# Delivering Sustainability

paazl

when shipping
gets serious

# Contents

# Introduction

In the world of e-commerce where customers want it all and want it now - and retailers give it to them – there seems to be little consideration for the sustainability of this practice of instant gratification. With brands looking every which way to delight their customers, super-fast delivery, excessive packaging and ‘try before you buy’ schemes have become the norm.

With consumers becoming ever more environmentally aware we have explored how sustainable our current methods are and how e-commerce delivery is adapting to an increasingly conscious market.

# Online or offline. What is the most sustainable way to shop?

# A matter of behaviour

It is widely reported that online retail is more efficient than offline. After all, the environmental cost of 30 customers – and potentially 30 cars - travelling to a store compared to one van delivering 30 items is pretty straight forward. However customer shopping and browsing behaviour patterns are actually far more complex.

Not all of us conduct the entire shopping process online and not all of us conduct the entire shopping process in a bricks and mortar store. Some of us conduct our research online and then go into the store to make a purchase. Some of us will browse in-store, obtain the required information from the sales assistant and then order the item online.

Then there is the matter of returns! Some customers order an item online and then return it to a store, some will return it by courier and some via a pick-up point. With so many possibilities what was previously 30 customers versus one delivery van has now become one delivery van plus 30 customers with their 30 cars.

> **“offline shoppers have a carbon footprint of almost twice that of online shoppers”**

# The most sustainable type of shopper

One study conducted by the MIT Centre for Transportation & Logistics, which analysed the environmental impact of various shopping techniques, categorised customers into different profiles. These profiles range from the traditional shopper who conducts all of their shopping offline and makes multiple visits to a store before making a purchase. To the online shopper who completes their entire shopping process online.

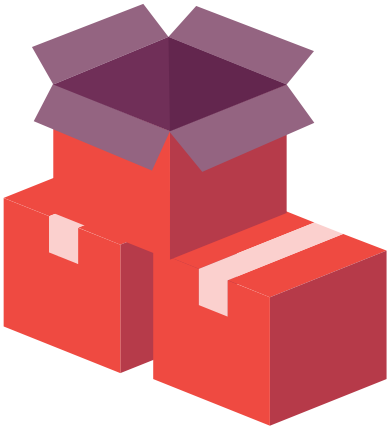
The study revealed that traditional offline shoppers have a carbon footprint of almost twice that of online shoppers. Although the carbon footprint of an online shopper does increase when they opt for express delivery.

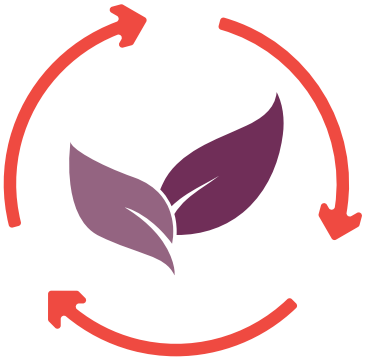
Online shopping has a lower carbon footprint because the delivery carrier uses an optimised delivery process. Whereas the offline shopper’s carbon emissions are mainly due to their transportation and multiple trips to store.

The study also revealed that the further away the customer lives from the store the more inefficient their transportation method tends to be. Customers that have a large distance to travel are more likely to do so by car. In urban areas where the distance to the store is shorter, customers are more likely to opt for greener modes of transport such as walking, cycling and public transport. With this in mind the further away the customer lives from the store the more environmentally efficient it is for them to shop online.

## The environmental cost of e-commerce packaging

While online shopping may save on transport emissions, it produces more packaging. Many e-commerce players are aware that overpacking items is an issue and are going to great lengths to tackle it. Amazon has already looked at ways to streamline its packaging system so that their products are more efficiently packed with minimal wasted space.





## So... which is the more sustainable?

Online shopping has the edge over offline in terms of sustainability. But ultimately whether online or offline shopping is the more sustainable will depend on the customer in question.

If an offline shopper travels to the store by bike the environmental cost of their transportation will decrease. So in that situation online shopping could be the less efficient option. However if an offline shopper lives in a rural location travelling to the store will cause more emissions than if they shopped online and the carrier delivers the item.

