IPF RESEARCH

JUNE 2024

IPF Research Awards 2023
Decarbonisation of Freight

GRANT AWARDED BY THE IPF RESEARCH PROGRAMME

This research was funded and commissioned through the IPF Research Programme.

This Programme supports the IPF's wider goals of enhancing the understanding and efficiency of property as an investment. The initiative provides the UK property investment market with the ability to deliver substantial, objective and high-quality analysis on a structured basis. It encourages the whole industry to engage with other financial markets, the wider business community and government on a range of complementary issues.

The Programme is funded by a cross-section of businesses, representing key market participants. The IPF makes a contribution to the Programme and gratefully acknowledges the support of these sponsoring organisations:

INTRODUCTION

In 2023, the IPF Research Programme launched its second grants scheme to provide financial assistance to promote real estate investment research. No specific themes were suggested and prospective applicants were encouraged to examine issues that would advance the real estate investment industry's understanding of and implications for asset pricing, risk-adjusted performance and investment strategy. The scheme was also open to individuals, working within institutional organisations, where the grant may be used to fund data acquisition.

The Grant scheme was first run in 2021 when three applicants were awarded grants. This time, an appraisal of proposals received by the deadline of 31 August 2023 resulted in the provision of grants to seven submissions, with limited supervision afforded by a sub-committee of the IPF Research Steering Group during the research period.

Each paper is available to download from the IPF website. We hope you find them a diverse and interesting read.

The following paper has been written by Neil Webster, Elijah Lewis and Olivia King, *Remit Consulting*.

Richard Gwilliam
Chair IPF Research Steering Group
June 2024

Executive Summary

Scope 3 emissions, emissions not produced by the company itself but by those that it is indirectly responsible for up and down its value chain. In this report, we look at several reasons why real estate investors should be paying attention to Scope 3, including:

- There are real estate opportunities for investors in providing infrastructure to the growing network of sustainable transport solutions e.g. consolidation and cargo-bike hubs;
- Transport is responsible for a significant amount of carbon and associated emissions;
- Local planning and transport policy in many cities is favouring more sustainable transport solutions; and
- Some elements of the supply chain (developers and tenants) are keen to de-carbonise.

We therefore look at possibilities, attitudes and barriers to adopting better practices when concerned with Scope 3 emissions in real estate. We also consider blockers to investors making in-roads to addressing Scope 3 emissions as well as other factors to consider.

Blockers

- Many loading bays and delivery acceptance processes are not designed for cargo bike operations yet;
- Fire safety of battery-powered vehicles has yet to be addressed nationally;
- No national policies on micro-mobility “vehicles” are available to lubricate the change;
- Reconfiguring existing, long established supply chains of major companies is difficult; and
- Arguments for change are mainly based on environmental, social and policy reasons not a financial business case.

Other considerations

- Consolidation and consolidation hubs are being used to good effect in some buildings in London;
- Alternative transport routes e.g. rail and water are being considered particularly in London;
- Cargo bikes are growing in number and are often more reliable in terms of timing of deliveries than many other alternative vehicle types;
- Aside from Zedify (nine cities) most cargo bike operations are local; and
- Many of the big logistics companies are changing the fuel (electric, green-hydrogen, hydrogenated fat) for parts of their fleet.

Next steps

- Share these findings – the aim of this study was to signpost what is going on in this niche in order that the market can respond as it sees fit.
- Make modest changes – for current buildings, start to measure the Scope 3 emissions you can influence. On the next development, try and design in some features which make it easier for the transport industry to decarbonise, for example, making it easier for cargo bikes to deliver.
- Influence procurement – whether you are an investor, property manager or tenant there are little steps which can be taken. Specify lower carbon delivery options where possible. For multi-tenant buildings, see if consolidation of deliveries is possible. If you are a tenant, lobby your landlord.
- Share good practice – if you are aware of other good examples share it with Remit Consulting and IPF members. The more we know, the more we can do.

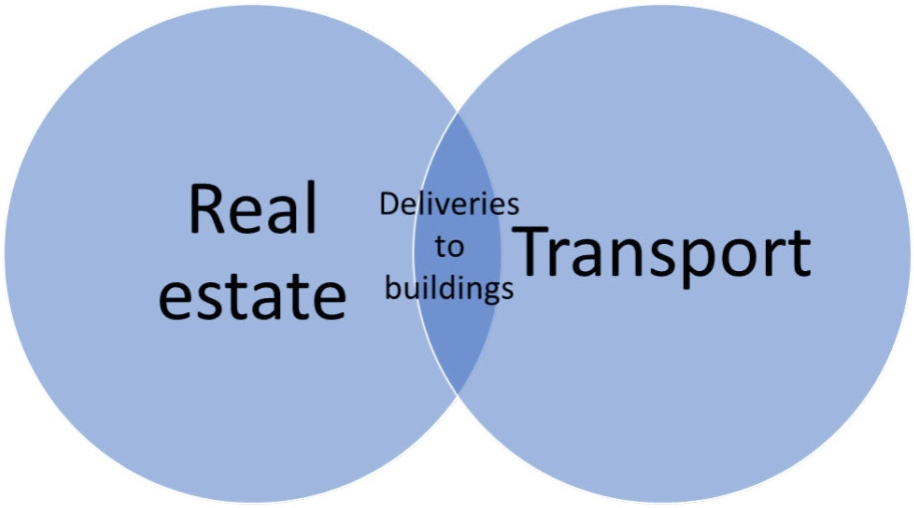
Contents

Why should Scope 3 be a Priority for Real Estate Investors?

What is the objective of this report?

The intent of this research is to:

- Understand current property investor attitudes towards Scope 3 emissions and why it is important now and in the future;
- Quantify the "size of the prize" within the office sector;
- Demonstrate how as investors, they can influence the reduction in carbon emissions through decarbonising deliveries to tenants in their office buildings; and
- Provide insights and strategies for investors to reduce Scope 3 emissions.



The intended scope for this report is at the intersection of property and transport emissions. Commuting (people) and freight (objects to buildings) are the two Scope 3 components in the overlap of the Venn diagram. This report focuses primarily on freight and the impact real estate has on the environment via the need to transport items to and from real estate. Non-transport items broadly do not move and are located within the building itself so are generally Scope 1 and 2. More detail can be found in Appendix A.

Emissions from property and transport

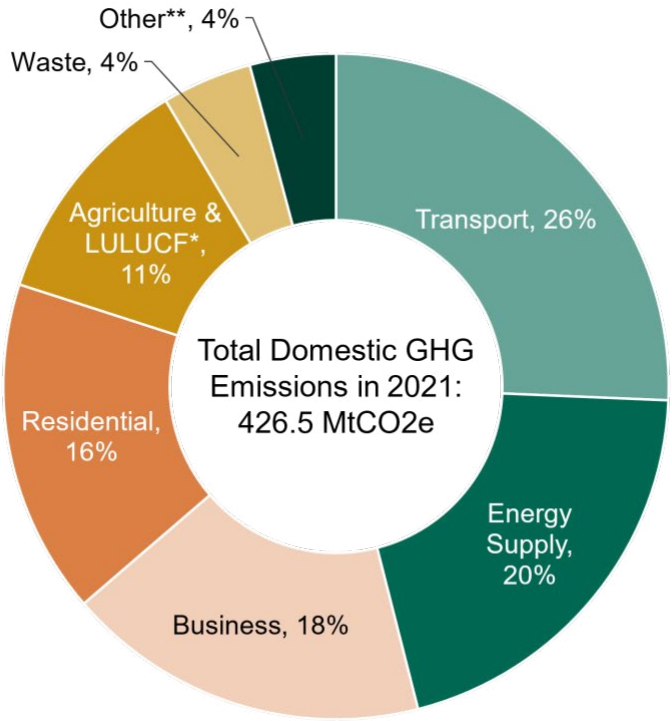
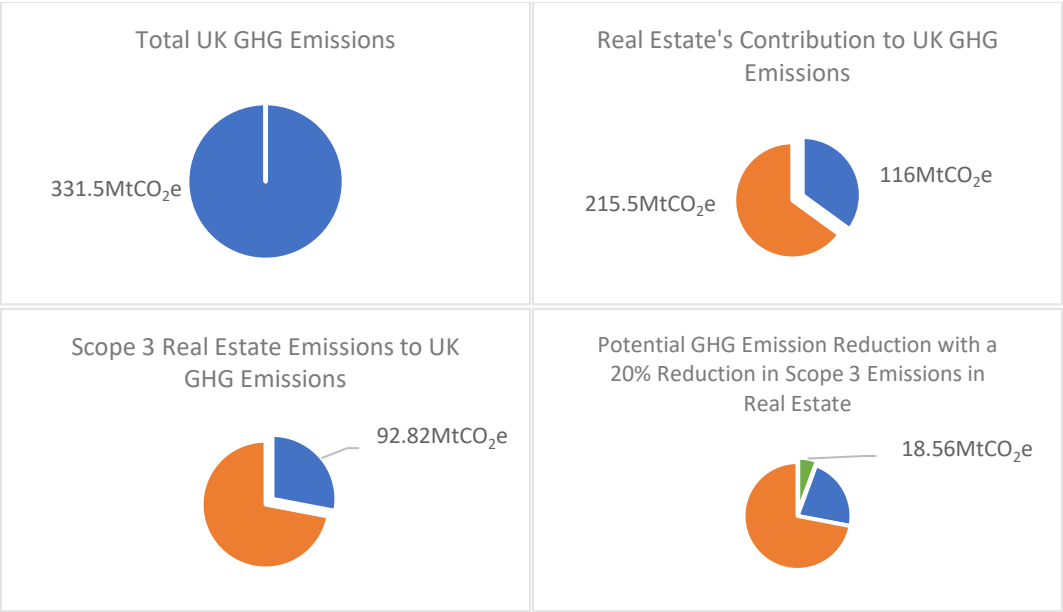


Figure 1: Transport and environment statistics: 2023, Department for Transport (1)

According to provisional government statistics, the UK produced 331.5MtCO_2e (million tonnes, carbon equivalent) in 2022, of which the built environment accounted for 30-40% of UK carbon emissions (1). A cautious estimate attributes 80% of this to Scope 3 emissions (estimates for Scope 3 emissions in real estate lie around 86% (2)). This means that Scope 3 emissions for the real estate industry account for around 92.8 MtCO_2e every year, yet only 15% of listed real estate companies have set targets for scope 1-3 net zero carbon emissions by 2050. Even **a conservative 20% reduction in Scope 3** emissions could lead to 18.6MtCO_2e less in the atmosphere every year, a **6% reduction in UK emissions overall**.



