A photograph of a lush green forest with sunlight filtering through the trees. A large, semi-transparent blue shape with a purple border is overlaid on the bottom left, containing the main text.

WHY THE LAST MILE IS LESS SUSTAINABLE THAN EVER

**And what we
can do about it**

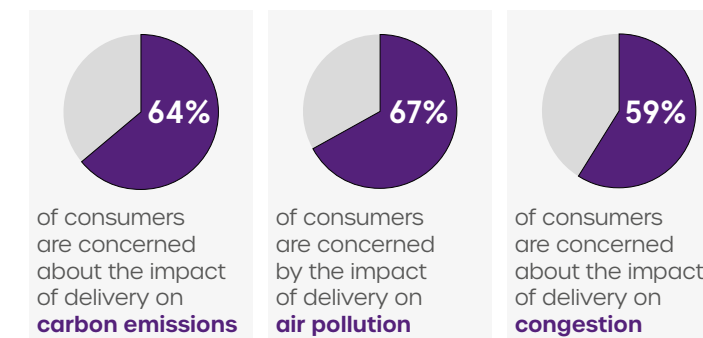


Introduction

There are myriad ways of thinking about sustainability in logistics. Look to any number of annual reports, or in some cases, to the dedicated sustainability reports published by carriers or posts from around the world. Their interpretation of sustainability and the actions that come from those interpretations are incredibly wide-ranging. Whether it's the minutiae of how frequently truck tyres are re-treaded, or the grander picture of workforce diversity and inclusion, or headline targets and data on greenhouse gas emissions, the parcel industry has very much adopted sustainability at both an operational and a strategic level.

We won't be covering the full range of sustainability initiatives and data in this white paper. It's too broad, and much of it is not fully within our remit as last-mile delivery and returns experts. What we've chosen to focus on in particular is the role sustainability plays between carrier and consumer, especially in the last mile. What effect are current initiatives having, what needs to happen for the big promises to be met, and how can carriers and posts genuinely create a more sustainable final mile.

We already know that consumers are increasingly concerned by and making decisions based on perceived sustainability. In our previous [post-COVID report](#), we revealed that:



All of these showed a significant increase from the previous year.

The last mile is the most visible part of the ecommerce journey for consumers, and it is the part they have the most control over through their choice of delivery option. There's still an information asymmetry, as economists would term it. Consumers often aren't sure which choices are more sustainable, and they're not being helped by the paucity of information at checkouts. Better information for consumers should allow them to express the preferences for sustainable delivery which so many profess to hold, though exactly how this will manifest is yet to be seen. What seems obvious is that if retailers can start to offer proven sustainable delivery options, their checkout conversion should increase.

Carriers and posts have been making a lot of noise about their goals to become carbon neutral, in timeframes which vary from the next few years to the 2040s and beyond. Somewhat depressingly, at the recent Leaders in Logistics conference in Copenhagen, UPS touted that their goal was to be carbon neutral by 2050. **But here's the hard truth about last-mile sustainability: parcel volumes are at record highs, and the reductions we've seen in emissions-per-parcel have been massively outpaced by that growth in volume.** We're delivering more parcels, driving more miles, and emitting more than ever.

To suit the action to the word, we need a rethink of our approach to parcel delivery.

Tim Robinson
Duddle CEO

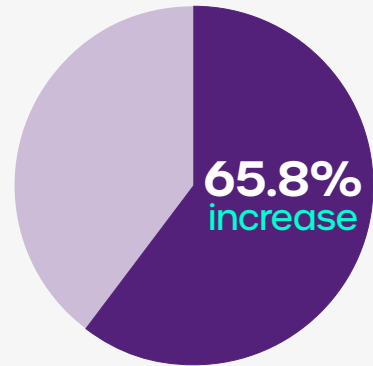
2021: A year of exceptional growth

eCommerce growth drastically accelerated during 2020 and 2021, with more consumers shopping online than ever before. Worldwide ecommerce sales grew from \$4.2 billion in 2020 to just under \$5 billion in 2021¹, and with this came a deluge of increased parcel volumes that challenged many parcel

delivery businesses, who found themselves operating at peak capacity levels in typically quiet periods of the year, and having to add entirely new capacity to deal with the "new normal" of peak volume.

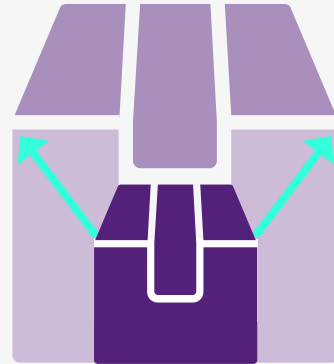
EVRI

Parcel volume increased from 380 million in 2019, to **630M** in 2020, a **65.8% increase**



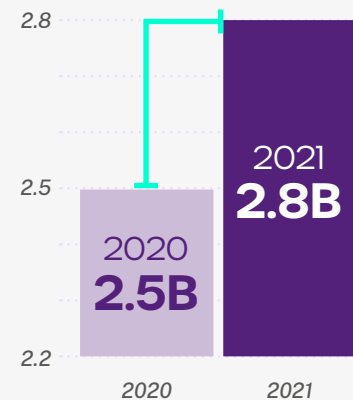
an post

Parcel volume increased by **100%** in 2020



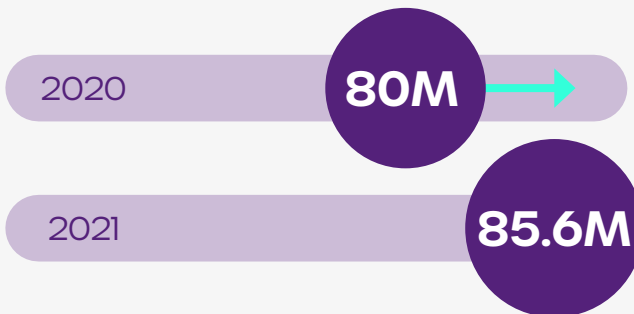
LA POSTE

Parcel volume increased from 2.5 billion in 2020, to 2.8 billion in 2021, a **10.7% increase**