> “Online shopping has the edge over offline”

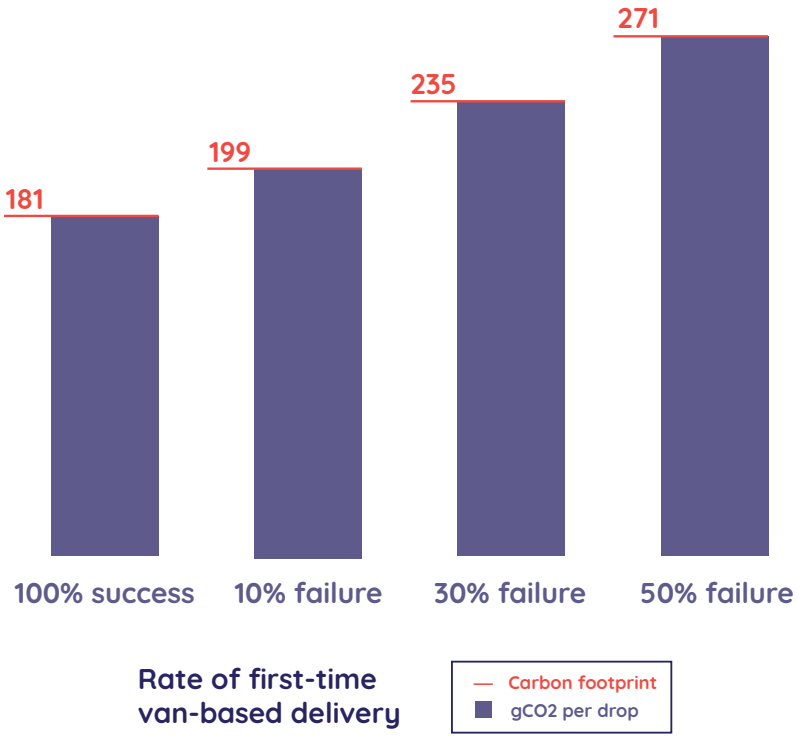
# The environmental impact of missed deliveries

Dutch economist Walther Ploos van Amstel has identified the two main stumbling blocks that disrupt the sustainability of online shopping. The first is that customers are not home to collect their deliveries and the second is that excessive packaging means that retailers are effectively transporting air.

Most delivery carriers work during business hours when the majority of customers are not at home. In fact up to 60% of customers miss their first delivery attempt and alternative arrangements need to be made to get the item into the hands of the customer (9).

> 60% of customers miss their first delivery attempt

Research carried out by the University of Heriot Watt in Edinburgh analysed exactly how much extra carbon a delivery van produces when a percentage of their deliveries fail. If a carrier vehicle fails to deliver half of their packages and then attempts to deliver them all a second time during the same working shift, their carbon emissions will be 50% higher than if all items had been delivered successfully first time (8). The table below is based on information collected in the study.




> If a carrier vehicle fails to deliver half of their packages...their carbon emissions will be 50% higher than if all items had been delivered

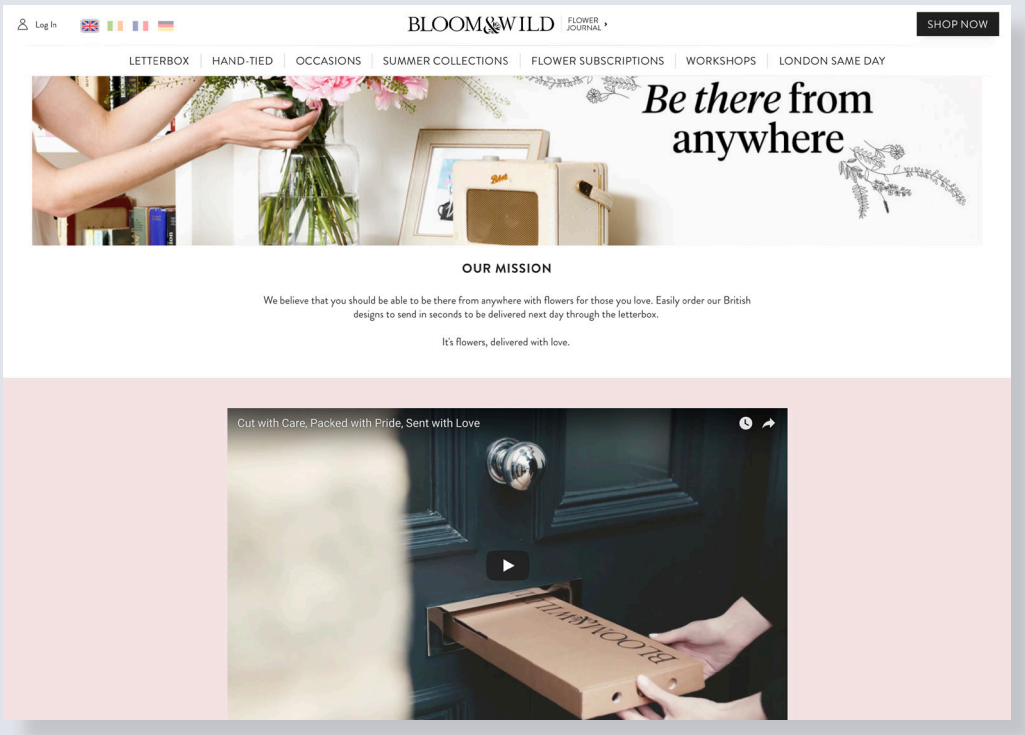
The research also assesses the environmental effect of what is often an inevitable outcome of missed deliveries; further failed delivery attempts and ultimately the customer collecting the item from a warehouse.