In March 2023, the Government published its Carbon Budget Delivery Plan in relation to transport. The associated document, Reverse Gear, calculated that demand reduction required to stay in line with the 6th Carbon Budget (the volume of greenhouse gases the UK can emit between 2033 and 2037) would **require a 20% reduction of traffic levels** relative to current plans (3). Freight to and from commercial buildings is part of this. Albeit traffic to and from homes are the major contributor, emissions from HGVs and vans make up 39% of Greenhouse Gas (GHG) emissions and 23% of road traffic – and the National Infrastructure Commission (NIC) predict that by 2050 the movement of items by HGV and rail freight could increase by up to 45% (1; 2; 3). Of this, we can estimate that deliveries to and from commercial and public buildings (as opposed to residential buildings) is in the order of **60-70%**, as 83% of all deliveries in the UK are done by HGVs and vans - taking into account HGVs are more likely to be used for non-residential deliveries and a significant portion of van deliveries are for the same purpose (7). Therefore, of the 109MtCO_2e that domestic transport contributes, **27.6MtCO_2e can be attributed to commercial deliveries** (8.3% of the overall GHG emissions in the UK in a year).

If transport related emissions are to be reduced it therefore requires collaboration from the real estate industry given the relationship between movement or people and goods within the built environment.

But, aside from carbon and other emissions reduction, are there any significant benefits as a building owner or developer? Building-specific environmental improvements (Scope 1 and 2) tend to influence improved property values and fiscal incentives are also directed in this area. The biggest factors seem to be:

- It is the right thing to be doing (the S in ESG);
- Policy is moving in the direction of restricting carbon emissions in transport (the G in ESG); and
- there are some emerging investment opportunities - buildings incorporating mobility hubs (see box to the right) and buildings supporting lower carbon transport (the E in ESG).

Investment Opportunities: The Ancoats Mobility Hub on the former Poland Street industrial estate in Manchester (68). It is set within a new neighbourhood of 1,500 new homes and will include:

- 150 secure bike parking spaces and changing facilities;
- 102 Electronic vehicle charging points, with potential for more;
- Up to 30 spaces for car club/car share schemes;
- 406 car parking spaces for residents and visitors; and
- A parcel delivery hub.

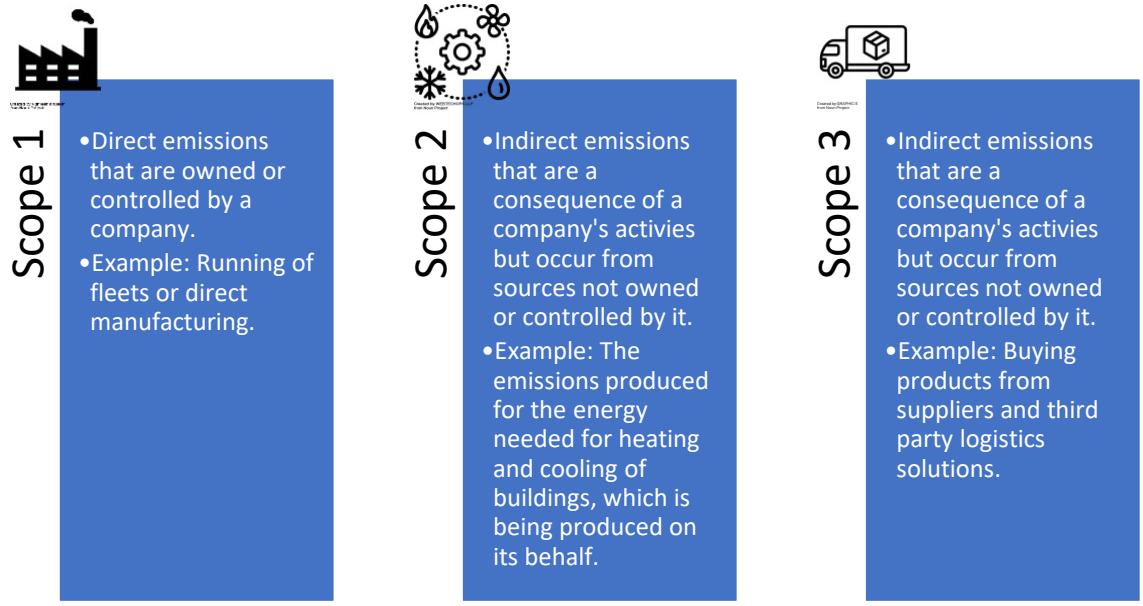
Document Review

Our document review focused on a range of published information. This is summarised below:

Topic	Sources
Definition of Scope 3 emissions	UK Green Buildings Council report on Scope 3 Emissions (Appendix A)
Current and future assessment of UK Net Zero trajectory	Climate Change Committee's (CCC) June 2023 Annual Progress Report to Parliament

	Government's Carbon Budget Delivery Plan - March 2023 Reverse Gear: The reality and implications of national transport emission reduction policies (Centre for Research into Energy Demand Solution) - May 2023
Overall investor attitudes	Urban Land Institute (ULI) C-Change programme, formed in late 2021. Bisnow (April 2023) by Mike Phillips, Ciara Long and Jacob Wallace
Policy and plans	• Global • National • Local
Investor Net Zero and ESG statements and policies	A selection of reports, statements and policies produced by investors
Logistic provider initiatives	Websites and mainstream media
Land use and planning	Bridging the Gap (November 2023) – Stantec, University of Leeds, Lancaster University, DecarboN8, Transport for the North

Definition of Scope 3 emissions



Scope 3 emissions loosely incorporate the remaining greenhouse gas (GHG) emissions not covered in Scope 1 or 2, that occur as a consequence of an organisation's activities for which it has no direct ownership or control over. Otherwise referred to as "value chain emissions", these encompass the indirect impacts both up- and downstream of the organisation.

Examples of upstream and downstream activities include, but are not limited to:

- Upstream: purchased goods and services, transportation of goods, extraction and production of purchased materials, and commute of employees; and

- Downstream: the use and disposal of products sold by the business, investments and any other activities related to the organisation's products during their lifecycle.

See Appendix A for more details on the different scopes and what is specifically included in Scope 3.

Current and future assessment of UK Net zero trajectory

As referenced above, the UK is not currently on a path for net-zero in transport by 2030 and Reverse Gear indicated the UK would need to see a 20% reduction of traffic levels relative to current plans. Surface transport is the major contributor and freight forms part of this.

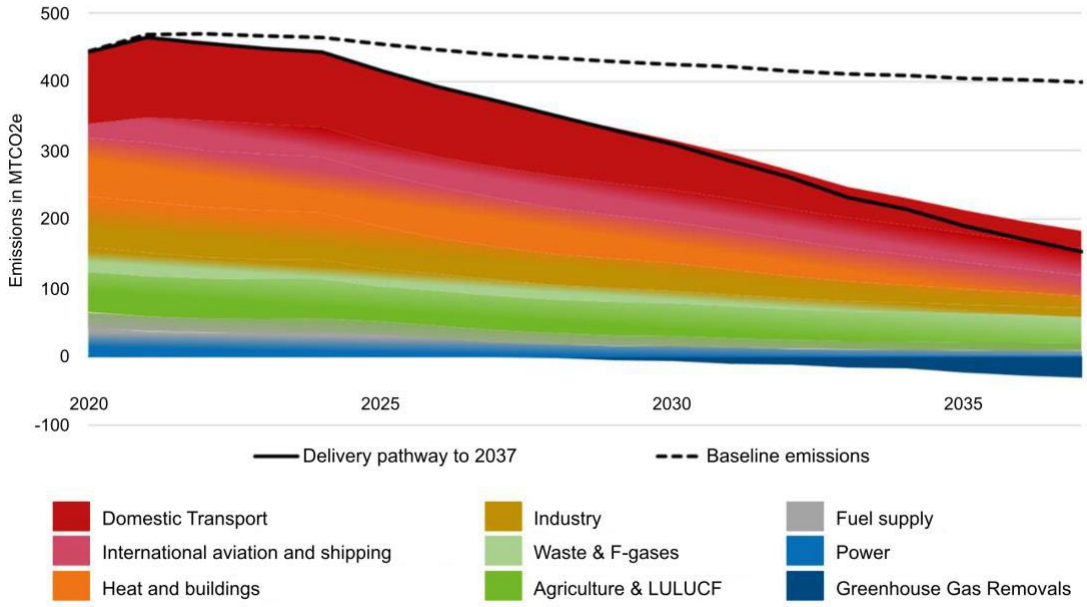


Figure 2: Indicative delivery pathway to 2037 by sector, The journey to Net Zero (4)

Overall investor attitudes

Allied to the above, (property) investor attitudes are understandably to focus on Scope 1 and 2 emissions which they can measure and control, to some extent. ULI found that **less than two thirds** of their investor survey participants (209 in total) **had set net-zero targets** (8). Of those who had not set a target only 15% planned to do so in the subsequent 12 months. Less than half of those with targets had, or knew they had, included Scope 3 emissions.