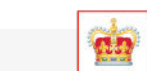
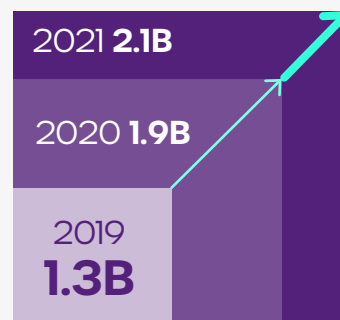
NZPost

Parcel volume increased from 80 million in 2020, to 85.6 million in 2021, a **7% increase**



dpd

Parcel volume increased from 1.3 billion in 2019 to 1.9 billion in 2020 (46% growth) and again to 2.1 billion in 2021 (10% growth)



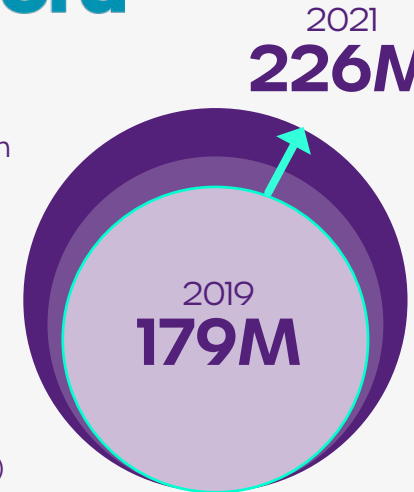
Royal Mail

Parcel volume increased from 1.3 billion in 2020, to 1.7 billion in 2021, a **30% increase**

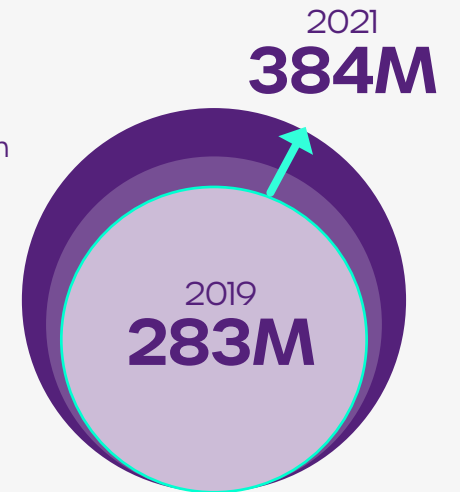


postnord

Parcel volume increased from **179 million** in 2019 to **198 million** in 2020 (10.6% growth) and again to **226 million** in 2021 (14.4% growth)



Parcel volume increased from **283 million** in 2019 to **337 million** in 2020 (19% growth) and again to **384 million** in 2021 (14% growth)



Pitney Bowes forecasts in its 2021 Parcel Shipping Index that global parcel volumes will double to 266 billion by as early as 2026. A study by the World Economic Forumⁱⁱ expects demand for last-mile delivery to grow by 78% globally by 2030. According to that study, without intervention, this will increase the number of delivery vehicles in the top 100 global cities by one-third, increasing delivery traffic by 32%.

With more vehicles on the road, congestion will also rise by 21% – adding an extra 11 minutes of commute time to each passenger every day. With more time on the road, commuters will also contribute to more emissions, highlighting how second-order effects have to be considered to fully appreciate the sustainability impacts of parcel delivery.

Parcel volumes to **DOUBLE BY 2026**

Last-mile delivery expected to grow by **78%** globally by 2030

The number of delivery vehicles in the top 100 global cities will **INCREASE 1/3**