The location of carrier warehouses tend to be on the outskirts of urban areas to allow for easy truck access and so this is potentially quite a significant journey for the customer. The journey itself if taken by car can produce more carbon emissions than further delivery attempts would. The research showed that in the most extreme circumstance that they tested the environmental cost of a customer travelling 25 miles to a warehouse and back produces the same amount of emissions as 26 delivery attempts (8).

> **“ produces the same amount of emissions as 26 delivery attempts ”**

To combat the number of missed deliveries a number of retailers have worked on packaging their products into letterbox-sized bundles. One such example is UK-based flower-delivery brand Bloom & Wild who hand pack their blooms into letterbox-sized boxes.

Naturally not every item is able to fit through a letterbox, so another solution is simply to conduct the deliveries outside of working hours. Evening and weekend deliveries are becoming an increasingly common and desired delivery option. Pick-up points are another alternative to combat missed deliveries.



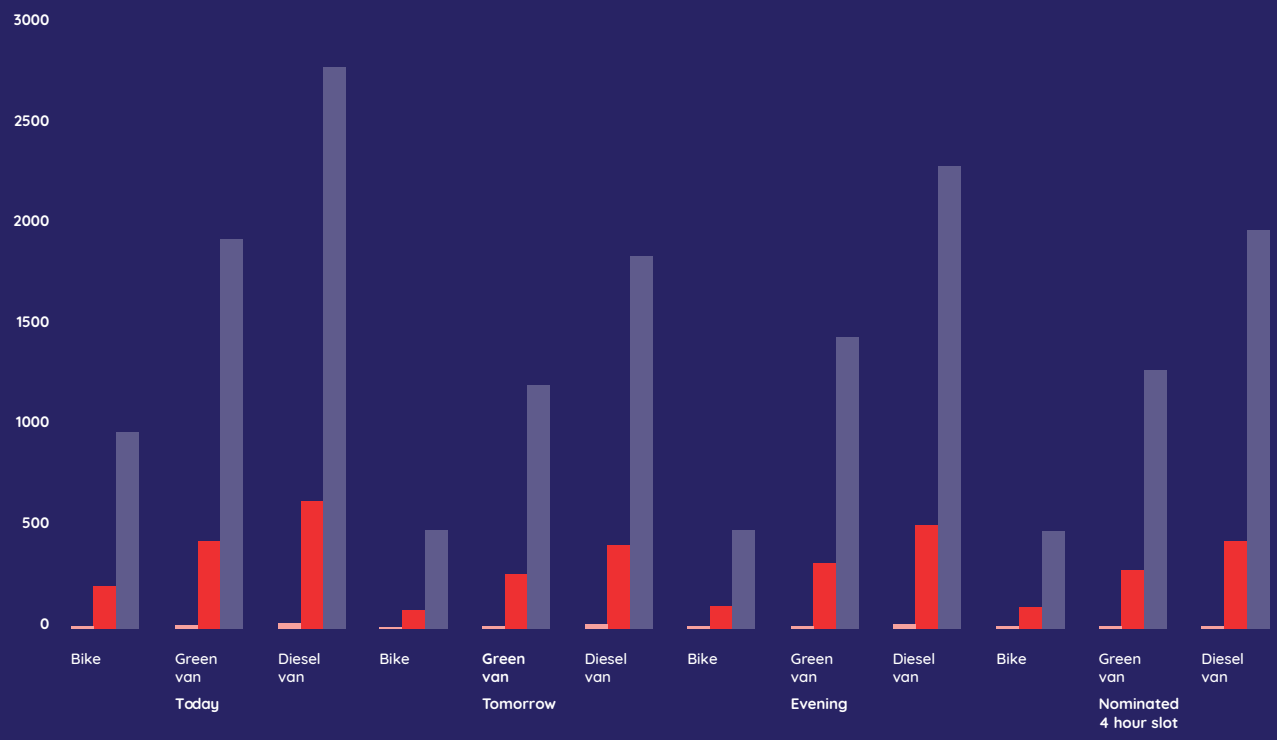
# The environmental impact of returns

In e-commerce returns are big. With retailers offering free returns we are now living in a culture where many online shoppers admit to ordering multiple items with the intent of keeping only one and returning the rest.

The environmental cost of transporting, packaging and processing the returned items is significant enough, but a major problem that retailers have with returns is the waste. In general if it is more cost-effective to throw items away than to repackage and resell them then that is what companies tend to do.

One of the most common reasons that items are returned is because they are damaged during transit, making the item trash before the retailer can even consider the possibility of re-selling.

# How sustainable are different delivery methods




The graph above is based on data collected by Thuiswinkel and compares the carbon footprint of delivering a book (pink), a pair of shoes (red) and a coffee machine (purple). In this graph the last mile of delivery will be via bike, green-gas van or diesel van. The totals take into account ground transportation to the warehouse.

The graph shows that transporting the book has the lowest carbon footprint. Being a small item they can be efficiently packed into the delivery van and also the package size will fit through letterboxes avoiding missed deliveries. Being the largest item the coffee machine has the highest carbon footprint because it can be less efficiently packed and transported.

