovation/20180725/meet-waymo-your-new-self-driving-grocery-chauffeur>
- 106 Walmart Website (2019, 10 December). Walmart to Test-Drive Autonomous Grocery Deliveries with Nuro. Retrieved from <https://corporate.walmart.com/newsroom/2019/12/10/walmart-to-test-drive-autonomous-grocery-deliveries-with-nuro>
- 107 Deutsche Post DHL Group (2021). ESG Statbook including GRI and SASB index 2020. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/statbooks/2021/DPDHL-ESG-Statbook-2020.xls>
- 108 New York City Department of Transportation (2021, May). Commercial Cargo Bicycle Pilot. Evaluation Report Retrieved from <https://www1.nyc.gov/html/dot/downloads/pdf/commercial-cargo-bicycle-pilot-evaluation-report.pdf>
- 109 Cheng, A. (2019, 4 December). New York Is Working With Amazon, Others To Test Cargo Bike Delivery; Will Your City Be Next? Forbes. Retrieved from <https://www.forbes.com/sites/andriacheng/2019/12/04/amid-record-online-sales-new-york-is-working-with-amazon-others-to-test-cargo-bike-delivery-your-city-will-be-next/?sh=50b8b828393f>
- City of London (2020, 15 December). City of London Corporation teams up with Amazon to cut delivery vehicles and improve air quality. Retrieved from <https://news.cityoflondon.gov.uk/city-of-london-corporation-teams-up-with-amazon-to-cut-delivery-vehicles-and-improve-air-quality/>
- 110 Schlosser, K. (2016, 8 June). Bicycle couriers disheartened as Amazon puts brakes on Prime Now bike deliveries. *Geekwire*. Retrieved from <https://www.geekwire.com/2016/amazon-bike-couriers/>
- 111 UPS Website (2020, 30 June). Lessons from our e-bike journey. Retrieved from <https://about.ups.com/us/en/our-stories/innovation-driven/lessons-from-the-e-bike-journey-of-ups.html> Nickelsburg, M. (2018, 25 October). UPS launches cargo e-bike delivery in Seattle, returning to bicycle courier origins a century later. Retrieved from <https://www.geekwire.com/2018/ups-launches-cargo-e-bike-delivery-seattle-returning-bicycle-courier-origins-century-later/>
- 112 FedEx Website (2020, 10 September). City Logistics. Retrieved from <https://www.fedex.com/en-us/sustainability/fedex-pilots-program-in-europe-to-improve-sustainable-deliveries.html>
- Chung, E., Hopton, A., Reid, T. (2020, 28 November). Parcel delivery companies are trading trucks for bikes in some Canadian cities. Here’s why. *CBC News*. Retrieved from <https://www.cbc.ca/news/science/parcel-delivery-trucks-e-bikes-1.5819378>
- Yahr, N. (2021). FedEx rolls out e-bike delivery in Madison. *Madison*. Retrieved from <https://www.dailyadvent.com/news/3e5ca4e974df2a3dc-b96f47046cf629b-FedEx-rolls-out-ebike-delivery-in-Madison>
- 113 See: Lawton, G. (2021, 13 July). The environmental challenges of last-mile delivery. *TechTarget*. Retrieved from <https://searchp.techtarget.com/feature/The-environmental-challenges-of-last-mile-delivery>
- World Economic Forum (2020). *The Future of the Last-Mile Ecosystem*. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 114 Nguyen, T. (2019, 16 October). Amazon’s 1-day shipping is convenient – and terrible for the environment. Retrieved from <https://www.vox.com/the-goods/2019/10/16/20917467/amazon-one-day-shipping-bad-for-environment>
- 115 Harvey, F. (2020, 15 September). Road congestion levels in outer London higher than before lockdown. *The Guardian*. Retrieved from <https://www.theguardian.com/environment/2020/sep/15/road-congestion-levels-in-outer-london-higher-than-before-lockdown>
- 116 Wikipedia (n.d.). *The Great Smog of London*. Retrieved from https://en.wikipedia.org/wiki/Great_Smog_of_London
- 117 Clean Air Act (1956). Retrieved from <https://www.legislation.gov.uk/ukpga/Eliz2/4-5/52/enacted>
- 118 Mayor of London (n.d.). *Zero Carbon London*. Retrieved from: <https://www.london.gov.uk/what-we-do/environment/climate-change/zero-carbon-london>