Emissions from delivery traffic will **INCREASE BY 32%**

CONGESTION will rise by **21%**

Will cost an extra **11 MINUTES** COMMUTE TIME for each passenger a day

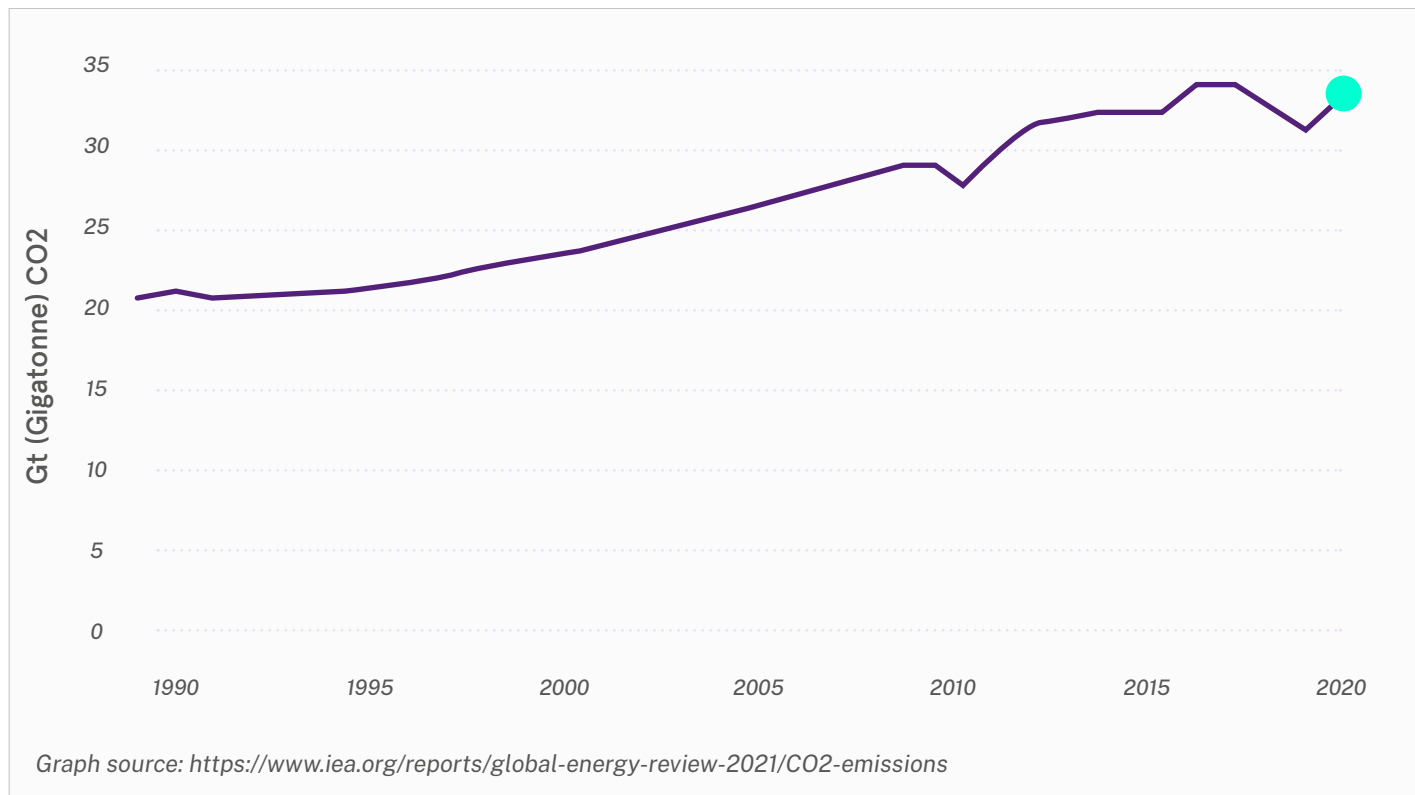
The core calculations are simple enough for last-mile delivery. Without change, sustainability in the face of increasing parcel volumes is not possible.

ⁱⁱWorld economic forum – The future of the last-mile ecosystem.

Global CO2 emissions are on the rise

During the travel-restricted pandemic, CO2 emissions fell in 2020. Sadly, 2021 did not continue the trend and rose by 5%ⁱⁱⁱ, the single largest increase in more than a decade.

Scientists have also predicted that 2022 could “set a new record for global emissions.”^{iv} If this trajectory is accurate, the world’s ‘carbon budget’ will be spent in 11 years. That means we will surpass the acceptable level of carbon produced to keep global temperatures below 1.5C.



One of the biggest causes of this increase in emissions was travel and transport, which increased in 2021 after a lapse in the pandemic. Road freight makes up approximately 40% of these emissions. The share of last-mile delivery within road freight is harder to calculate. Scottish research estimates that of all road transport¹, last mile emissions represent 6.6% of emissions^v.

“2022 could “set a new record for global emissions.”

For carriers however, last-mile deliveries represent a much more significant chunk of their emissions profile. DPD’s 2020 sustainability report has last-mile as the second-largest contributor, causing 38% of its greenhouse gas emissions^{vi}.

As noted previously, rising parcel volume means more vans on the road, more miles driven, and more emissions, despite the CO2 efficiency progress made in the last mile sector.

Royal Mail, for instance, reported the lowest CO2 per parcel of any major UK delivery company at an average of 208g CO2e per parcel. This is nearly a 2% increase in efficiency compared to the previous year, which reported an average of 212g CO2e per parcel.

In 2020, Royal Mail delivered 1.3 billion parcels, with an average CO2 emission per parcel of 212g. That means its overall emissions were 275,600 tonnes of CO2. In 2021, parcel volumes grew to 1.7 billion. Despite the 2% increase in efficiency, with fewer grams of CO2 emitted per parcel, Royal Mail’s overall emissions rose to 353,600 tonnes of CO2 – a 28% rise in emissions.

Royal Mail

In 2020,
Royal Mail deliveries generated **275,600T** of carbon emissions

In 2021, Royal Mail increased **carbon efficiency by 2%** to an average of **208g CO2e per parcel**

In 2021, Royal Mail deliveries generated **353,600T** of carbon emissions

Despite increased carbon efficiency,
Royal Mail delivery emissions went up by 28%
in large part due to increased parcel volumes.

To reduce emissions in the context of increasing parcel volumes, carriers need to improve carbon efficiency by a far more substantial amount.

Electric fleets aren't enough - yet

One of the biggest trends in sustainability is electric vehicle fleets, with most carriers and postal services in various stages of electrification.

	1500
	168
	400
	10,000*
	3300
	5000
	1000
	2000*
	1200*

However, there are drawbacks to electric vehicles, such as their availability.

DPD claim that the electric vehicles they use are "typically £20,000 more expensive per vehicle compared to the diesel equivalent, and not available in the number we require". In addition, DPD states that manufacturers are "preferring to produce left-hand drive all-electric vehicles to cater for larger European markets", leaving UK and Ireland with fewer options than 10,000* their European counterparts.