Same-day delivery has the highest carbon footprint whereas next-day delivery has the lowest because the carrier has more time to work efficiently. Evening delivery and the nominated-time slot reduce the number of missed deliveries making them more sustainable than same-day delivery.

# Same-day delivery

72% of customers in the UK are more likely to shop online if same-day delivery is available (7). Retailers such as ASOS and Revolve are giving their customers what they want when they want it, and they want their items delivered the same day. This could potentially be the most inefficient way to deliver and it all comes down to how the retailer handles it.

Some retailers put location limits on their same-day delivery options. If we take ASOS as an example their same-day delivery method, ASOS Instant means that customers who order before noon can have their item delivered that evening. ASOS have restricted this service to only those that live in certain postcodes in the major metropolitan areas of London, Birmingham, Leeds and Manchester. Keeping the same-day delivery to areas close to their warehouses will reduce the miles – and emissions – of their delivery vans.

> **“72% of customers in the UK are more likely to shop online if same-day delivery is available”**

The sustainability issue with same-day delivery is that time pressure leaves the retailer with little time to fill the delivery van to its full capacity and so they are often going out for delivery half – or even less - full.

But all is not lost for same-day delivery! New startups such as Stuart - a bike-based courier service offering last-mile delivery services in city centres across Europe - are promising to offer express delivery with zero emissions.

Maybe it is possible to provide same-day delivery without compromising on your carbon footprint after all. Just as long as the item is in stock and the customer lives within cycling distance of your store!

> **“ASOS have restricted this service to only those that live in certain postcodes”**

## Pick-up points

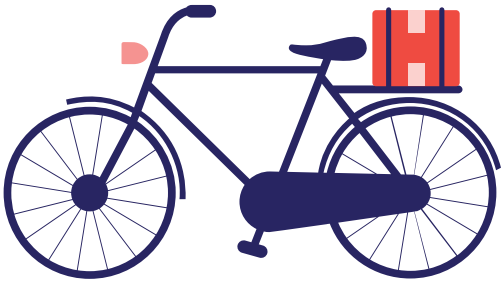
Pick-up points alleviate missed deliveries and in doing so alleviate the additional carbon emissions that come with re-delivery. They also reduce the number of delivery vans on the road and the amount of kilometers that need to be completed.

Rather than delivering ten packages to ten different addresses the delivery van can potentially take one journey to one pick-up point and deposit all ten items for the customers to collect at their convenience.