- 119 BBC News (2003, 18 February). Smooth start for congestion charge. Retrieved from http://news.bbc.co.uk/2/hi/uk_news/england/2770721.stm
- 120 Transport for London (2008, 4 February). London’s poor air quality tackled with launch of Low Emission Zone. Retrieved from <https://tfl.gov.uk/info-for/media/press-releases/2008/february/londons-poor-air-quality-tackled-with-launch-of-low-emission-zone>

- 121 Brignall, M. (2011, October 21). London's low emissions zone will force vans and minibuses off roads. *The Guardian*. Retrieved from: <https://www.theguardian.com/money/2011/oct/21/london-low-emissions-zone-vans>
- 122 Union of Concerned Scientists & The Greenlining Institute (2021, June). *Low- and Zero-Emissions Zones*, p. 5-6. Retrieved from <https://www.ucsusa.org/sites/default/files/2021-06/low-and-zero-emissions-zones.pdf>
- 123 Transport for London (2021). ULEZ: Where and when. Retrieved from <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/ulez-where-and-when>
- 124 Carrington, D. (2016, 5 February). The truth about London's air pollution. *The Guardian*. Retrieved from <https://www.theguardian.com/environment/2016/feb/05/the-truth-about-londons-air-pollution>
- 125 Mayor of London (2020, October). Air quality in London 2016-2020. Retrieved from <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/air-quality-london-2016-2020>
- 126 Mayor of London (2021, 25 October). World's first Ultra Low Emission Zone expands to cover inner London. Retrieved from <https://www.london.gov.uk/press-releases/mayoral/ultra-low-emission-zone-covers-all-of-inner-london>
- 127 Mayor of London (2018, 11 May). Mayor sets out bold strategy to make London the greenest global city. Retrieved from <https://www.london.gov.uk/press-releases/mayoral/london-environment-strategy-sets-out-vision>
- 128 Mayor of London (2018). Transport Strategy. Retrieved from <https://tfl.gov.uk/corporate/about-tfl/the-mayors-transport-strategy>
- 129 Mayor of London (2018). Transport Strategy. Retrieved from <https://tfl.gov.uk/corporate/about-tfl/the-mayors-transport-strategy>
- 130 Wright, R. (2016, 30 December). Cargo bikes take the strain as London congestion grows. *Financial Times*. Retrieved from <https://www.ft.com/content/77dcaafe-cdc9-11e6-864f-20dcb35cede2>
- 131 DHL Website (n.d.). It's clear and clean sailing for last-mile logistics in London. Retrieved from <https://www.dhl.com/global-en/spotlight/sustainability/urban-logistics-river-boat.html>
- 132 Bradshaw, T. (2021, 12 January). The pandemic tech boom is reshaping our cities. *Financial Times*. Retrieved from <https://www.ft.com/content/40c3a928-6faf-4746-903d-3a114aac3878>
- 133 Ahmad, S. (2021). Flipkart to pilot drone delivery of Covid-19 vaccines in Telangana. *Business Standard*. Retrieved from https://www.business-standard.com/article/companies/flipkart-to-pilot-drone-delivery-of-covid-19-vaccines-in-telangana-121061101349_1.html
- 134 See: Amazon Website (2016, 7 December). Amazon Prime Air. Retrieved from <https://www.amazon.com/Amazon-Prime-Air/b?ie=UTF8&node=8037720011>
- DHL (2019, 29 May). DHL Express launches its first regular fully-automated and intelligent urban drone delivery service. Retrieved from <https://www.dhl.com/tw-en/home/press/press-archive/2019/dhl-express-launches-its-first-regular-fully-automated-and-intelligent-urban-drone-delivery-service.html>
- FedEx (2019, 18 October). Wing drone deliveries take flight with FedEx. Retrieved from <https://www.fedex.com/en-us/sustainability/wing-drones-transport-fedex-deliveries-directly-to-homes.html>
- UPS Website (2020, 27 April). UPS Flight Forward, CVS to launch residential drone delivery service in Florida retirement community to assist in Coronavirus response. Retrieved from <https://about.ups.com/us/en/newsroom/press-releases/innovation-driven/ups-flight-forward-cvs-to-launch-residential-drone-delivery-service-in-florida-retirement-community-to-assist-in-coronavirus-response.html>