As well as prioritising left-hand drive vehicles, manufacturers are struggling to keep up with demand. In 2019, electric vehicle start-up Rivian attracted investment from Amazon^{vii}, and a contract for 100,000 vans. However, it's not yet clear if the first 10 production vans have actually been delivered to Amazon. As a result, Amazon is buying thousands of electric vans from alternative providers in Europe and elsewhere.

With demand clearly high, prices are rising to match. Material prices are increasing across the entire auto industry. In 2021, the price of steel rose by as much as 100%, aluminium around 70%, and copper more than 33%. In addition, the price of lithium carbonate increased by 150%, graphite by 15%, and nickel by 25%, all of which are essential components to build batteries for electric vehicles.^{viii}

*by 2022

"The transition to a zero-emission, electric fleet will not be an easy journey. From a purely operational standpoint, whichever way you look at it - whether in terms of range, payload or volume - a van with an internal combustion engine beats an electric one hands down. Only when it comes to tailpipe emissions does the battery-powered vehicle outshine the diesel. So we know that this is going to put extra pressure and increased demands on those colleagues out in our depots."

David Landy, Head of Fleet at Evri.^{ix}

If carriers and posts can secure electric vehicles, they then face the challenge of powering them. Carriers must have an infrastructure in place to charge vehicles, which may not be possible at depots. Instead, drivers may have to install home installation points in schemes like DPD's home charging initiative. Partnering with Pod Point, DPD contributes £350 towards installing home chargers for drivers^x - which also act as incentives to encourage electric adoption for their personal vehicles. For carriers with driver owned fleets, they would have to make the choice to replace their own vehicle to electric, so these charging points and schemes are essential for fleet electrification.

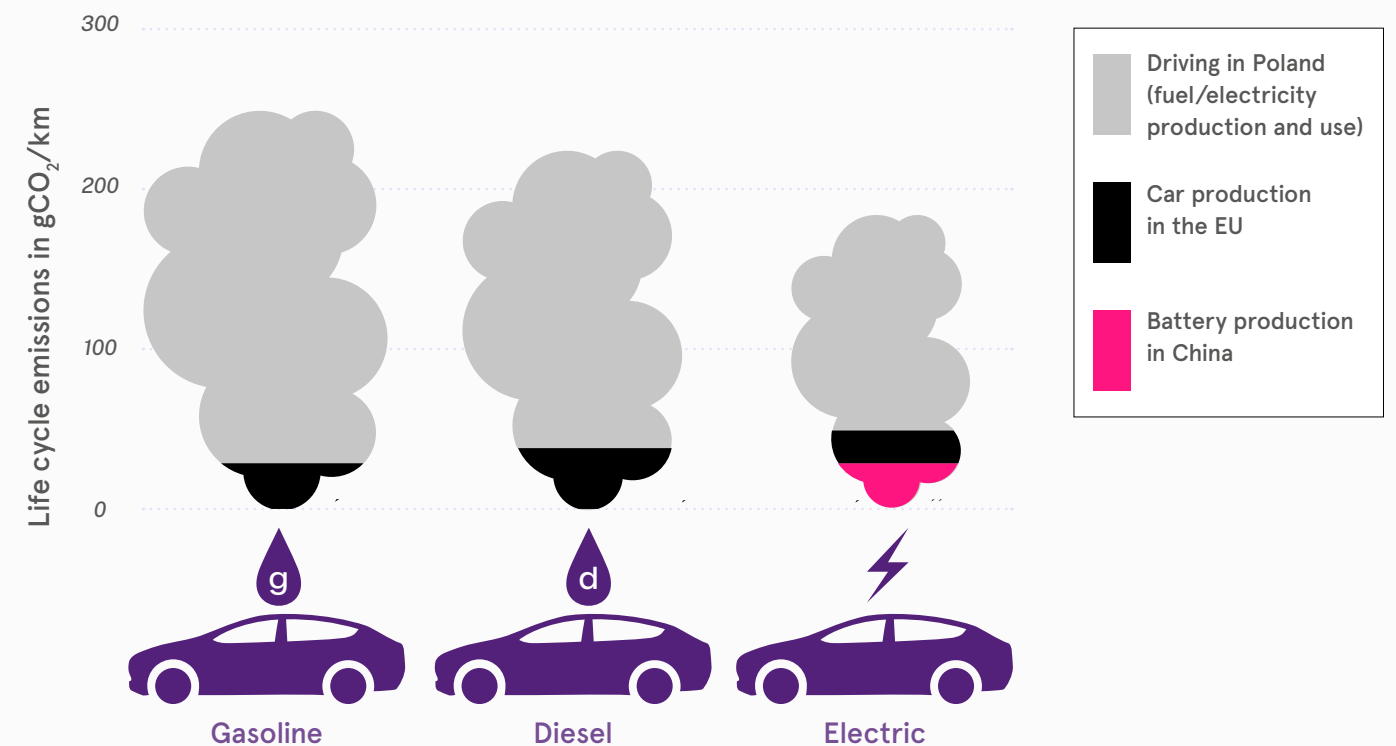
The effectiveness of electric vehicles in reducing overall emissions is heavily dependent on the region they're operated in. An electric vehicle in the US, where fossil fuels make up most of the country's energy production, will incur more CO2 emissions than one used in Iceland, which runs almost entirely on hydro and geothermal energy. One important benefit of

EVs is that emissions aren't released at the tailpipe. That's particularly valuable for urban centres already struggling with air pollution.