The sustainability issue with pick-up points is when the customer comes to collect their item, or rather how they choose to collect it. Pick-up points are conveniently located in newsagents, small retailers, supermarkets and petrol stations. In fact the pick-up point networks of some countries are so vast that DHL stated 90% of Germans are within ten minutes of a DHL pack station (DHL).

> “90% of Germans are within ten minutes of a DHL pack station”

If we apply the findings from the MIT study which are that the further away the customer lives from the store the more sustainable it is to shop online. City dwellers who live close to the pick-up point will probably use more sustainable forms of transport like walking, cycling or taking a bus. Whereas for customers who live in more rural areas they may need to drive to the pick-up point and so in this situation it is probably more sustainable to have the item delivered to their home.



> “City dwellers who live close to the pick-up point will probably use more sustainable forms of transport like walking, cycling or taking a bus.”

## Click & Collect

The findings of the MIT study are that the shopper who opts to order their item online and collect in store has the second highest carbon footprint of the online shopping profiles. Although this is still a third less than the traditional shopper who conducts all their shopping in a bricks and mortar store.

The increase in emissions for the Click & Collect opting customers is due to the use of their own transportation. Again it can be argued that depending on what form of transport the customer opts for will determine how sustainable Click & Collect is as a delivery option.

One of the major sustainability benefits of Click & Collect is that returns are often made immediately - this is especially the case for fashion brands – and so an extra trip to store to return the item is no longer required.

Click & Collect also alleviates missed deliveries as customers can collect the item at their convenience. It also relieves customers of multiple browsing trips to the store as they will probably conduct the majority of their research online.

> “Returns are often made immediately – this is especially the case for fashion brands – and so an extra trip to store to return the item is no longer required”

## Standard Delivery

In MIT's study the shopper with the lowest carbon footprint is the online shopper who opts for standard delivery. Their transportation emissions are low because the retailer will generally have a more efficient delivery process than if the customers were to travel to the store themselves. The extra time that the retailers have with standard delivery allows them to find a more efficient way to deliver, for example ensuring that the van is appropriately full.


## Green Delivery

Currently green delivery is not very widespread, but some retailers offer their customers a green delivery option where they find the most efficient way of getting the item to its end destination.

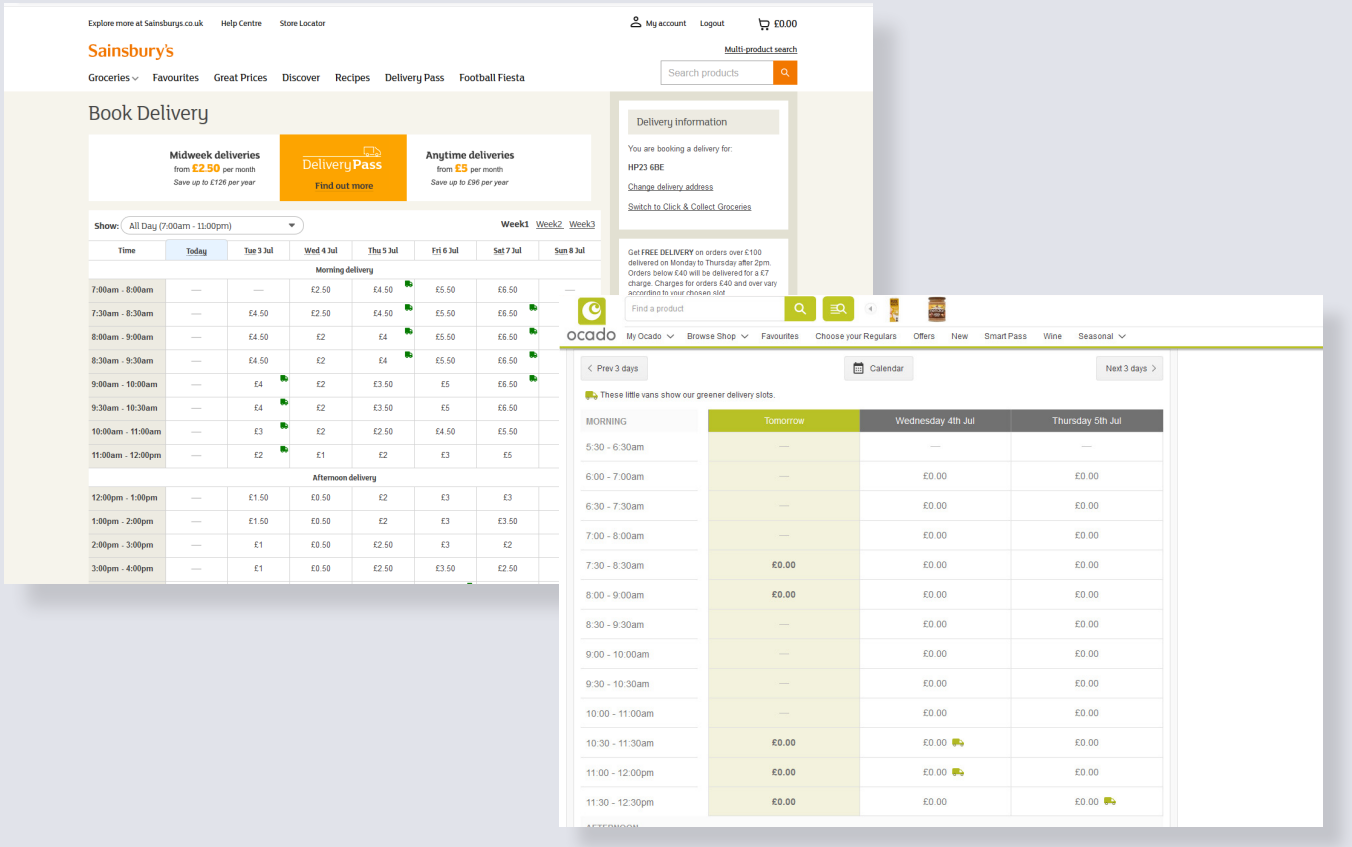
Yes, the delivery time could be noticeably longer than consumers have become accustomed to. But without time pressure retailers and logistics carriers can ensure their delivery vans are full and plan the most efficient delivery method.