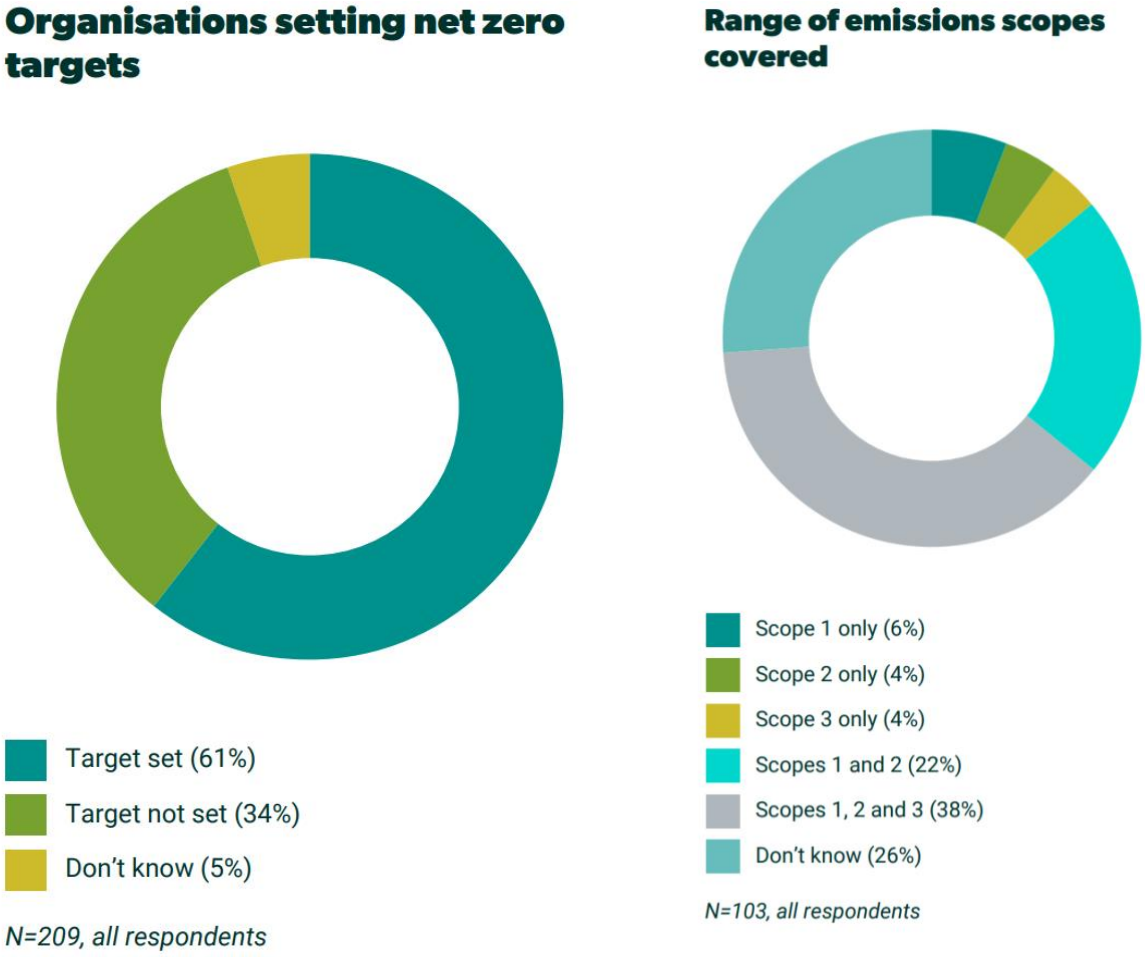


Figure 3: C Change Survey - Decarbonisation rises up the investment agenda (18)

Few Investors currently have Scope 3 in their sightlines.

The Bisnow investigative series surveyed 75 of the largest wealth funds, investment managers and REITs. They found that almost half of these institutions have no target to reduce carbon emissions from their portfolios, and only 12 respondents, **16%, included both embodied carbon and tenant emissions in their decarbonisation target** (9). More detail on investor opinions can be found in Appendix B.

Investor Net-Zero and ESG statements and policies

Individually published investor plans support the conclusion above that the focus is on Scope 1 and 2 and not 3. Understandably freight is seen as a transport issue not a property one, even though the occupiers and buildings generate the demand. There exists a plethora of badges for environmentally friendly buildings, including EPCs, DECs, LEED, WELL and BREEAM, and have tended to focus on

considerations within the building i.e. Scope 1 and 2 emissions. However, recently announced changes to GRESB (Global Real Estate Sustainability Benchmark) standards show a move to more wider issues, including Scope 3. This may start to move perspectives of investors that Scope 3 is a property issue.

Businesses are required to disclose emissions data under Streamlined Energy and Carbon Reporting (SECR). The government, in October 2023, published a call for evidence to determine the benefits, costs and practicalities of Scope 3 reporting in the UK, following the GHG protocol, as currently most Scope 3 disclosures are voluntary under the SECR framework. There already exist some private sector frameworks such as the Science Based Targets Initiative (SBTi) and the CDP (Carbon Disclosure Project), but currently there remains a gap in information for investors to fully assess the climate risks and opportunities of their investments.

Public Sector policy and plans

The majority of SMART (Specific, Measurable, Achievable, Relevant and Time-bound) targets are to be found in UK regional and/or city planning and transport strategies and plans. We have examined those for Birmingham, Bristol, Edinburgh, London and Manchester. The table below provides a summary of those initiatives. More can be found in Appendix C, but the picture is one of differing target dates and no consistency of message across the UK.

City	**Climate Strategy:** To be carbon neutral by	**Parking Action Plan:** When, and if, the city is introducing parking regulations (as a means of decarbonising and reducing congestion)	**Transport Action Plan**: The deadline for each city to implement their changes regarding transport as means of decarbonising and achieving their climate strategy	**E-Cargo Bike Trial**: Whether the city has implemented this as a means of decarbonising fleet, included within this is how many are available to trial	**Water Freight**: Has the city explored/trialled use of its waterways as a mean of transporting goods and decarbonising
Birmingham	2030		2031	20 e-cargo bikes (13 bikes, seven trikes), 13 trailers	
Bristol	2030	In progress	2036	Trial involving seven different types of e-cargo bikes. Success in trial has resulted in companies establishing operations, for example Tier is offering 20 e-cargo bikes in Bristol	
Edinburgh	2030	2023/24		Cargo Bike Movement – try electric cargo bikes for free for a trial period	
London	2030	2018	Has two plans, one is due by 2026 and the other 2041	Cargo bikes have proven to be successful here, with many companies utilising them, some already operate over 50 bikes	2007
Manchester	2038			26 bikes, six trailers	

Most initiatives to date are quite modest in scale and localised. Little is systemic with national significance.

Logistic provider initiatives

Whilst we approached several full-service providers, most were reluctant to share much in the way of plans that might give away competitive advantage. Most providers have taken steps to change the fuel for parts of their fleet (see Appendix D), but we could not find evidence that ways are being

found to increase the yield for fleets so that more deliveries are made from fewer vehicles (or miles). We are aware from some sources that most providers are continually investigating methods of improving this as it will give them an advantage and reduce costs.

Strategic land use and planning tools

If the foregoing might be seen as tactical or short term measures, one report which tackles this issue from a more strategic standpoint is Bridging the Gap by Stantec, University of Leeds, Lancaster University, DecarboN8 and Transport for the North (TfN).

The study takes the 20% carbon reduction gap to be bridged, as identified by Reverse Gear and outlines scenarios which might achieve that. These are bigger, strategic proposals which were tested in Bury, Lancashire. The degrees of change proposed and analysed were:

1. A baseline "future" – TfN "Just About Managing" scenario, assuming that the progressive policies of TfN, Transport for Greater Manchester (TfGM) and Bury Council are implemented;
2. A "supercharged" version of TfN's "Digitally Distributed" scenario – digital- and technology-led mobility services replacing car ownership and use; and
3. A "supercharged" version of TfN's Urban Zero Carbon scenario – a strategy of high density living around mass transit systems, creating living environments more amenable to walking, cycling and micromobility.

Only the third scenario gets close to the decarbonised state required. The study also considers employment land but has more of a focus on residential. However, it does prove that simply tinkering with the current models will not "bridge the gap".

A blend of options needs to be considered. Optimise AND revolutionise.

Interviews

The key lines of enquiry we explored in the interviews were:

- Do individuals agree with the overall findings we reached from the document review (the fragmented approach to carbon reduction, Scope 3 is not high on the list of priorities of investors, some investment opportunities exist)?
- What alternative transport means are there or have been considered?
- What is the future for alternative fuels and decarbonisation of existing fleet?
- What examples are there of delivery solutions which help to lower carbon emissions?
- What examples are there of consolidation and consolidation hubs?
- Are you measuring the status quo and also monitoring improvements?
- What is stopping you implementing solutions?

These broadly fell into the following themes:

Topic	**Sub-topics**
Policy	Local rather than national
Consolidation possibilities	Horizontal v vertical
Alternative fuels	Electricity, hydrogenated fat, Green Hydrogen

Alternative transport	Cargo-bikes, Water, rail, micro-hubs, urban air mobility
Measuring	Some doing it but much more to be done
Barriers to adoption	See below for a summary on barriers to adoption

Interviews - Detail

We dispensed with the idea of a quantitative survey as we had found the high-level quantitative data we needed. The interviews thus became a focus on qualitative aspects, and their purpose was to explore the above topics with a range of industry players in order to get a granular response compared to the more macro levels during the document review.

As well as the interviews, we were fortunate enough to be invited to a round table discussion facilitated by Stantec at the Interchange Conference in Manchester in February 2024. As this was a Chatham House basis, we have included some of the feedback during that event in this section but not attributed any of the insights.

Policy

The general view is that aside from carbon reduction measures associated with climate change, more generally, there are **very few hard-hitting measures** which "force" organisations to make meaningful changes in this area. ULEZ in London has had a significant impact but that is one regional example. 80,000 non-compliant vehicles have been taken off the road between June and August 2023 giving a 56 percentage point increase in vehicles meeting the standards since 2017.

Interviews reinforced that selected cities in the UK have policy to influence changes but without concrete plans, targets and supporting funding, measures of decarbonisation act as incentives, rather than deterrents from using polluting means and are therefore less effective than they should be.

It is worth noting the establishment and activities of the Sub-national Transport Bodies (STB) which came about from 2016 onwards. They include England's Economic Heartland, Midlands Connect, Transport East, Transport for the North, Transport for the South East, Western Gateway and Peninsula Transport. They are pursuing a range of initiatives and published plans in 2021 to 2023. e.g. Transport for the North published a Transport Decarbonisation Strategy in December 2021 (10).

Consolidation

Consolidation can be in the form of logistics operations or through physical consolidation centres.

Steve Whyman, Founder of CurbCargo, is involved in an initiative backed by Department for Transport (DfT), that has been successfully piloted at a single, multi-tenanted building in London City (the City). The CurbCargo SaaS platform captures delivery data and uses this to prompt changes in delivery patterns and foster collaboration between tenants to reduce vehicle movements. They have already **identified opportunities to reduce deliveries/collections**, and hence emissions**, by 15-20%**, and these interventions are being implemented jointly by the property management team and tenants.

He comments that, "*current policy interventions including congestion charging, Ultra-Low Emission Zones (ULEZ) and the shift to electric vehicles are making an impact. However further changes and innovation are needed to meet the environmental, health, and quality of life challenges caused by increasing freight vehicle numbers in cities*."

An example of a **consolidation centre** is 22 Bishopsgate in the City of London. The centre operates from Borehamwood and was implemented as part of the planning permission for the building. Initial figures show that the planned building, without a consolidation centre, may have received around 1,000 deliveries per weekday from a mixture of van/courier, bike/foot, and motorbike deliveries. This has been reduced to the order of one morning and one afternoon delivery from the consolidation centre and circa 30 other niche deliveries, a **97% reduction in deliveries**.

British Land has been promoting two projects which could be described as micro-mobility hubs. At 5 Kingdom Street (Paddington Central), they have secured planning approval for a 121,000 sq. ft ultra-low carbon logistics hub. It is planned that the facility will provide inbound access to HGVs with outbound deliveries via smaller electric vehicles and electric cargo bikes. British Land calculates that the hub will **remove around 100 large vans** from Westminster's roads **every day, reducing annual carbon emissions by up to 90%.**

Alternative Fuels

A key method of decarbonising freight deliveries is by looking at the delivery stock currently in use and powering it by means other than traditional fossil fuels. There will likely always be a need for vehicles of varying sizes, and there is therefore obviously a limit on how much we can optimise deliveries and routes. Hence, the actual method of powering these vehicles should be considered when looking to reduce Scope 3 emissions of an urban investment. For example, HGVs currently produce 16% of all domestic transport and comprise 75% of UK freight movements, suggesting a focus on reducing their part in logistics could have a significant impact.