- Walmart (2021, 17 June). Walmart invests in DroneUp, the nationwide on-demand drone delivery provider. Retrieved from <https://corporate.walmart.com/newsroom/2021/06/17/walmart-invests-in-droneup-the-nationwide-on-demand-drone-delivery-provider>
- Sinha, S. (2021, 30 September). Flipkart hops onto drone delivery bandwagon; begins with vaccines in Telangana. Retrieved from <https://timesofindia.indiatimes.com/business/india-business/flipkart-hops-onto-drone-delivery-bandwagon-begins-with-vaccines-in-telangana/articleshow/86641256.cms>
- 135 Brown, C. (2019). Assessing the True Impact of Delivery Robots on Driving Jobs. *Fleet Forward*. Retrieved from <https://www.fleetforward.com/338535/assessing-the-true-impact-of-delivery-robots-on-driving-jobs>
- 136 Transport & Environment (2021). How clean are electric cars? Retrieved from <https://www.transportenvironment.org/wp-content/uploads/2020/04/TEs-EV-life-cycle-analysis-LCA.pdf>
- 137 World Economic Forum (2020). The Future of the Last-Mile Ecosystem. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf
- 138 Doi, T. et al. (2021, 13 May). Efficient and sustainable last-mile logistics: Lessons from Japan. McKinsey & Company. Retrieved from <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/efficient-and-sustainable-last-mile-logistics-lessons-from-japan>
- 139 Lawton, G. (2021, 13 August 2021). 10 strategies for more sustainable last-mile delivery. *TechTarget*. Retrieved from <https://searcherp.techtarget.com/feature/10-strategies-for-more-sustainable-last-mile-delivery>
- 140 Gonzalez, G. & De Haan, E. (2020, December). The battery paradox. Centre for Research on Multinational Corporations (SOMO). Retrieved from <https://www.somo.nl/nl/wp-content/uploads/sites/2/2020/12/SOMO-The-battery-paradox.pdf>
- 141 See for example: Amnesty International & Transport & Environment (2021). The EU battery regulation due diligence rules. Retrieved from <https://www.transportenvironment.org/wp-content/uploads/2020/04/TEs-EV-life-cycle-analysis-LCA.pdf>
- Amnesty International (2021, 4 February). Powering change: Principles for businesses and governments in the battery value chain. Retrieved from <https://www.amnesty.org/en/documents/act30/3544/2021/en/>
- 142 UPS (2021). UPS Sustainability Highlights, p. 2. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- DHL Website (2021, 28 June). DHL expands its liquefied natural gas green truck fleet. Retrieved from <https://www.dhl.com/cz-en/home/press/press-archive/2021/dhl-expands-its-liquefied-natural-gas-green-truck-fleet.html>
- 143 Oil Change International (2019, 30 May). Burning the gas 'bridge fuel' myth: why gas is not clean, cheap, or necessary. Retrieved from <http://priceofoil.org/2019/05/30/gas-is-not-a-bridge-fuel/>
- 144 Freight Waves (2021, 20 April). Is Amazon getting into the renewable natural gas business? Retrieved from <https://www.freightwaves.com/news/is-amazon-getting-into-the-renewable-natural-gas-business>
- 145 UPS (2021, 4 August). Renewed focus on renewable energy. Retrieved from <https://about.ups.com/us/en/social-impact/environment/climate/renewed-focus-on-renewable-energy.html>
- 146 Transport & Environment (2021, September). LNG Trucks: a dead end bridge. Emissions testing of a diesel- and a gas-powered long-haul truck. Retrieved from <https://www.transportenvironment.org/discover/lng-trucks-a-dead-end-bridge/>
- 147 FedEx Website (2021). Our approach to innovating operations. Retrieved from <https://www.fedex.com/en-nl/about/sustainability/our-approach.html>
- 148 Walmart (2020, 21 December). 'Tis the Season for Hassle-Free Returns. Retrieved from <https://corporate.walmart.com/newsroom/2020/12/21/tis-the-season-for-hassle-free-returns>
- 149 Deutsche Post DHL Group, communication to SOMO, 26 November 2021.