If retailers have more time they can calculate the best delivery route to maximise the number of deliveries in one area and in doing so minimise driving time and fuel emissions.

> “the most efficient way of getting the item to its end destination”

A study conducted by the University of Washington discovered that food delivery companies can emit 80-90% less carbon dioxide when they take delivery routes that cluster customers together rather than catering to individual time slots (12). This does of course assume that all customers are home to receive their delivery.

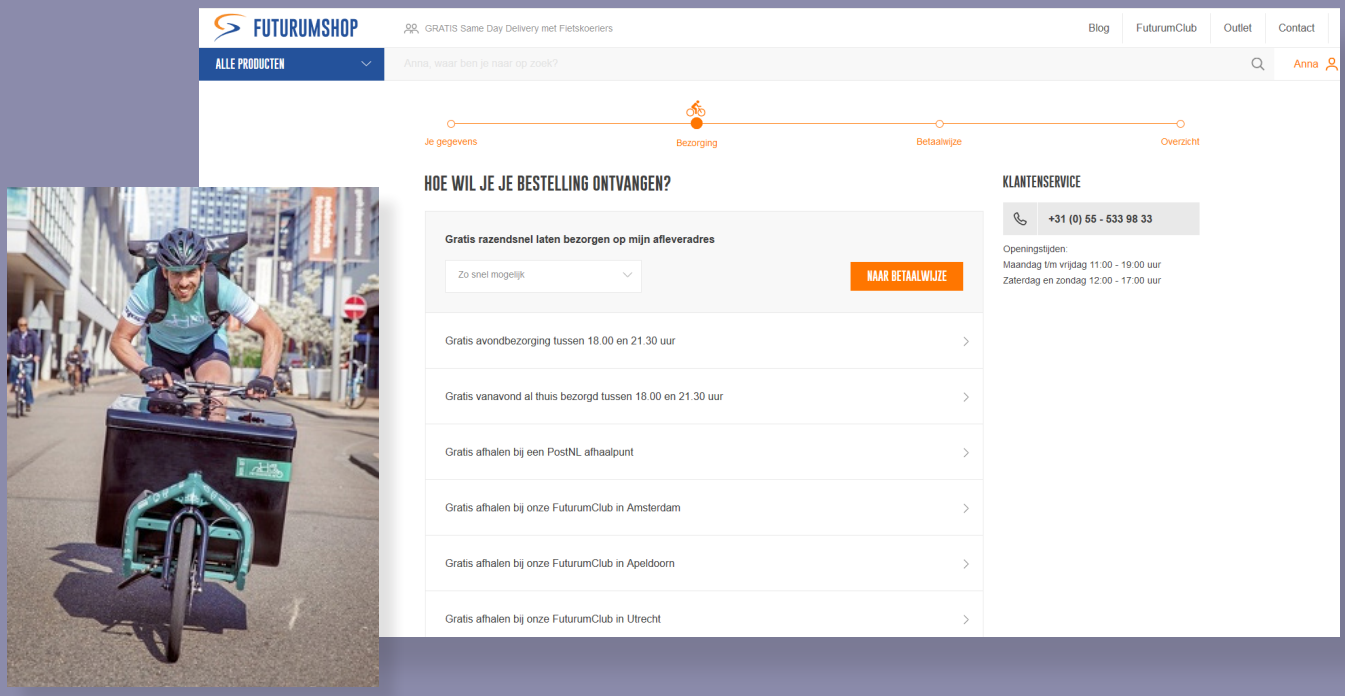
A similar approach has been adopted by Dutch delivery company Picnic. Rather like modern-day milkmen they deliver according to set routes at set times. Picnic customers know what time their delivery will be – and they can also track it on the Picnic app – so it is up to them to be home to receive it. This efficient delivery approach and Picnic's use of electric powered vehicles enables them to deliver for free.