Various methods of fuelling vehicles exist, such as battery-powered, biodiesel and ethanol-based vehicles. In September 2023, zero emissions vehicles accounted for 2.3% of all road using vehicles, up from 1.5% the year before (11). Along with electrifying fleets and use of hydrogenated fats, hydrogen has a key part to play in energy solutions needed to achieve decarbonisation and to ensure the UK's energy security. Government analysis indicates that by 2050, the **UK will need between 250 and 460 Terawatt Hours** (TWh) of hydrogen per year, delivering **20-35% of the UK's final energy consumption** – equivalent to the UK's total energy consumption today. The government is aiming to have 1 Gigawatt (GW) of electrolytic hydrogen (hydrogen obtained from the splitting of hydrogen from water molecules) and 1GW of carbon capture, usage and storage (CCUS) enabled hydrogen (hydrogen obtained from reacting methane (CH_4) with steam and capturing the excess carbon) operational or in the pipeline by 2025 (12).

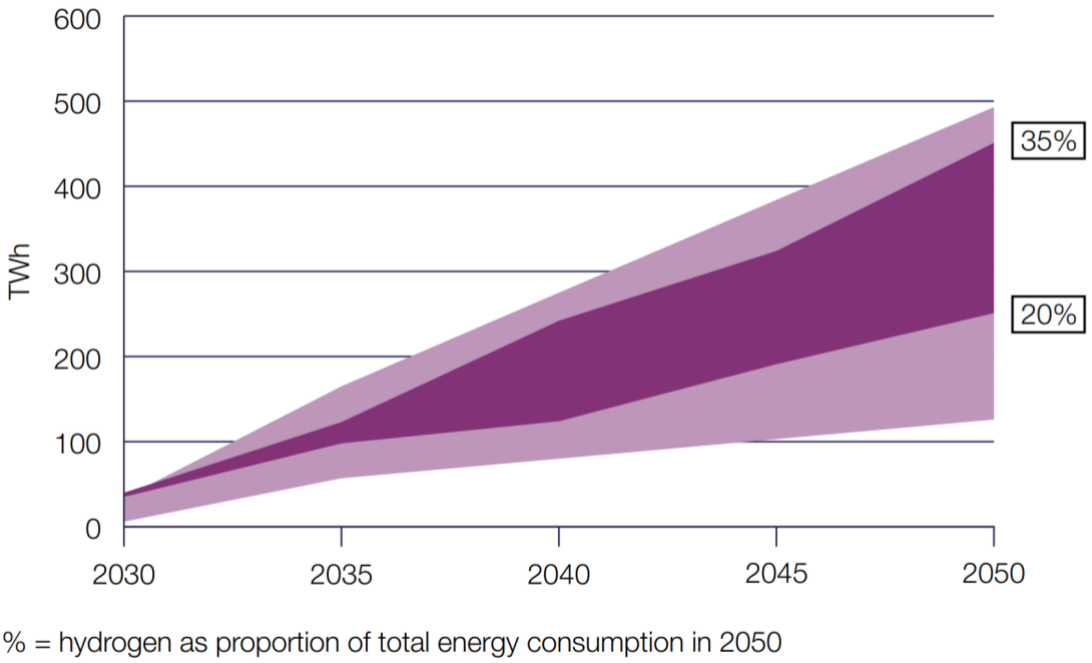


Figure 4: Hydrogen demand and proportion of final energy consumption in 2050 (5)

Hydrogen production represents a significant growth opportunity. The Department for Energy Security and Net Zero (DESNZ) estimates that **by 2030, the sector could support over 12,000 jobs and unlock over £9 billion in private investment** which, by 2050, could increase to 100,000 jobs and £13bn in gross value added (13).

However, there is currently limited production capacity in the UK, and whilst technology to expand the production has been developed, it has not been operational for extended periods (years) nor on multiple sites. The price of producing and delivering hydrogen is currently greater than the market will pay (when compared to the price of natural gas, diesel etc). Nevertheless, price support subsidies are available in various forms from the Government (and the EU); for example, the UK government may provide a subsidy to applicants of the Hydrogen Allocation Rounds (round 1 was announced in December 2023, round 2 is currently open). Hydrogen, as a realistic and economical alternative, is clearly in its infancy but a solution to be monitored closely. By way of a small example, in February 2024, airline Loganair announced plans to launch services with a hydrogen-powered aircraft in Scotland's Orkney Islands by 2027.

Alternative Transport

Alternative transportation covers all modes of travel other than private motor vehicles. The Mayor of London and Transport for London (TfL), working together with the boroughs around London and the Freight Forum, have proposed methods in which freight and servicing trips can become more efficient, by:

- Determining occasions in which freight can be moved from road to rail without impacting passenger services;
- Expanding the proportion of goods being moved on London's waterways; and
- Assessing if any and what benefits arise from introducing regional freight consolidation and distribution centres.

In conjunction with this, Cross River Partnership (CRP) has conducted a number of pilot projects and case studies looking at rail, water, and cargo bike freight opportunities, including micro-mobility hubs in Brixton, Pimlico and Wandsworth. Some of these explored opportunities include:

- Smarter Greener Logistics - development of rail freight and walking freight initiatives;
- Clean Air Logistics for London (CALL) – initiative to move more freight into London via river rather than road, supported by zero emission delivery methods; and
- Clean Air Thames - demonstrate air quality improvements along the Tidal Thames by retrofitting inland commercial vessels with an after exhaust treatment.

More details including a guide for local authorities, site requirements and evaluation reports can be found on the Cross River Partnership website.

The cargo bike market and related sustainable transport models for deliveries are relatively modest at the moment. A £400,000 electric cargo (e-cargo) Bike Grant Fund was established by the Department for Transport and delivered by the Energy Saving Trust in 2021. Due to the number of applications, a further £300,000 was made available shortly after. Such a sizeable financial injection was understandably popular among small businesses and sole traders, giving them an opportunity to introduce (e-cargo) bikes into their everyday transport operations. Applicants were able to opt for up to five bikes per organisation and were also able to submit joint high-street applications for shared e-Cargo bikes until the grant period closed in 2022.

With the amount of electricity needed by an e-cargo bike being approximately **5-6% of an electric van's requirement for the same load**, being 60% faster and emitting 90% less CO_2 than vans, means this e-cargo bikes should be considered seriously by all third party logistics suppliers and fleet operators. Incidentally, over 39% of vans used for freight delivery are less than a quarter full, averaging a 300kg payload, which is within the limits of cargo bike capacity – clearly a suitable alternative for many deliveries currently (14). However, disjointed funding from individual councils has resulted in a niched and somewhat fragmented offer – it is rare to find a logistics provider supplying e-cargo bike solutions across multiple cities.

The Bikes for Business evaluation report by Just Economics and Team London Bridge, concluded "*Cargo bikes are a leading alternative to petrol and diesel vans, with emerging evidence that they can reduce congestion, improve business efficiency, and support the development of more liveable and healthier cities*" but that *"behaviour change towards lower emission deliveries can be time-consuming and difficult to achieve*" (15).

Measuring

As we found earlier, Scope 3 is not a major focus. However, we are aware of one organisation, an occupier/tenant, who are measuring all their carbon inputs and outputs associated with their occupancy. This includes all deliveries to and from the building. They are also using this data to influence their procurement and the nature of services provided by lower carbon means e.g. last mile deliveries by cargo bike. This shows that **the measuring of an office's impact is possible**, and we expect – with the rise of smart buildings and the commonplace of data – these measurements to be much more common as Scope 3 shifts into focus.

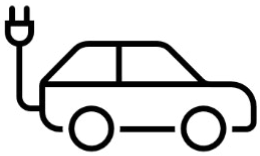
Barriers to adoption

We consider there to be five main barriers: **financial, control, policy, infrastructure and safety**.

Many areas are promoting the adoption of decarbonised deliveries. Particularly for offices with frequent, predictable routes within defined areas, significant barriers must be navigated before widespread adoption of zero-emission solutions becomes a reality.

Financial

Financial friction is the biggest barrier to adoption of zero-emission delivery methods. It is well documented that electric vehicles currently carry a **steeper price tag** than their internal combustion engine counterparts, presenting a hurdle for budget-conscious businesses and town planners alike. With advancements in battery technology and the scaling up of infrastructure surrounding the production of electric vehicles this barrier may reduce in the next ten years.



Furthermore, there is **limited access to financing** for such projects. Obtaining funding requires the lenders to take on a certain level of risk. As battery power is still a relatively new technology, it comes with bigger risks. Consequently, smaller companies that require funding struggle to acquire the capital necessary to make the wholesale switch to electric fleets.

Not only is there a higher capital outlay for electric vehicles than for internal combustion engines, but also the **running and maintenance costs** tend to be higher. Concerns about higher charging costs and potential range limitations add to the hesitancy to adopt the new technology. Moreover, remedying inevitable technical and performance issues, tends to attract a much higher price tag as often electric vehicles are more complex than traditional cars and vans, and therefore require a specialist to repair them.

At the consumer level, there are still the financial vs planet considerations. Transport for the North's 2021 Decarbonisation Strategy states "*Freight operators are already strongly incentivised towards efficiency, as it helps them to increase their competitiveness. However, some opportunities are not being taken due to market failures, such as a lack of information, an inability to coordinate between operators, or* ***a consumer willingness to pay for fast deliveries at the expense of energy efficient outcomes****.*" (16)

Control

Many businesses that have offices in cities in the UK depend on third-party logistics providers. A significant proportion of these may not be prioritising decarbonisation, as they have financial and practical issues to contend with to remain competitive in their respective market. As a consequence, occupiers within a multi-let environment are often devoid of influence over how deliveries are made to and from their offices. Whilst some logistics providers have made efforts to decarbonise by investing in electric HGVs, this is still a minority position and only a relatively small part of the process of business to business deliveries. B2B logistics process is convoluted, and lines of authority and control are often unclear**, leaving the investors and occupiers with limited control over what happens upstream or downstream**. The lack of transparency throughout the chain hinders the implementation of sustainability measures as there is no unified effort towards decarbonisation.