- 150 Deutsche Post DHL Group Website (2021). Green last mile & line haul. Retrieved from <https://www.dpdhl.com/en/sustainability/environment/green-last-mile-line-haul.html>
- Deutsche Post DHL Group describes the target as follows: "Electrify 60% of our last-mile delivery vehicles by 2030". In response to a draft version of this report, Deutsche Post DHL Group stated that "[t]he use of the word 'our' refers to 'our own' as well as 'on our behalf', whereas in the previous green delivery target, we only included 'our own' fleets." Deutsche Post DHL Group, communication to SOMO, 26 November 2021.
- 151 See: Tims, A. (2019, 14 April). Fines and a frantic life on the road – the lot of Amazon's harried staff. *The Observer*. Retrieved from <https://www.theguardian.com/money/2019/apr/14/amazon-fines-depot-workers-driver>
- Temperton, J. (2018, 8 February). The gig economy is being fuelled by exploitation, not innovation. *Wired*. Retrieved from <https://www.wired.co.uk/article/gig-economy-dpd-courier-taylor-review>
- Kuiper, M. (2020, 11 November). Misstanden bij koeriers zijn eerder regel dan uitzondering. *NRC Handelsblad*. Retrieved from <https://www.nrc.nl/nieuws/2020/11/11/misstanden-bij-koeriers-zijn-de-regel-a4019763> (in Dutch)

- Alimohamed-Wilson, J. & Reese, E. (2021). *The Cost of Free Shipping. Amazon in the Global Economy*. London, England: Pluto Press.
- 152 Metropolitan Transportation Commission (2017, February). Most Congested Urban Areas in the U.S. Retrieved from <https://mtc.ca.gov/node/121616>
- 153 American Lung Association (2021, 1 November). Most polluted cities. Retrieved from <https://www.lung.org/research/sota/city-rankings/most-polluted-cities>
- 154 Cabrera, Y. (2021, 13 January). Garden of hope. Grist. Retrieved from <https://grist.org/justice/in-the-shadow-of-amazon-resistance-takes-root-in-san-bernardino/>
- 155 Anguino, D. (2021, September 23). A record number of cargo ships are stuck outside LA. What's happening? The Guardian. Retrieved from <https://www.theguardian.com/us-news/2021/sep/22/cargo-ships-traffic-jam-los-angeles-california>
- 156 Cabrera, Y. (2021, 13 January). Garden of hope. Grist. Retrieved from <https://grist.org/justice/in-the-shadow-of-amazon-resistance-takes-root-in-san-bernardino/>
- 157 Cagle, A. (2021, 10 June). Online shopping is poisoning the air, but electric vehicles can help. Earth Justice. Retrieved from <https://earthjustice.org/blog/2021-june/online-shopping-is-poisoning-the-air-but-electric-vehicles-can-help>
- 158 Mayor Eric Garcetti (2019). L.A.'s Green New Deal. Sustainable City Plan. Retrieved from https://plan.lamayor.org/sites/default/files/pLAN_2019_final.pdf
- 159 Mayor Eric Garcetti (2019). L.A.'s Green New Deal. Sustainable City Plan. Retrieved from https://plan.lamayor.org/sites/default/files/pLAN_2019_final.pdf
- 160 LA Incubator (n.d.). Transportation Electrification Partnership. Retrieved from <https://laincubator.org/transportation/>
- 161 Government of National Capital Territory of Delhi (2020, 7 August). Delhi Electric Vehicles Policy. Retrieved from https://transport.delhi.gov.in/sites/default/files/All-PDF/Delhi%20Electric%20Vehicles%20Policy%2C%202020_0.pdf
- 162 Transport for London (2020, 3 February). TfL Press Release – London and Los Angeles announce collaboration on transport innovation. Retrieved from <https://tfl-newsroom.prgloo.com/news/tfl-press-release-london-and-los-angeles-announce-collaboration-on-transport-innovation>
- 163 Deutsche Post DHL Group (2021). ESG Presentation Q1 2021, p. 22. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/presentations/2021/DPDHL-ESG-Presentation-Q1-2021.pdf>
- 164 Deutsche Post DHL Group (2021). Managing and supporting our subcontractors. Retrieved from <https://www.dpdhl.com/en/sustainability/environment/managing-and-supporting-our-subcontractors.html>
- 165 Deutsche Post DHL Group (2020). Supplier Code of Conduct (version 2020.5). Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/responsibility/DPDHL-Group-Supplier-Code-of-Conduct-2020-5.pdf>