The British online supermarket Ocado and supermarket chain Sainsbury's currently offer green delivery options. When their customer chooses their delivery slot the times when there is another delivery in the same area are highlighted as being their green delivery slots.

Customers are more inclined to opt for green delivery! Logistics firm B2C Europe revealed that 85% of customers would choose a greener delivery option - even if that meant a longer delivery time - if it was communicated that it would cut down on pollution (3).

> 85% of customers would choose a greener delivery option- even if that meant a longer delivery time




Dutch bicycle supply store FuturumShop have partnered with Fietskoeriers a delivery carrier that operates solely by bike to bring their city dwelling customers the ultimate in convenience without compromising on their carbon footprint. Deliveries including same-day delivery will be couriered by bike and all deliveries are free of charge. FuturumShop are also activey working to increase the number of deliveries that are pedal powered. In 2016 they announced that they wanted 40% of their deliveries to be via bike by mid-2017 (10). What a great partnership! We are sure their cycling-enthusiast customers will appreciate receiving their orders by bike in addition to reduced congestion and emissions.

> “the ultimate in convenience without compromising on their carbon footprint”

# The sustainability efforts of delivery carriers

So now let's turn to the people that are actually delivering our online shopping, the carriers. And we are impressed! Many carriers are operating with electric or low-emission vehicles, setting themselves ambitious sustainability targets and are even using solar power to run their warehouses. Let's meet them.

# Bpost

Belgium's largest delivery carrier Bpost has their own sustainable delivery fleet consisting of 2,561 bicycles, 2,652 electric bicycles, 324 electric delivery three-wheelers and one eVan.
In 2017 they partnered with Belgium based eco-delivery specialists Bubble Post. This move demonstrates their plan to expand their sustainable delivery efforts further.


# DPD

The DPDgroup is responsible for almost 5% of the total voluntarily offset of CO2 emissions in Europe. In 2017 all of the 1.2 billion parcels that DPD delivered were carbon neutral. This is part of their commitment to delivering carbon neutral packages without any additional costs for their customers. They have done this by measuring the amount of carbon that their processes produce, taking steps to reduce this amount and then offsetting the remaining emissions. In 2017 DPD reduced the amount of carbon produced per parcel by 11% compared to 2016 (5). This was also the year that they offset 912,731 tonnes of CO2. DPD are also increasing the number of deliveries that are made by clean vehicles such as bikes and electric-powered tricycles.


> “reduced the amount of carbon produced per parcel by 11%”

# DHL

DHL set themselves the ambitious target of operating with 30% more carbon efficiency by 2020 against their 2007 numbers. One of the ways that they are working towards this target is through greener and cleaner transportation. DHL have 10,500 e-bikes and e-trikes. They operate pedal powered vehicles in 80 European cities across 13 European countries. Their latest introduction is the cubicycle, which are four-wheeled bikes that are able to carry containers of up to 125 kg and cover an average of 50 kilometers per day.

DHL massively reduced their carbon footprint by replacing 3,400 of their diesel powered delivery vans with electric powered vans manufactured by StreetScooter. In addition to emitting no carbon emissions, the new electric vans are quieter reducing the amount of noise pollution.