Policy

As discussed earlier, robust and comprehensive policies are vital to the uptake of decarbonisation initiatives. To change people's behaviours, incentives need to be created. The government has the power and finance to develop many of those incentives, for example, by taxing cigarettes to reduce smoking or providing grants for PV panel installation on domestic properties. One such programme is the "Plug-in Grant", which acts as a discount at purchase for electric vehicles, but this may not be sufficient incentive to garner widespread adoption. (17)

An example of a funding programme was the UK Government's eCargo bike grant, which previously covered up to 40% of the cost of a cargo bike. However, the scheme ended in 2022 and, despite its uptake and success, it has not been reintroduced.

Rather than rely solely on central government, several councils and combined authorities across the UK have taken it upon themselves to create incentives. Due to an absence of a national policy framework that addresses urban freight decarbonisation, we see **disjointed solutions** throughout the country, which leads to a lack of cohesion and a difficulty in scaling up operations throughout the country and therefore throughout the entire supply chain. Indeed, we have seen many companies provide solutions for individual cities, but there have been very few attempts to provide country-wide solutions. Some solutions do exist, but we have yet to see the take-up which would create lasting impact in this area, largely due to the barriers in place.

he lack of dedicated national urban freight policy in the UK leads to uncertainty and hinders investment.

Not only is there a paucity of national guidance **but policy has changed**, pushing back the ban of sales of petrol cars from 2030 to 2035. While the government defends its position change, saying the previous deadline of 2030 would "impose unacceptable costs on hard-pressed British families", this absence of clear direction leads to uncertainty for investors, and **increases the risks of investing** in solutions such as electric vehicles and cargo bikes to unacceptable levels.

Along with cargo bikes, we have also seen a variety of approaches and types of micro mobility vehicles. Many local authorities have taken steps towards developing shared micro mobility schemes, including e-scooters, cargo bikes and e-bikes. The **current regulations are lagging behind** the speed of development of this sector but plans to introduce a Transport Bill from the UK Government will potentially provide clarity around the future of these micro mobility vehicles. Unfortunately, this particular Bill was scheduled to be introduced into parliament in the 2022-23 session but has been delayed and not yet presented to Parliament (18). Without a holistic view, it is difficult for investors to feel secure about investing in alternative modes of transport and the infrastructure necessary to support them. The creation of a category of low-speed, zero-emission vehicles (LZEV) hinted at in the Transport Bill will provide a catch-all for these types of micro mobility vehicles, establish how these vehicles should be regulated and provide powers to local transport authorities to manage rental operations for them (19). Until this bill is passed, many possible solutions are on hold.

Infrastructure

Another barrier to adoption of large-scale electric fleets, cargo bikes and the like are the changes in infrastructure required to support them. Limited access to charging points, particularly in urban areas, can create **range anxiety** and provide operational challenges for businesses. This lack of availability puts people off using electric infrastructure, but this presents an opportunity for levelling up the infrastructure of our cities, providing sufficient charging networks to supply each city.

For cargo bikes in particular, many cycle lanes are not suitable for the size of a cargo bike, providing another set of challenges. Beyond this simple issue, many courier and logistics companies have predefined routes that are the most efficient for delivering to clients and buildings. What happens when this needs to be changed due to constraints if you use a different method of transportation? Logistics companies have to train staff for these different transportation methods and find suitable delivery routes on top of the existing routes for current delivery networks.

To further cement the inertia in current supply chains, the cost of installing and maintaining charging infrastructure can be expensive. The higher the cost, the more likely it is to put off smaller business disproportionately, as they cannot front the costs. Therefore, upscaling of the infrastructure needs to be **spearheaded by larger organisations** before it becomes accessible to SMEs and other small businesses.

Reconfiguring existing supply chains can provide another barrier, as businesses may see it as something that has to be solved all at once. If a company has 10 different suppliers that it regularly uses, but each of those suppliers supplies to 10 different businesses, then one company may find it difficult requesting that a supplier delivers goods via low-carbon means when adjusting for a single client is probably too much. On the other hand, if the supplier moves everyone to, e.g. cargo bikes, that is going to be an increased cost for the clients when not all of them may have asked for it, and the supplier risks losing clients to competitors. There needs to be an **incentive to overcome the inertia within existing supply chains** if freight deliveries are going to be decarbonised.

The recent planning discussions regarding the new **Brompton HQ** at Ashford are perhaps illustrative of a new owner-occupier breed. Brompton proposed zero new on-site car-parking, but National Highways were concerned at the "*potential to impact on the safe and efficient operation of the strategic road network*". This has led to four delays in Ashford Borough Council making a decision on the scheme. (70)

Another practicality to consider is that consolidation hubs, that allow for better last-mile logistics such as cargo bikes and electric fleets with shorter ranges, are only really effective in **dense urban populations**. They then incur a service charge cost to the host building which is paid for by the tenants. However, if the building were half the size and therefore half the tenants, the cost of the consolidation centre remains broadly the same and quickly becomes impractical. An obvious solution to this is for areas (i.e. more than one building) to "share" a consolidation centre, but this only works if there are others nearby that are willing to use it. We need to promote collaboration between businesses, third-party logistics providers and cities to allow for better resource pooling and joint investments in infrastructure and sustainability initiatives. This can be difficult even when investors own an entire area, if one fund wants to prioritise ESG but another fund is simply trying to maximise returns. These ownership issues and inability to share prevents large-scale developments that would add value to the area.

Safety

In 2022, the London Fire Brigade were called out to an average of one e-bike or e-scooter battery fire every two days. The perceived risk has led to several large-scale developments from banning such transportation to and from and within their sites. If we are to decarbonise the delivery to offices across the country, this is a challenge that needs tackling. Insurance companies are putting up the prices of cover for fires due to the frequency of these fires, and trains have banned them due to the risks. To overcome this, we need a **national policy surrounding battery safety**. The Bicycle Association and Association of Cycle Traders have already put together some material to tackle the dramatic headlines of these fires, but policies surrounding battery safety need to be updated to be in line with current battery standards. This way, safety of buildings and preventions of fires can be prioritised and commuters, as well as fleets, can use electric vehicles for transportation.

Figure 5: E-bikes and fire safety, Bicycle Association (72)

As well as barriers from policies, there are physical barriers that often prevent office stock from receiving deliveries via updated, decarbonised methods. Many offices rely on vans to deliver, but do not have a location for cargo bikes to park, and due to safety concerns around other large vans are often banned from using the cargo bays. Flexibility and the ability to adapt to different methods of delivery should be at the forefront of investor and architects' minds when creating office buildings. Flexibility and being able to accept deliveries from a wide variety of methods may be essential in the effort to decarbonise deliveries.

Other factors

It is difficult at present for a "client" to elect for a specific individual delivery to be made by a certain transport method. The only way is to use supply contracts to influence change or to arrange a collection to be made via carbon zero supplier e.g. cargo bike or alternative fuel businesses.

While increasingly common in London, the use of cargo bikes outside of London is less prevalent and fewer businesses have considered it as an option for decarbonising their deliveries. A business with multiple offices across the country, may currently outsource deliveries to a single entity, but this may not be possible nationally when looking to decarbonise given the lack of coverage of some of the decarbonised solutions.

Another barrier is that lorries and vans will still be needed for certain items, as there is a limit to weight and size for what can be carried via cargo bike. Indeed, decarbonising these lorries and vans is important and, as discussed earlier, several logistics companies are in the process of electrifying their fleet including vans and lorries – see Appendix D. So, the benefit of catering for a new mode of

vehicle must be justified, which when combined with the previous barriers mentioned above, is often not a strong enough proposition.

Conclusion

We purposely set out to explore a niche and difficult to examine area. It was always likely that this would be a horizon-scanning exercise focused on qualitative data, rather than quantitative, due to the limited availability of comprehensive data. The interviews proved illuminating. One property manager remarked that now that they had heard of this research, they might use it when exploring value-add propositions on new bids. There is no silver bullet – just lots of bronze ones! We have explored some other possibilities in Appendix E in more detail.

Our overriding conclusion is that **to achieve the carbon reductions required a strategic and big impact plan needs to be delivered across the industry**. As borne out by the "Bridging the Gap" report, the pace and scale of tactical measures are insufficient. As it neatly sums up, "*long-term development planning cannot solve the carbon problem given the imperative for action before the end of the decade. However, it does have to be ready with projects and proposals which align with the actions which will have been taken to accelerate decarbonisation. There is no 'business as usual'.*"

And this is where investors, developers, planners, property managers, occupiers and others across the industry can play their part. Scope 3 emissions are not the sole domain of the transport industry. As was stated in a roundtable facilitated by Stantec as part of this research, the demand side of the equation needs to be adjusted. A status quo of nil change to vehicle miles and simply changing the fuel is not enough on its own.

Therefore, consolidation, consolidation hubs, fuel change, improved efficiency, and reduced demand all have their part to play but only as part of a bigger plan – optimise then revolutionise.

What are the blockers?

A lack of clear and comprehensive national policy is part of the issue but as has been borne out, not all of the initiatives and solutions are to be found in one place. This is a real-estate meets transport issue, not the sole domain of one. This report may go some way to helping on the education front. Recognising the problem is the first step to solving it.

Funding is another issue. Some modest initiatives already exist – support for fuel change, cargo bike pilots, research into alternative transport. However, the Government's "Plan for Drivers" and the recent discussions on the Labour party scaling back of their £28 billion Green pledge demonstrate that investment to combat climate change is not universally popular giving other pressing needs.

Time frames are another blocker. Some responses are immediately available but the discussions on hydrogen show that others have much longer lead-in times and are potential solutions to sustaining the planet beyond the 2030 and 2040 net-zero targets.

Transport for the North's Decarbonisation Strategy has an excellent summary of the key policy levers and the associated risks. The three key policy levers are:

1. Low Emission Vehicle Uptake;
2. Demand management; and
3. Improving Freight Efficiency.

This comes with some associated risks, including:

- Depending on location, potential to blight particular areas with elevated level of HGV and delivery vehicle traffic;
- Higher costs for 'just in time' or next day deliveries may disproportionately affect lower income groups and smaller businesses; and
- Labour market changes as more freight moved by rail, disproportionately affecting those with low to middle levels of education.

What can investors and developers do?

One focus would be to **respond to policy**. As shown, several local authorities in the UK are developing planning and transport policy which supports net-zero initiatives. For example, several are seeking to restrict the use of the private car and vans within city centres. If this is the case, city centres may be difficult to reach by old vehicles and alternative means will have to be used. Accordingly, if city centres remain prime office locations, the developments will need to support such policy moves and make adjustments for new forms of freight delivery.

Another investor response is to **invest in the building infrastructure associated with the new breed of services**. These could include charging infrastructure, consolidation centres, mobility hubs and hydrogen production plants. Due to the immaturity of these new services, they present opportunities with the transformation of demand for alternative uses. This not only provides potential financial returns but also helps reduce Scope 3 emissions.