DPD contributes £350 towards installing home chargers for drivers

When compared to petrol and diesel vehicles, a new study shows that electric cars lead to lower overall CO2 emissions^{xi}, even if the electricity used to power them comes from fossil fuel generation. The 'greener' the energy used to power the vehicle, the more carbon savings it offers. While electric vehicle production results in more greenhouse gas emissions than conventional vehicle production, electric vehicles still emit less than their fuel counterparts over a complete lifecycle in countries with decarbonised power generation.

In the worst case scenario, EU electric cars emit 22% less CO2 than diesel and 28% less than petrol



Source: Transport & Environment

Electric vehicles emit less overall and are a great step towards sustainability and reducing the number of emissions per mile.

However, they are not carbon neutral, thus the core challenge of reducing the number of miles driven per delivery remains.

Making the last mile more sustainable

The long-term solution for last-mile sustainability is to reach zero emission deliveries. We're a while away from this, so the short and medium-term solutions are to:

1. Reduce emissions per mile
2. Reduce the number of miles driven

To address the first point, carriers need to invest in electric vehicles as covered above, or in low or zero-emission delivery methods such as on-foot deliveries or cycle delivery services. This would be easier to implement in urban areas but may not be possible for rural locations or bulky items.

Posts have an advantage here, with previously established delivery routes and infrastructure to fulfil their Universal Service Obligation (USO). For example, Royal Mail was named the most carbon-conscious delivery company in the UK, primarily down to their 90,000 'feet on the street' postal workers.^{xii}

To reduce the number of miles driven, carriers need to increase drop density, improve consolidation, and reduce failed deliveries, which are increasing as consumer behaviours change following the pandemic. Instead of being at home and available to accept deliveries, consumers are returning to work and social engagements. As our Post-Covid report discovered, 58% of consumers are back to normal or busier than before the pandemic.

There's one solution that carriers and posts can use to achieve all these goals in the short term: increasing the share of parcel volume delivered through their out-of-home (OOH) networks.

To reduce the number of miles driven, carriers need to increase drop density, improve consolidation, and reduce failed deliveries

How sustainable is OOH?

On the surface, OOH networks provide substantial sustainability savings for carriers and posts. OOH networks reduce the number of stops by dropping off multiple parcels at single locations. This should lead to fewer miles on the road and consequently fewer emissions. By consolidating deliveries into their automated parcel machines (APMs), Polish carrier InPost has reported:



-53KG/DAY
of CO2 reduced by APMs in Poland



54M LITRES
of petrol saved in 2021 with delivery to locker instead of to-door



~75% LESS
CO2 emissions compared to to-door

One simulation by DHL also found that drivers using their service points delivered the same volume of parcels by driving 38% of the distance that home delivery drop-offs would have required.

In addition, OOH points allow consumers to collect when convenient for them, improving customer experience and reducing the number of failed deliveries.

Ultimately, the sustainability of any particular out-of-home delivery depends on the journey a consumer makes to the OOH location to collect their parcel.

Research from Vrije University Brussels illustrates that if the journey is part of a trip chain (i.e. it is part of a pre-existing journey or a multi-purpose route) then OOH delivery results in CO2 savings over home delivery – no matter which type of transport is used to collect it.

50.4% of consumers make a dedicated trip to their collection point rather than a trip chain. OOH will still provide significant GHG emission savings if consumers travel on foot, bike, or rail-based public transport. However, if the consumer drives, takes a bus or rides a motorcycle to the collection point, they create more emissions than if they had the parcel delivered to their home.

There are limited academic studies on this crucial area so far, and there remains debate in the industry as a whole as to the final efficiency of out-of-home delivery. However, when consumers are able to use public transport or other low-emission modes – something which should become increasingly common – out-of-home delivery displays a truly powerful capability to drastically reduce delivery emissions, at the kind of scale which is necessary for a solution to counterbalance the growth of parcel volumes.

Collection is part of a trip chain (49.6% respondents)

Transport mode used for collection of the parcel	% of users of transport mode	Average distance to the Cubee (km)	Average emission per mode (g/km)	Total emission by the consumer	Extra emission by the driver	Total emission per parcel (collecting)	Emission per parcel (home delivery)	Difference Green = less CO2 Red = more CO2
FOOT	35 %	0.75755 km	0 g/km	0g	2.56 g	2.56 g	134.773 g	- 132.213 g
BIKE	23.3 %	0.75755 km	0 g/km	0g	2.56 g	2.58 g	134.773 g	- 132.213 g
CAR	28.3 %	0.75755 km	121.5 g/km	92.04 g	2.56 g	94.6 g	134.773 g	- 40.17 g
BUS	8.3 %	0.75755 km	110 g/km	83.33 g	2.56 g	85.89 g	134.773 g	- 40.83 g
TRAIN	3.3 %	0.75755 km	26 g/km	19.69 g	2.56 g	22.25 g	134.773 g	- 112.52 g
MOTORCYCLE	1.7 %	0.75755 km	107 g/km	81.05 g	2.56 g	83.61 g	134.773 g	- 51.16 g
SUBWAY	0 %	0.75755 km	20 g/km	15.15 g	2.56 g	17.71 g	134.773 g	- 117.06 g
TRAM	0 %	0.75755 km	30 g/km	22.72 g	2.56 g	25.28 g	134.773 g	- 109.45 g

Collection is part of a dedicated trip (50.4% respondents)