- 166 Deutsche Post DHL Group (2020). Supplier Code of Conduct (version 2020.5). Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/responsibility/DPDHL-Group-Supplier-Code-of-Conduct-2020-5.pdf>
- 167 Carbon Disclosure Project (n.d.). Search and view past CDP responses. Retrieved from <https://www.cdp.net/en/search>
- 168 McDonnell, T. (2021, 20 May). Carbon offsets are going primetime and they're not ready. Quartz. Retrieved from <https://qz.com/2009746/not-all-carbon-offsets-are-a-scam-but-many-still-are/>
- 169 McDonnell, T. (2021, 20 May). Carbon offsets are going primetime and they're not ready. Quartz. Retrieved from <https://qz.com/2009746/not-all-carbon-offsets-are-a-scam-but-many-still-are/>
- 170 McDonnell, T. (2021, 20 May). Carbon offsets are going primetime and they're not ready. Quartz. Retrieved from <https://qz.com/2009746/not-all-carbon-offsets-are-a-scam-but-many-still-are/>
- 171 Deutsche Post DHL Group (2021). Annual report 2020. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/annual-reports/DPDHL-2020-Annual-Report.pdf>
- 172 This data is extracted from the company responses by Deutsche Post AG (2016) and Deutsche Post Group DHL (2017-2020) submitted to the Carbon Disclosure Project.
- 173 FedEx (2021). 2021 ESG Report. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
- 174 This data is extracted from the company responses by FedEx (2016-2019) submitted to the Carbon Disclosure Project.
- 175 UPS (2020). TCFD Report. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/2020_UPS_TCFD_Report_081921.pdf
- 176 This data is extracted from the company responses by United Parcel Services (2016-2019) submitted to the Carbon Disclosure Project and supplemented with data from Refinitiv Eikon on 15 November 2021.
- 177 Amazon (2021). 2020 Annual report. Retrieved from https://s2.q4cdn.com/299287126/files/doc_financials/2021/ar/Amazon-2020-Annual-Report.pdf
- 178 Soper, T. (2018, 27 June). Amazon's new blue crew: Tech giant enlists entrepreneurs to own the 'last mile,' delivering packages in Prime vans and uniforms. GeekWire. Retrieved from <https://www.geekwire.com/2018/amazon-creates-new-package-delivery-program-entrepreneurs-effort-last-mile/>
- 179 Amazon Website (n.d.). Own your success. Retrieved from <https://logistics.amazon.com/>
- 180 Amazon (2021). Amazon 2020 Sustainability Report, p.11. Retrieved from <https://sustainability.aboutamazon.com/pdfBuilderDownload?name=amazon-sustainability-2020-report>
- Amazon Website (n.d.). Delivering Shipment Zero. Retrieved from <https://sustainability.aboutamazon.com/environment/sustainable-operations/shipment-zero>
- 181 Amazon (2021). 2020 Annual report, p. 4. Retrieved from https://s2.q4cdn.com/299287126/files/doc_financials/2021/ar/Amazon-2020-Annual-Report.pdf
- 182 Retrieved from Refinitiv Eikon on 27 October 2021.
- 183 Deutsche Post DHL Group (2021). Annual report 2021. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/annual-reports/DPDHL-2020-Annual-Report.pdf>
- 184 Deutsche Post DHL Group (2020, 28 February). Ad hoc: Impact of Coronavirus and decision on StreetScooter. Retrieved from <https://www.dpdhl.com/en/investors/announcements/ad-hoc-announcements/ad-hoc-dpdhl-20200228.html>
- 185 Deutsche Post DHL Group (2021). Sustainability Roadmap Facts & Figures, p.1. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/responsibility/dpdhl-sustainability-roadmap-facts-figures.pdf>
- Deutsche Post DHL Group (2021, 22 March). Accelerated Roadmap to decarbonization: Deutsche Post DHL Group decides on Science Based Targets and invests EUR 7 billion in climate-neutral logistics until 2030. Retrieved from <https://www.dpdhl.com/en/media-relations/press-releases/2021/dpdhl-accelerated-roadmap-to-decarbonization.html>
- 186 Deutsche Post DHL Group (2021). Annual report 2021. Retrieved from <https://www.dpdhl.com/content/dam/dpdhl/en/media-center/investors/documents/annual-reports/DPDHL-2020-Annual-Report.pdf>
- 187 Retrieved from Refinitiv Eikon on 27 October 2021.