The call on government, central, regional and local is probably a greater one. The work being done at regional and combined authority level, e.g. sub-national transport bodies (STBs), seems to have the greatest potential for impact. As new ideas and technologies are tested, they have the potential to be rolled out nationally. The timing of this report ahead of an Autumn 2024 election means that most national plans are on hold.

The money question

As we have established, there is no one single large public money pot to feast on. There are pockets of funding to help kick start initiatives – scrappage schemes, testing proof of concept, DfT funds for further studies, stimulating the hydrogen market etc.

There are some private funds with green, ethical and sustainable motives and some developers with B Corp credentials who are seeking to influence pursuing lower carbon solutions around Scope 3. As investor sentiment shifts (and the effects of global warming start to impact the insurance industry), these private funds are bound to become more numerous.

Call to action – what can you do?

Share these findings – the aim of this study was to signpost what is going on in this niche in order that the market can respond as it sees fit.

Make modest changes – for current buildings, start to measure the Scope 3 emissions you can influence. On the next development, try and design in some features which make it easier for the transport industry to decarbonise, for example, making it easier for cargo bikes to deliver.

Influence procurement – whether you are an investor, property manager or tenant there are little steps which can be taken. Specify lower carbon delivery options where possible. For multi-tenant buildings, see if consolidation of deliveries is possible. If you are a tenant, lobby your landlord.

Share good practice – if you are aware of other good examples share it with Remit Consulting and IPF members. The more we know, the more we can do.

Appendices

Appendix A – Emission Scope definitions

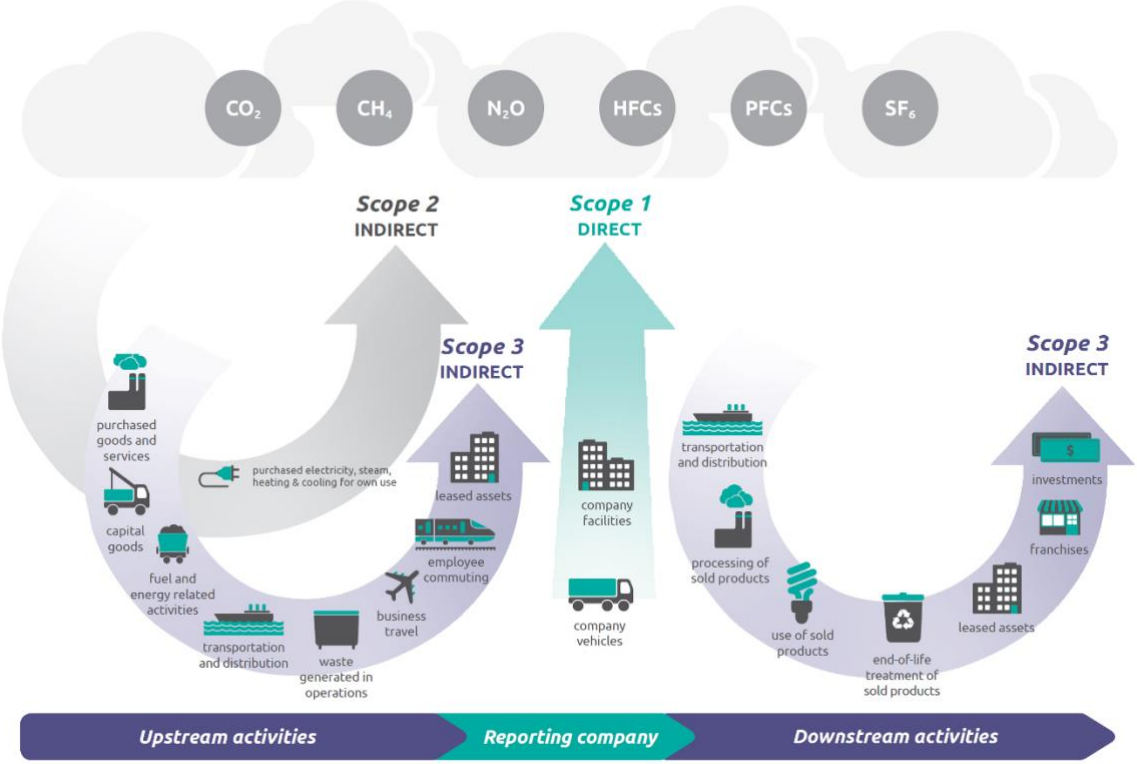


Figure 6: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Greenhouse Gas Protocol (6)

Scope 1 emissions

Scope 1 emissions are those which are directly produced by an organisation; they are owned or controlled by said organisation. These occur due to burning fossil fuels on-site, which can include the use of company-owned vehicles and other processes, such as chemical reaction. These can be allocated to four main themes:

1. Stationary combustion: those emissions which are released directly from the burning fossil fuels to power heat sources (such as a coal-burning fire) or a stationary combustion engine;
2. Mobile combustion: emissions which are released from mobile combustion engines (such as company cars). Fossil fuels, including petrol and diesel, are burnt as a direct result of the company's activities, releasing greenhouse gases into the atmosphere;
3. Fugitive emissions: Emissions caused by leakage during business processes, such as fugitive emissions from refrigeration and air-conditioning units. Fugitive emissions also include other irregular gas releases or vapours; and
4. Process emissions: Emissions released during industrial processes or on-site manufacturing.

Scope 2 emissions

Scope 2 emissions are those which are indirectly made from business operations. This includes the energy required to heat and cool buildings; the emissions are being produced on the company's behalf. Whilst these emissions occur outside of the company's direct control, it is still associated with the energy purchased and used. As with Scope 1, Scope 2 emissions can be broken down into four themes:

1. Electricity: this emission is the greatest contributor to Scope 2 for organisations. This is generated by power plants burning fossil fuels, which is then purchased by the business. While it is not directly produced by the organisation and thus does not directly release greenhouse gases (GHGs), the final user of the energy still has some ownership over the emissions due the energy demand they created;
2. Steam: This is often particularly used in industrial processes, heating, and cleaning. Combustion assets – e.g. a boiler or a thermal power plant – will produce the steam, and hence the energy provided is outside the company's direct control.
3. Heat: Heat emissions arise from multiple sources, but the largest for organisations is generally in the supply of hot water. This comes under Scope 2 emissions as it is often provided by a third party organisation via a local district heat network.
4. Cooling: This contributes to Scope 2 emissions as cooling agents (such as chilled water from off-site) as it is provided by an outside party.

Scope 3 emissions

Scope 3 emissions are where it becomes a bit harder to define, but it loosely entails the remaining GHG emission that occur as a consequence of an organisation's activities for which it has no direct ownership or control over. Otherwise referred to as "value-chain emissions," these encompass the indirect impacts both up- and down-stream of the organisation.

Examples of upstream and downstream activities include, but are not limited to:

- Upstream: purchased goods and services, transportation of goods, extraction and production of purchased materials, and commute of employees; and
- Downstream: the use and disposal of products sold by the business, investments and any other activities related to the organisation's products during their lifecycle.

This includes, but is not limited to emissions from:

Upstream	**Downstream**
Purchased goods and services	Downstream transportation and distribution
Capital goods	Processing of sold products
Fuel- and energy-related activities not included in Scope 1 or Scope 2	Use of sold products
Upstream transportation and distribution	End-of-life treatment of sold products
Waste generated in operations	Downstream leased assets
Business travel	Franchises
Employee commuting	Investments
Upstream leased assets	

- As the definition of this emission scope is less clearly defined, many organisations may feel discouraged by the lack of ready-to-access activity data. The breadth of the data can be daunting, which may lead to the consequence of organisations possessing the tendency to prioritise *what is easy* rather than *what is important*.
- Scope 3 emissions currently do not account for $PM_{2.5}$ (particulate matter under 2.5 micrometres in diameter – often fine particles that increase the risk of health problems like heart disease, asthma and low birth weight) and NO_X emissions, which both impact air quality and the population health, as it is a measure of greenhouse gas and therefore the impact on global warming.

The International Sustainability Standards Board (ISSB) issued their own standards on reporting GHG in June 2023, and the Global Reporting Initiative (GRI) are in the process of issuing their own and is open for comments until March 2024. A comparison of these can be seen below (20):

Item	GRI 305	IFRS S2
Scope 3 categories reporting	The reporting organisation shall report the following information: d. Other indirect (scope 3) GHG emissions categories and activities included in the calculation. The organisation can use the following upstream and downstream categories and activities from the "GHG Protocol Corporate Value Chain Standard". GRI 305-3-d and Guidance	[…] for Scope 3 GHG emissions […] disclose: 1. The categories included within the entity's measure of Scope 3 GHG emissions, in accordance with the Scope 3 categories describe in the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011) IFRS S2 29 (a) (vi) (1)
Reassessment	-	In accordance with paragraph B11 in IFRS S1, on the occurrence of a significant event or a significant change in circumstances, an entity shall reassess the scope of all affected climate-related risks and opportunities throughout its value chain, including reassessing which Scope 3 categories and entities throughout its value chain to include in the measurement of its Scope 3 GHG emissions […] IFRS S2 B34
Scope 3 measurement framework	-	An entity's measurement of Scope 3 GHG is likely to include the use of estimation rather than solely comprising direct measurement. In measuring Scope 3 GHG emissions an entity shall use a measurement approach, inputs and assumptions that result in a faithful representation of this measurement. The measurement framework described in paragraphs B40-B54 provides guidance for an entity to use in preparing its Scope 3 GHG emission disclosures. IFRS S2 B38-B57

Appendix B – Investor Sentiment

Many companies feel discouraged that they may not have ready access to their Scope 3 data and feel powerless to control it. This can lead to the question of what investors can actually do in reality about their Scope 3 emissions. There are various studies which illustrate that Scope 3 emission are not as big a priority for investors and developers as Scope 1 and 2 and two of the key reports' findings are set out below.

The first report was by the Urban Land Institute (ULI) as part of its C-Change programme, formed in late 2021, focussing on mobilising the European real estate industry to decarbonise (21).

ULI sets out two sets of climate risks for investors and property managers – 1. physical risks such as flooding or the consequences of hotter periods of weather and 2. transition risks i.e. those risks associated with the move to a low-carbon environment.