> “operate pedal powered vehicles in 80 European cities across 13 European countries”

## PostNL

The Dutch national carrier, which delivers 22,000 parcels a day has added some cleaner options to its collection of delivery vehicles in recent years. PostNL use biogas vehicles, electric vehicles, e-cargo bikes, electric scooters and e-bikes to carry out their operations.

The carrier now uses electricity to power 100 routes in Amsterdam saving 60,000 kilos of carbon dioxide emissions – the same as three households – each year. The plan is to roll out their eco efforts into other Dutch cities in the upcoming years. They have stated that by 2025 they would like to deliver in 25 city-centres with zero carbon dioxide emissions.

> “Saving 60,000 kilos of carbon dioxide emissions - the same as three households”


## Royal Mail

In 2011 Royal Mail announced that they were reducing the number of deliveries carried out by bike for speed and safety reasons. While they believed it would be more time-efficient it undoubtedly impacts their sustainability efforts. Thankfully in recent years Royal Mail has demonstrated their commitment to reducing their carbon footprint.

In 2017 the largest delivery carrier in the United Kingdom started a pilot of nine fully electric delivery vehicles manufactured by British automobile manufacturers Arrival. The plan to go electric has the potential to significantly reduce noise and air pollution as well as reduce operational costs by more than half.

They also announced in their 2017-18 corporate responsibility report that they had reduced their carbon emissions by 4.6% compared to the previous year.


> “pilot of nine fully electric delivery vehicles”

# UPS

UPS have a fleet of over 9,000 alternative fuel and advanced technology vehicles. They have set themselves a number of sustainability targets one of which is that by 2025 40% of the fuel for their ground vehicles will come from a sustainable source.

They are also experimenting with a number of sustainability pilots. One of such is in Hamburg, Germany, where deliveries in the city centre are conducted by foot, bike and electrically-assisted tricycles. They have found that in city centres they have to navigate between pedestrians, cars and bikes and so smaller more agile vehicles are practical as well as efficient.

> “ smaller more agile vehicles are practical as well as efficient ”

# Customer attitudes towards sustainability

Research conducted by logistics company B2C Europe revealed that over half of consumers are unaware that express delivery services produce more emissions than slower delivery services (3). Despite this the results showed that the environmental effects of delivery were important to the 1,000 consumers that were surveyed. 85% of respondents answered that they would opt for slower delivery if it was clearly communicated that this meant a reduction in emissions (3).

69% of the customers surveyed stated that they would be more motivated to purchase from retailers who follow sustainable practices, and 59% stated that they were worried about air pollution (3).

The findings from this research is further backed up by the work of Dr Niels Agatz from the Erasmus University Rotterdam who specialises in delivery and logistics. He has looked into how retailers can persuade customers to opt for more efficient delivery. He concluded that retailers can either offer a discount at the time of ordering or they can clearly communicate that this option is more energy efficient and will produce less emissions. His findings were that when customers are made aware that the delivery method is green it is almost as effective as when a discount is offered in terms of the number of customers choosing that method.

It is clear that customers are worried about the effects of e-commerce delivery on air quality, congestion and the environment. There is also the indication that customers are willing to forgo speed for a lower carbon footprint as long as the retailer communicates this to them.

> over half of consumers are unaware that express delivery services produce more emissions than slower delivery services

> when customers are made aware that the delivery method is green it is almost as effective as when a discount is offered

# Conclusion

The efficiency of online and offline shopping comes down to transport. The method that ensures the fewest number of carbon-producing vehicles on the road is often the most efficient.

Whilst online shopping tends to have the edge over offline, the main issue in e-commerce is that speed of delivery can cause what is usually an efficient delivery process to cut corners in the mission to get the item to the customer as fast as possible. It is exciting to see that delivery carriers are committed to improving their processes to reduce the amount of emissions that they produce.

The retailers themselves could do more to tackle the inefficiency in e-commerce delivery. Customers are more environmentally aware than ever before and are crying out for ways to be more sustainable. If the brands themselves communicated to their customers the carbon footprint of their various delivery methods, customers would be more likely to opt for more sustainable practices.

The e-commerce industry already has the technology to make positive changes. Now through communication e-commerce can truly become the most sustainable way to shop.

**“Customers are more environmentally aware than ever before and are crying out for ways to be more sustainable.”**

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# Power to the parcel!

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