- 188 FedEx (2021). 2021 Annual report. Retrieved from [https://s21.q4cdn.com/665674268/files/doc_financials/annual/2021/389437\(1\)_12_FedEx_AR_WR.pdf](https://s21.q4cdn.com/665674268/files/doc_financials/annual/2021/389437(1)_12_FedEx_AR_WR.pdf)
- 189 FedEx (2020, 7 February). FedEx to optimize last-mile residential deliveries; position for continued e-commerce growth. Retrieved from <https://newsroom.fedex.com/newsroom/fedex-to-optimize-last-mile-residential-deliveries-position-for-continued-e-commerce-growth/>
- 190 Bloomberg (2021, 27 August). FedEx ground delivery becomes a road to riches for contractors. Retrieved from <https://www.bloomberg.com/news/articles/2021-08-27/fedex-fdx-ground-delivery-becomes-road-to-riches-amid-ecommerce-boom>
- 191 FedEx Website (2021). Our approach to innovating operations. Retrieved from <https://www.fedex.com/en-nl/about/sustainability/our-approach.html>
- 192 FedEx (2021). 2021 ESG Report, p. 11. Retrieved from https://www.fedex.com/content/dam/fedex/us-united-states/sustainability/gcrs/FedEx_2021_ESG_Report.pdf
- 193 FedEx Website (2021). Company structure & facts. Retrieved from <https://www.fedex.com/en-us/about/company-structure.html>
- 194 FedEx Website (2021). Company structure & facts. Retrieved from <https://www.fedex.com/en-us/about/company-structure.html>

- 195 Retrieved from Refinitiv Eikon on 27 October 2021.
- 196 Retrieved from Refinitiv Eikon on 27 October 2021.
- 197 Walmart Website (2018, 18 August). Walmart and Flipkart Announce Completion of Walmart Investment in Flipkart, India's Leading Marketplace eCommerce Platform. Retrieved from <https://corporate.walmart.com/newsroom/2018/08/18/walmart-and-flipkart-announce-completion-of-walmart-investment-in-flipkart-indias-leading-marketplace-e-commerce-platform>
- Walmart (2021). Form 10-K 2021, p. 33. Retrieved from <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000104169/598c8825-536a-4371-ab8a-98b9ee761c43.pdf>
- 198 Singh, G. (2021, 20 March). Flipkart to pump \$2.5B to expand logistics network; Ekart dabbles in hyper-local delivery. IndianOnlineSeller.com. Retrieved from <https://indianonlineseller.com/2016/11/flipkart-to-pump-2-5b-to-expand-logistics-network-ekart-dabbles-in-hyper-local-delivery>
- 199 Flipkart Website (2020, 25 August). 100% Electric Mobility. Flipkart Drives to Sustainability with EV100. Retrieved from <https://stories.flipkart.com/100-electric-mobility-by-2030-flipkart-drives-towards-sustainability-with-ev100/>
- 200 This figure is from a media source and not from Flipkart's official annual report, as Flipkart's annual report does not appear to be publicly available. Firstpost (2020, 2 December). Flipkart India revenue up 12 percent in the financial year 2020 even as losses drop 18 percent. Retrieved from <https://www.firstpost.com/business/flipkart-india-revenue-up-12-percent-in-the-financial-year-2020-even-as-losses-drop-18-percent-9072631.html>
- Exchange rate (1 INR = 0.0136574 USD) taken from XE.com, "INR to USD Chart", 31 December 2020, <https://www.xe.com/currencyconverter/convert/?Amount=346.1&From=INR&To=USD>
- Bureau Van Dijk's corporate database Orbis reports that Flipkart Private Limited's (registered in Singapore) turnover in 2019 (for the financial year ending on 31 March 2020) was US\$ 6.3bn. Its net income in 2019 was US\$ -2.5bn (Orbis, Flipkart Private Limited, Key Information, retrieved on 5 November 2021).