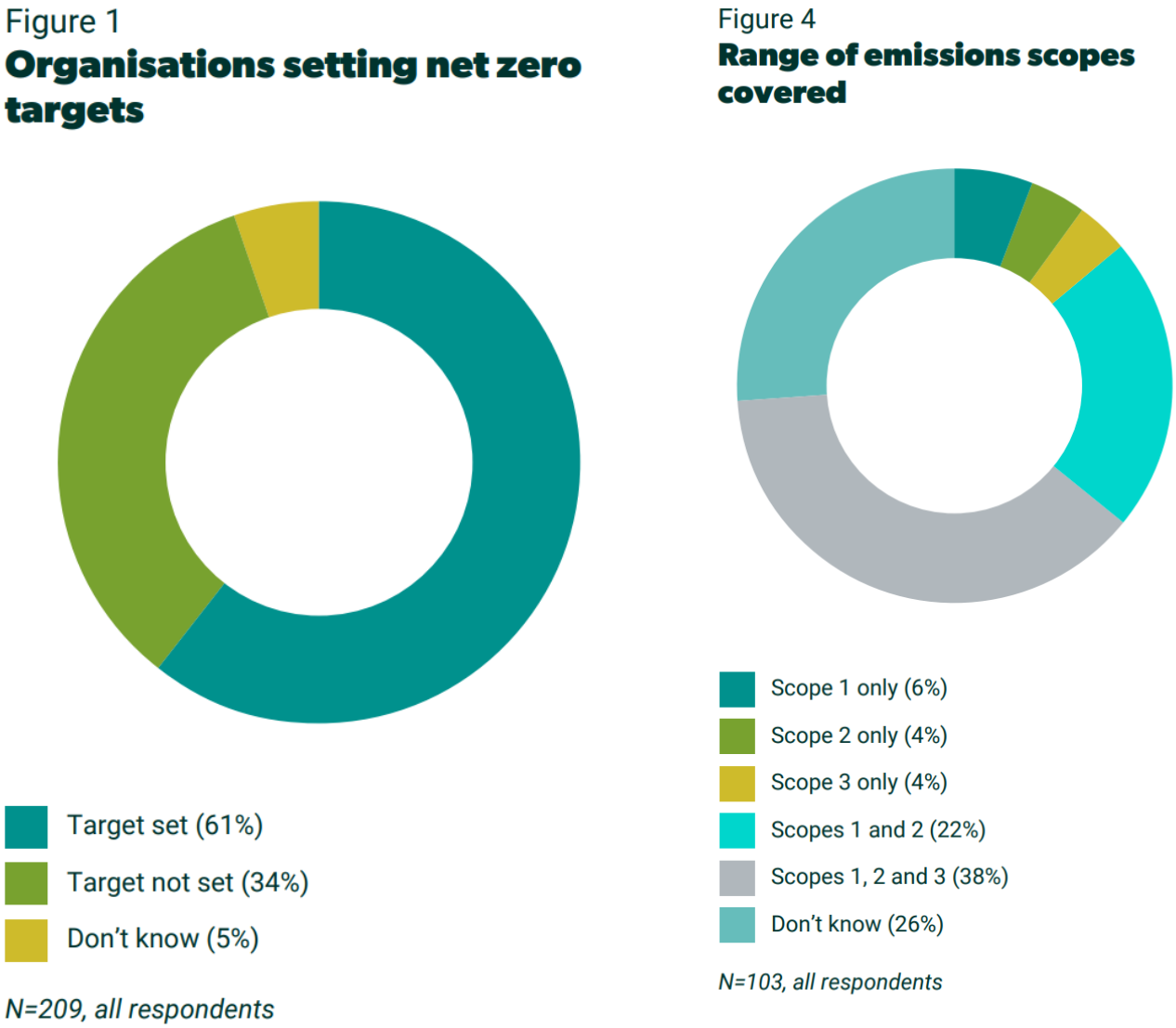


Figure 7: C Change Survey - Decarbonisation rises up the investment agenda (14)

Less than two thirds of their investor survey participants (209 in total) had set net-zero targets. Of those who had not set a target, only 15% planned to do so in the subsequent 12 months. Less than half of those with targets had, or knew they had, included Scope 3 emissions. Generally, it was a lack of knowledge (whether that be a lack of methodology, datasets, skills or resources in the company, or lack of knowledge in the industry) which were the main barriers to incorporating transition risks

into investment decision-making. In addition, 88% of companies are not factoring carbon pricing in their financial reporting (21).

Figure 26

Organisations incorporating carbon pricing in their financial reporting

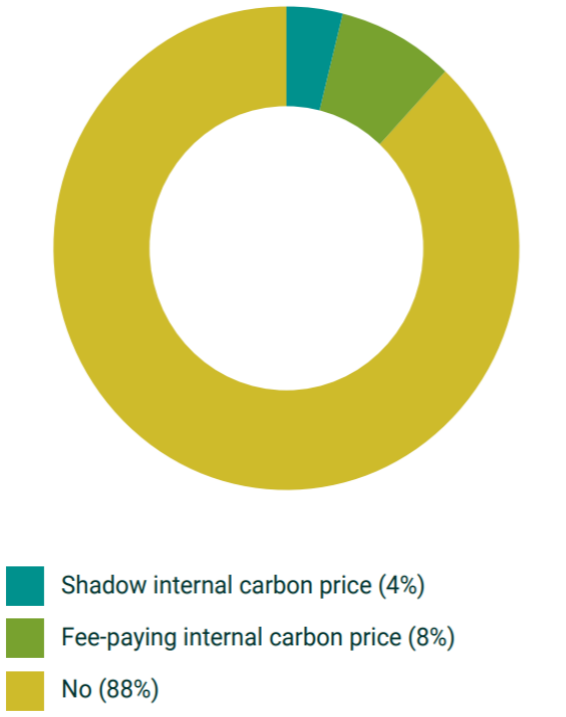


Figure 8: C Change Survey - Decarbonisation rises up the investment agenda (14)

There are gaps in the market understanding about the impact of these risks which is causing owners to underestimate the affect they can have on value or to not be aware of the challenges and costs to decarbonise assets in their ownership. Thus, anything we can do to highlight why Scope 3 is critical for investors to consider and what steps they can take will be invaluable.

The second report we are highlighting is an investigative series from Bisnow surveyed 75 of the largest wealth funds, investment managers and REITs (9). They found that almost half of these institutions have no target to reduce carbon emissions from their portfolios, and **only 12 respondents (16%) included both embodied carbon and tenant emissions in their decarbonisation target**. A further 12 did include emissions from tenants, but not embodied carbon, in their targets, and according to a study by the BPF and JLL, 9 of 10 senior leaders in the UK real estate industry do not believe that the industry will hit its 2050 net-zero targets.

This is further reinforced by Remit Consulting's experience of the market, where we talked to clients and asked them whether they consider issues relating to the decarbonisation of freight in tenders. One remarked that now that they had heard of this research, they might use it when exploring value add propositions on new bids.

While this outlook looks particularly bleak for decarbonisation, some firms nonetheless have started taking action and recognising the need for change. ARUP, for example, has already started assisting its clients in their decarbonisation efforts. We have also witnessed an uptick in the use of green leases that consider occupiers' energy sources, carbon emissions released during operations and decreasing waste and water usage, a promising start. Some other methods of reducing Scope 3 emissions are provided by the Energy Advice Hub, including collaborating with other organisations and industry partners to align procurement and purchase requirements, and investing in GHG emissions' reduction and removals projects (22).

Appendix C – Regional Policies and Initiatives

Birmingham

Birmingham City Council has implemented numerous projects to aid in the reduction of both the council's emissions and those of the city as a whole. One example is Birmingham District Energy Company (BDEC) providing low-carbon, heating, cooling, and power, boasting a combination of tri-generation and co-generation energy centres. This will allow savings of approximately 15,000 tCO_2 each year (23).

Of most relevance to this project, Birmingham has started trialling its first electric bin lorry [sic]. This has been implemented with the objective to explore how some council operations can be made emission free and thus decarbonise its fleet. The Dennis Eagle eCollect is powered by an electric motor and five battery packs, and has the capacity of collecting roughly 11 tonnes of waste in one round, twice a day, equating to the traditional, fuel powered bin lorry. The vehicle can work throughout the day without needing to stop to recharge. At the close of day, the lorry will return to the depot to be charged overnight, allowing it to function for the next shift. Replacing a conventional diesel bin lorry with an electric one would save between 25 and 35 tCO_2 per year (24).

Figure 9: Birmingham trials first zero-emissions bin lorry (23)

Birmingham introduced its Transport Action Plan, including its objective and subsequent actions, on reducing transport emissions by 2031. This includes re-allocating road space, "transforming the city centre", encouraging active travel and controlling demand via limiting parking availability; Birmingham has plans to pedestrianise its streets and various public spaces in which access for private cars will be made limited, with no through-trips being permitted (25).

They see the implementation of the Transport Action Plan as vital given transport contributes approximately one-third of carbon emissions in the city. Efficient use of freight is seen as essential to day-to-day life and the city's operation, ensuring businesses and individuals receive the goods required and when and where it is needed, a requirement current freight does not presently meet and therefore the plan will potentially achieve two objectives rather than emission reduction alone.

This dual need has required changes to both the type of vehicle and the number of vehicles, particularly since the pandemic has inflated the quantity of deliveries and thus the number of HGVs and LGVs. Updates could come in the form of introducing and increasing the number of consolidation and micro-consolidation centres that will serve specific areas of the city and in replacing some vehicles with electric vehicles, including the move towards e-cargo bikes for last-mile deliveries.

In addition, Birmingham City Council received 13 e-cargo bikes and 7 e-cargo trikes in December 2020. Four will be employed by the Council itself to replace van trips in effort to modernise its fleet, another four will be used to assist in the collection of donations and food/clothing deliveries to vulnerable people by The Active Wellbeing Society (TAWS). The remaining ones are available to be loaned to individuals, businesses, and other community groups (26).

Bristol

In 2019, the Mayor of Bristol introduced the Bristol One City Environment Board to expedite the changes needed to make Bristol a city that prioritises sustainability (27). Bristol is one of the few cities in the UK to reference all three scopes of their emissions, explaining its progress towards classifying and quantifying them, not just those created within the city, but "the wider consumption-based carbon footprints of residents and businesses".

The Bristol One City report outlines the city council's operation emissions for 2020-21. It reported 1,200 tonnes CO_2e of Scope 3 emissions arising from its fleet and employees' business car emissions at 331 tonnes CO_2e (28).

The council has set a Climate Strategy ambition for Bristol to be carbon neutral and climate resilient by 2030. It has already cut its operational emissions by half since 2015, and they plan to be carbon neutral for emissions under direct control by 2025. They have set further targets, including the move to 90% of cars being electric, and for total car journeys to decline by 40% by 2030. Bristol City Council have also been awarded £500,000 from the government for their Net Zero Transport City pilot to undertake plans to decarbonise its transport network, setting the internal target of replacing 100% of its fleet with electric vehicles before 2030.

In Bristol, transport emissions account for 34% of the average carbon footprint, with freight and business travel comprising 17% of the economy's footprint (28). Moreover, by 2030 Bristol City Council would like to shift significantly towards more people walking, cycling and using other low carbon public transport, with a total reduction of 40% in the vehicle miles, achieved, in part, through a decline in commercial vehicle mileage through freight consolidation.