Transport mode used for collection of the parcel	% of users of transport mode	Average distance to the Cubee (km)	Average emission per mode (g/km)	Total emission by the consumer	Extra emission by the driver	Total emission per parcel (collecting)	Emission per parcel (home delivery)	Difference Green = less CO2 Red = more CO2
FOOT	9.8 %	0.666 km	0 g/km	0g	2.56 g	2.56 g	134.773 g	- 132.213 g
BIKE	18 %	1.47 km	0 g/km	0g	2.56 g	2.58 g	134.773 g	- 132.173 g
CAR	54.1 %	2.22 km	121.5 g/km	269.73 g	2.56 g	272.29 g	134.773 g	+ 137.51 g
BUS	6.6 %	2.4 km	110 g/km	264 g	2.56 g	266.56 g	134.773 g	+ 131.78 g
TRAIN	3.3 %	1.4 km	26 g/km	36.4 g	2.56 g	38.96 g	134.773 g	- 95.81 g
MOTORCYCLE	3.3 %	1.8 km	107 g/km	192.6 g	2.56 g	195.16 g	134.773 g	+ 60.38 g
SUBWAY	1.6 %	2.2 km	20 g/km	44 g	2.56 g	46.56 g	134.773 g	- 88.21 g
TRAM	3.3 %	1.4 km	30 g/km	42 g	2.56 g	44.56 g	134.773 g	- 90.17 g

True OOH sustainability depends on carrier and consumer

Several factors influence the true sustainability of OOH, including the carrier's drop density and routes, the location and coverage of the OOH network and how the consumer accesses it.

Urban areas tend to have the most savings from OOH, as the OOH networks will be denser, and consumers are more likely to collect on foot or by a chain trip. CPost International provided an excellent case study of this at WMX Miami, detailing the launch of community mailboxes on the island of Curacao.

Installed in accessible outdoor locations near residents' homes, community mailboxes are a set of lockable mailboxes in which every household will have a dedicated box and a key. Instead of delivering to each household, CPost can consolidate hundreds of deliveries to a single location. Doing so has taken CPost from having to serve 80,000 addresses to just 150 locations. This decrease has reduced the need for delivery vehicles by 80% on the island, reducing the miles driven and thus reducing emissions.



It will be harder to reach the same kind of carbon savings in more rural areas, particularly if there are limited drop off points. The more spread out the OOH locations are, the more likely it will be for consumers to make a dedicated car trip for collection, thus creating more emissions.

That said, investing in OOH infrastructure in these areas will reduce consumer distance. The closer a consumer is to a pickup point, the more likely they will be able to travel on foot or as part of their daily commute, saving carbon emissions overall. InPost also note in their annual report that they see proximity to lockers as a key determinant of initial consumer adoption and usage frequency.

In other words, investing in more out-of-home locations so that more options are closely accessible will tend to result in more volume into each location as shopper usage increases, helping to counteract the dilution of volume across more locations. At some point however, having more and more collection points will reduce drop density and start to reduce the CO2 (and cost) savings potential of the network. As with understanding consumer access, carriers need to be able to quickly and easily analyse OOH locations' performance to determine their effectiveness.

Investing in more out-of-home locations so that more options are closely accessible will tend to result in more volume into each location as shopper usage increases

For OOH to be genuinely sustainable, carriers need to drive volume into their networks and understand how consumers are accessing their locations. For their part, consumers need to understand the effect their journey has on overall emissions and consciously choose to take a more sustainable trip. Providing the information and incentives for them to do so is down to the carrier and the merchant.

Carriers need to provide more eco choices to their consumers

Sustainable delivery options are becoming more important to consumers when shopping online.

More than a third of UK shoppers consider being able to offset their carbon equally as important as obtaining free delivery^{xiii}. In addition, 39.3% of consumers revealed they would be more likely to purchase through an online retailer offering an eco-friendly delivery option.

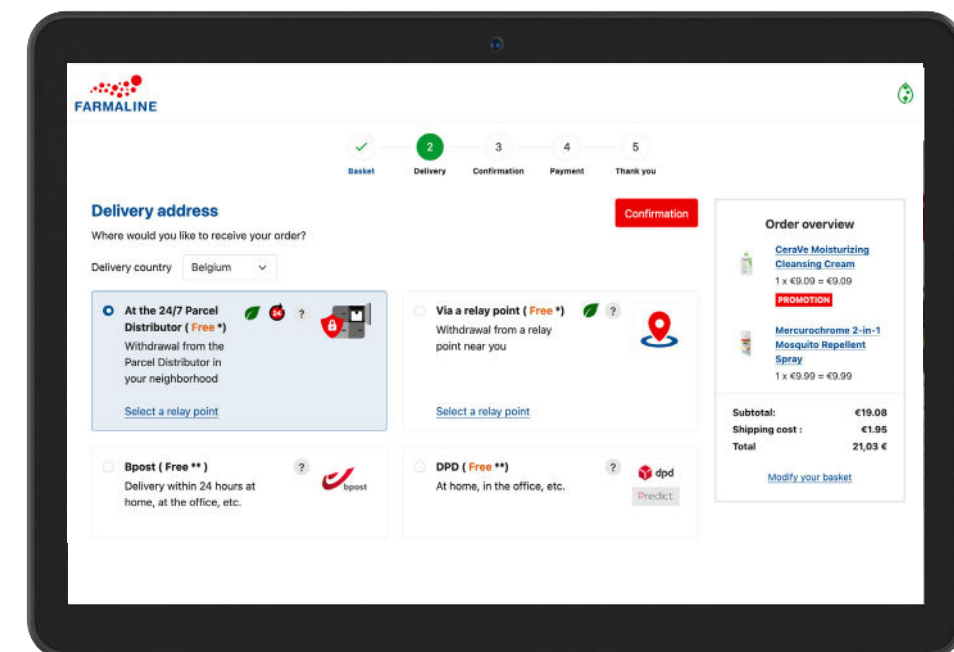
In addition, nearly half of consumers would be willing to pay £1 or more for eco-friendly delivery options^{xiv}.