- 201 UPS (2021). 2021 Form 10-K. Retrieved from <https://investors.ups.com/sec-filings/annual-filings/content/0001090727-21-000013/0001090727-21-000013.pdf>
- 202 Putzger, I. (2021, 16 June). UPS mulls same-day service – but may not use its own drivers. Retrieved from <https://theloadstar.com/ups-mulls-same-day-service-but-may-not-use-its-own-drivers/>
- Black, T. (2019, 25 November). UPS asks temp workers to use their own cars for holiday deliveries. Retrieved from <https://www.bloomberg.com/news/articles/2019-11-25/ups-asks-temps-to-use-own-cars-for-holiday-rush-rankling-union>
- 203 UPS' goal is 40% "alternative" fuel in ground operations, but it includes natural gas, which cannot be considered renewable or sustainable. UPS (2021). UPS Sustainability Highlights. Retrieved from https://about.ups.com/content/dam/upsstories/assets/reporting/sustainability-2021/Sustainability_Highlights_081721_final.pdf
- 204 UPS (2021). UPS Fact Sheet, p. 23. Retrieved from https://about.ups.com/content/dam/upsstories/assets/fact-sheets/ups-global/UPS_Fact_Sheet.pdf
- 205 UPS (2021). 2021 Form 10-K. Retrieved from <https://investors.ups.com/sec-filings/annual-filings/content/0001090727-21-000013/0001090727-21-000013.pdf>
- 206 Retrieved from Refinitiv Eikon on 27 October 2021.
- 207 Walmart (2021). 2021 Annual report. Retrieved from https://s2.q4cdn.com/056532643/files/doc_financials/2021/ar/WMT_2021_AnnualReport.pdf
- 208 Walmart Website (n.d.). Walmart Announces the Acquisition of Parcel, a Technology-Based, Same-Day and Last-Mile Delivery Company. Retrieved from <https://corporate.walmart.com/article/walmart-announces-the-acquisition-of-parcel-a-technology-based-same-day-and-last-mile-delivery-company>
- 209 Walmart Website (2021, 24 August). Walmart Launches Walmart GoLocal, a New Delivery as a Service Business. Retrieved from <https://corporate.walmart.com/newsroom/2021/08/24/walmart-launches-walmart-golocal-a-new-delivery-as-a-service-business>
- 210 Walmart Website (2021, 24 August). Walmart Launches Walmart GoLocal, a New Delivery as a Service Business. Retrieved from <https://corporate.walmart.com/newsroom/2021/08/24/walmart-launches-walmart-golocal-a-new-delivery-as-a-service-business>
- 211 Walmart (2021). Form 10-K 2021, p.33. Retrieved from <https://d18rn0p25nwr6d.cloudfront.net/CIK-0000104169/598c8825-536a-4371-ab8a-98b9ee761c43.pdf>
- 212 Walmart Sustainability Hub (n.d.). Walmart's pathway to a zero-emissions future. Retrieved from https://www.walmartsustainabilityhub.com/media-library/document/zero-emissions-by-2040-white-paper/_proxyDocument?id=00000174-ad59-d343-a17d-bffd7bba0000
- 213 Walmart (2021). 2021 Annual report. Retrieved from https://s2.q4cdn.com/056532643/files/doc_financials/2021/ar/WMT_2021_AnnualReport.pdf
- 214 Retrieved from Refinitiv Eikon on 27 October 2021.

About this report

Authors: Ilona Hartlief & David Ollivier de Leth

With input from: Esther de Haan & Jenny Pannenbecker

Copy-edit: Marieke Krijnen - www.mariekekrijnen.com

Layout: Frans Schupp

Photo: Mika Baumeister via Unsplash



Stichting Onderzoek Multinationale Ondernemingen
Centre for Research on Multinational Corporations

KNSM-laan 17
1019 LA Amsterdam
The Netherlands
T: +31 (0)20 639 12 91
info@somo.nl
www.somo.nl

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