Consumers are more inclined to buy from retailers offering sustainable options, and in most cases will pay more for it. However, during the 'designing the ultimate flexible delivery experience' panel at Leaders in Logistics, it was revealed that only 3% of people in the UK feel they are being given the right information on sustainability.

Consumers are more inclined to buy from retailers offering sustainable options, and in most cases will pay more for it

Simply advertising that one option is greener than another is a good start, as in the example from Belgian retailer Farmaline below.



However, even better would be a checkout where average emissions reductions for specific delivery options were clearly displayed. It's the job of carriers to analyse not only how OOH delivery affects their emissions profile, but to understand the ways consumers access their network, and incorporate

this data into their metrics. Offering genuinely scientific and trustworthy information about sustainability goes beyond simply offering the option – it actively encourages consumers to make the decisions they say they're keen to make.

How carriers can increase OOH volume

There are two key components to driving OOH volume:

1. Make sure consumers know the OOH options exist and understand the benefits
2. Make OOH options easy and convenient for consumers to use

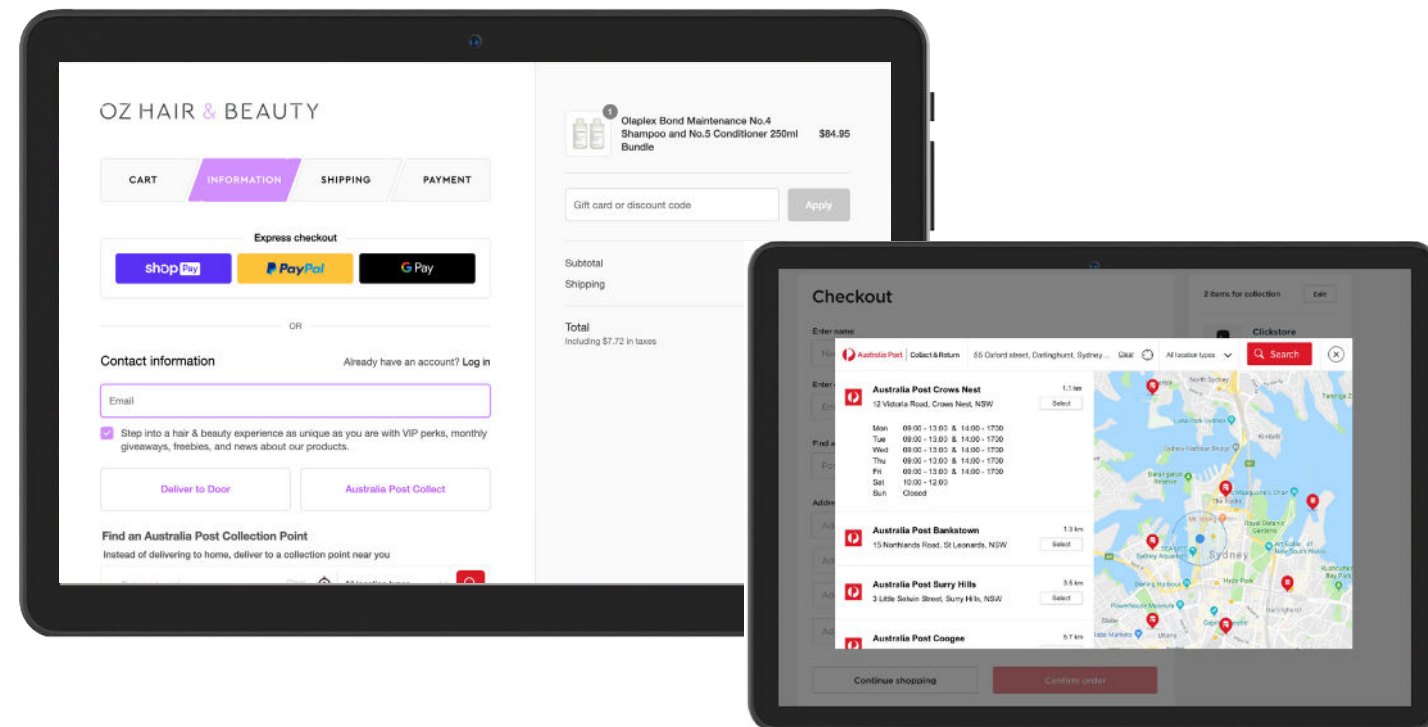
Increasing OOH volume begins at the checkout. If consumers don't know about a carrier's offering and why it benefits them, or if choosing an OOH location is harder for them than home delivery, they won't use it.

That means carriers need to be able to influence checkouts so that they can communicate the full range of available delivery options, rather than reverting to home delivery as

the default. Working with merchant partners on this is crucial to the success of OOH delivery as a whole.

If it's not clearly available at the key moment where consumers are choosing their delivery option, out-of-home delivery will never receive significant volume. If carriers can add data on sustainability savings such as carbon not emitted or miles not driven to these delivery options, that provides a great incentive for merchants to make the necessary changes, and for consumers to select these options.

Secondly, this means making sure the experience of choosing and then collecting an OOH delivery is quick and easy for consumers. Australia Post's fully branded checkout integration is available to its merchant partners across ecommerce platforms, and makes the user journey incredibly simple. In just 2-3 clicks, users can search for and select a nearby pickup location using the map, making it quicker than typing in their home address for home delivery.



This integration is uniform across platforms, so no matter which retailer shoppers are purchasing from, they'll get a consistent and easy-to-use experience. Even better, though, it's simple for retailers to integrate, encouraging more to adopt the integration.

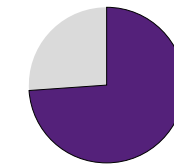
Experience at the point of collection is crucial too. Once a customer has chosen out-of-home delivery, their shopping

journey and collection experience should be seamless. Keeping them informed of exactly when and where their parcel will be available for collection helps to reduce parcel dwell time as well as improving customer satisfaction. Using simple QR codes and shelf-scan book-in procedures can help host locations to store parcels neatly and securely, and means shoppers don't need ID to pick up their parcel, so long as they have the QR code from their email.

Key findings for last-mile sustainability in 2022

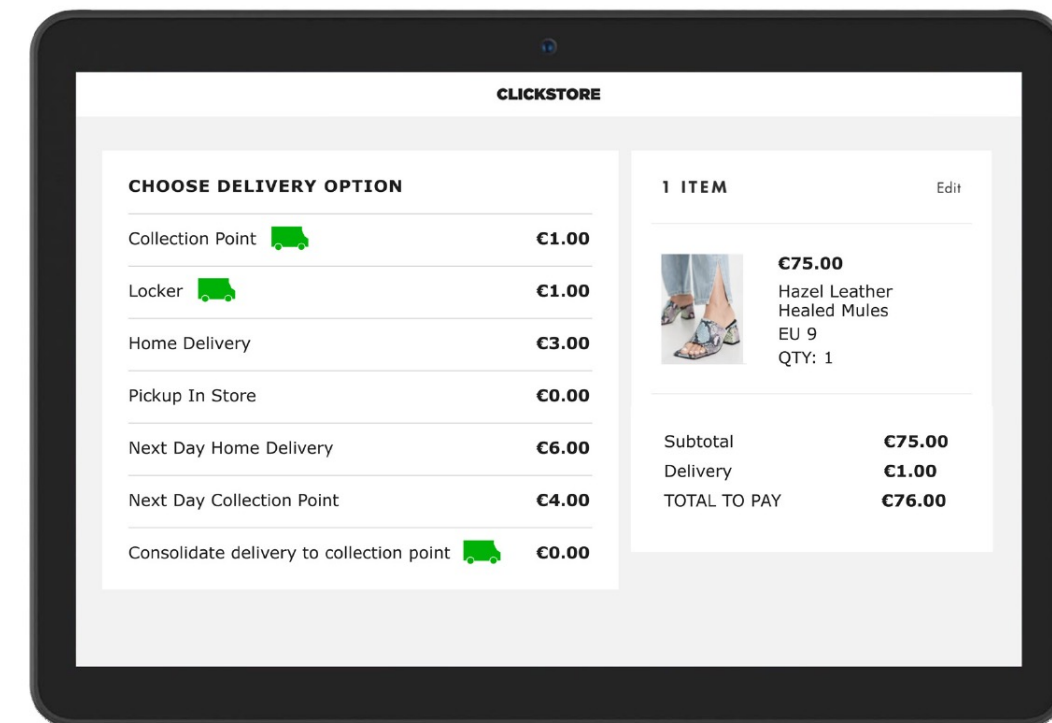
Right now, we're emitting more than ever. Despite some positive changes and deliveries becoming more carbon-efficient, parcel volume growth over the last few years has tipped the scales in the wrong direction. If carriers are to be sustainable and maintain high parcel volumes, further action must be taken.

Although electric vehicles will be an essential part of long-term sustainability, carriers still must reduce the number of miles driven per parcel in the short and medium term, through consolidating deliveries in OOH networks. On aggregate, this should reduce carbon emissions, provided the OOH network is not primarily accessed by dedicated motor vehicle trips.



74% of shoppers plan to use out-of-home delivery in the future

74% of shoppers plan to use out-of-home delivery in the future, partly because it offers several convenience benefits for consumers who are no longer at home to accept deliveries. Consumers are also becoming more environmentally conscious in their delivery options, and 43% of them would be willing to pay more to select them, but crucially only 3% think they have the right information on sustainable deliveries.



Ultimately it falls on carriers to provide OOH as an option for consumers and make it easy for them to use, but the process towards this requires input and buy-in from merchant customers too, and has to be appealing and useful for them. Carriers should be emphasising their ability to provide clear and efficient communication, particularly around the sustainability benefits on offer, as well as creating and sharing easily adopted checkout integrations for their merchant partners.

Consumers say they want to shop more sustainably, but for the rubber to meet the road when it comes to sustainable delivery, they need to get credible and clear information at the most relevant time in their shopping experience – when they're choosing delivery options at the checkout.

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About Doddle:

Doddle helps carriers and posts around the world make ecommerce delivery and returns more efficient, customer-friendly and useful. Years of fulfilment experience in the world's most advanced e-commerce markets gives us the expertise to help carriers create delivery and returns strategies that enhance customer experience, promote sustainable solutions and drive profitability and efficiency. Our white-label technology platform powers the creation, roll out and management of a full out-of-home delivery & returns ecosystem.

Each of the solutions in the platform is designed to drive loyalty, create cross selling opportunities, promote efficiency, and address the need for more sustainable supply chains. Doddle's expertise and technology is trusted by some of the world's biggest retail and logistics businesses from ASOS and Amazon to USPS and Australia Post. Headquartered in London, UK, Doddle also has regional teams in the U.S., Australia, Europe and Japan.

Find out more at [Doddle.com](https://doddle.com)

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