To help facilitate this, Bristol has pedestrianised various areas of the city and its streets and improved its cycling infrastructure. It has established a "zero tail pipe emission delivery hub to consolidate freight deliveries" within the city centre. Zedify, a last mile logistics company specialising in light electric vehicles, has increased its commercial availability throughout the city, initially introduced in 2021 with a £1,000 grant in support from Bristol City Council's Go Ultra Low West project. In 2022 Zedify opened a new delivery hub, allowing it to now make over 48,000 emission-free deliveries in Bristol per annum (29).

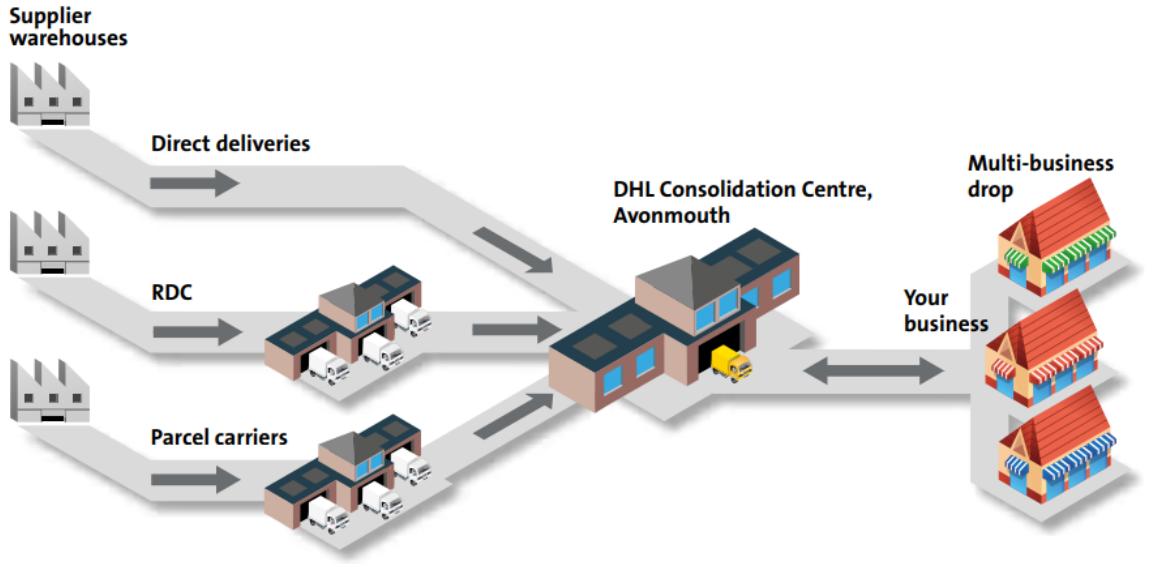


Figure 10: The Role of Active Travel in Improving Health (74)

Other similar organisations have established themselves in the city, such as XeroE who has recently expanded from London. City Funds has invested an approximate £100,000 in equity and XeroE have set up its operation within Bristol's "The Galleries", offering a Pick Up, Drop Off Unit (PUDO) allowing for large quantities of items to be delivered simultaneously to the PUDO. This has resulted in a reduction in the number of vans driving around the city centre, thus leading to a decline in the amount of congestion. To help incentivise customers to convert to this sustainable and emission-free delivery, XeroE offers both same-day and next-day deliveries. They predict that they will be able to carry out 6,000 deliveries per month, setting the ambitious target of growing to 50,000 per month in 2024.

The Council has initiated a very comprehensive climate action plan on how to best tackle its Scope 1, 2, and 3 emissions. The top three most relevant actions for this report are:

Reference Number	Action	Expected Outcome
5	Execute the Electric Vehicle Centre of Excellence, offering support for companies to move towards a fully electric fleet. Included within this, is an action for the council to buy and then loan sixty-two cars or vans.	March 2024
6	Create a freight strategy setting out how it will be assisted to becoming zero carbon and more efficient.	December 2023 Status: Still in progress as of 17th January 2024. Just their freight consolidation strategy has been released.
8	Establish proposals for the wider city on how to decarbonise the transport network, expediting this through electrifying the bus fleet, introducing consolidation and micro-consolidation hubs for e-cargo freight and initiating a Zero Emission Zone to aid the Zero Emission Transport City proposal.	2023 Status: partially achieved – the electrification of buses has been paused due to changes in government resulting in loss of funding.

		However, it is important to note that there are some electric buses being operated.

Whilst Bristol does have its own Parking Strategy, it does not yet have a pavement parking ban as seen in Edinburgh, Manchester and London. However, this may soon change as there have been increasing calls to introduce this. A petition to do so/calling for action is rapidly gaining momentum.

In 2019, Bristol adopted its Transport Strategy which considers congestion and air quality. This incorporates the city's approach with the relevant outcomes and actions to deliver the strategy. The strategy includes the council's "vision" for up to 2036, in which time it wishes to achieve the above targets. Appendix D summarises the relevant objectives but see the actual transport strategy for greater detail (30).

Edinburgh

Edinburgh has stated that by 2030 it will be a net-zero, climate-resilient city, having established its pathway to net zero, setting the top strategies. In particular, one of its strategies relates to the decarbonisation of public transport: "the way we move people, goods and services accounts for 31% of the city's total emissions" (31).

Below is a table issued by the City of Edinburgh outlining its top ten options for reducing carbon emissions:

Rank	Measure	Emissions Reduction Potential (ktCO2e)
1	Shift from Petrol-Car to Pedestrian & Bicycle Journeys	8,154
2	Insulating Domestic Buildings	7,376
3	Shift from Diesel Car to Pedestrian & Bicycle Journeys	5,954
4	Shift from Petrol Car to HEV/EV Journeys	5,224
5	Shift from Petrol Car to Electric Bus Journeys	3,109
6	Shift from Petrol Car to Diesel Bus Journeys	2,533
7	Shift from Petrol Car to Hybrid Journeys	2,407
8	Electrical appliance upgrades in Domestic Buildings	1,501
9	Shift from Diesel Car Journeys to Diesel Bus	1,433
10	Installing Heat Pumps in Domestic Buildings	1,351

Figure 11: Edinburgh's Top Ten Most Carbon-Effective Emission Reduction Options (7)

As of February 2023, Edinburgh introduced its Parking Action Plan which will make it harder for vans to park on the pavement, thus reducing the option to travel by van, leading to lower vehicular emissions and congestion. Moreover, the city implemented a ban on pavement parking at end of January 2023, with those found guilty of doing so facing a fine worth up to £100.

London

London's transport network has been set the target to become zero emission by 2050, playing an important role in establishing a zero carbon city. In 2021, transport contributed 25% of London's CO_2 emissions (32). Within the city, 90% of goods delivered are moved by road (33). The distance travelled by these vehicles in London has risen by an estimated 39% over the previous 25 years. This is, in part,

a result of the significant increase in LGV journeys (up 54% between 1993 and 2017) and a slight reduction in HGV miles over this period (6%).

In 2013, the Greater London Authority (GLA) and Transport for London (TfL) conducted the London Atmospheric Emissions Inventory and discovered that of road transport, freight contributed 33% of NO_x emissions, 29% of $PM_{2.5}$ emissions and 23% of road related CO_2 emissions (34). However, the 2019 report demonstrated an "accelerated" progress towards cleaner air since 2016.

Sadiq Khan, Mayor of London, declared that by 2041, 80% of journeys made in London should be carried out by walking, cycling or public transport. By 2026 he wants to lessen the number of lorries and vans in central London in the morning peak by 10% (35). In 2018, London was the first UK city to possess an e-cargo bike food delivery service – delivering up to 100 orders per day while reducing the associated pollution.

The Mayor of London and Transport for London, working together with the boroughs around London and the Freight Forum, have proposed methods in which freight and servicing trips can become more efficient, by:

- Determining occasions in which freight can be moved from road to rail without impacting passenger services;
- Expanding the proportion of goods being moved on London's waterways; and
- Assessing if any and what benefits arise from introducing regional freight consolidation and distribution centres.

Alongside this cooperative, the mayor is working with the freight industry, Business Improvement Districts (BIDs) and individual organisations to brainstorm methods to better the efficiency of last-mile deliveries.

Congestion within London is a major issue; in 2017, drivers were reported to have spent 74 hours in gridlocked traffic during peak hours (36). In economic/monetary terms, this represents a cost to individual drivers the equivalent of £2,430 per annum and the capital £9.5 billion per annum from direct and indirect costs.

The city has introduced e-cargo bikes as a method of decarbonising fleet and reducing congestion as they have the ability to make deliveries faster and more efficiently, additionally benefiting air quality. TfL has predicted that these could replace an approximate 4% of van kilometres by 2030, with this figure reaching 17% for central London. This reduction could translate to Greater London saving an estimated 30,000 tCO_2 each year by 2030.

Plans have already been developed to transform the method by which deliveries are made in London, through partnering with boroughs, businesses and the freight and servicing industry, promoting the growth of cargo bikes. A rise in cargo bikes across London has already been experienced, as many "big player" freight organisations have begun to employ these, namely Amazon and DHL, largely as a result of them offering a faster, cheaper and greener alternative.

Within London, boroughs have introduced their own various independent initiatives to drive the transition towards net zero. For example, Westminster City Council set the objective to become carbon neutral by 2030, with the whole borough to follow suit by the end of the following decade (37).

Westminster's key objective to reach this target is to reduce the number of vehicular movement and the consequent emissions. Included within this objective, Westminster has proposed several key milestones:

- Reduce the number of freight vehicles by 80% before 2040;
    - The Council acknowledges that this is ambitious, but states that if nothing is done to reduce the numbers of freight, servicing and deliveries (FSD), an increase by 36% by 2041 will be experienced; and
- The FSD vehicles which still operate around Westminster will need to be zero emission by 2040.

Within the actions identified to achieve these objectives, the Council has set up three key themes: Reducing, Remoding and Retiming, to distinguish each of them.

Reducing	Remoding	Retiming
Minimise FSD activity, duration spend within the city and the impact on the local road network and environment, through macro- and micro-consolidation initiatives.	Seek alternatives for mode of transport (rail and water), moving fleet to less polluting, and enhancing the infrastructure necessary to their use.	Manage and monitor delivery times to avoid conflict with other users of the street (including pedestrians and cyclists), operating during non-peak hours.

Similarly, the City of London is currently reviewing its Transport Strategy, and some key modified aspirations include:

- Reducing the number of freight vehicles that pass through London City without an origin or destination in the Square Mile;
- Developments that are applying for planning permission for significant expansion or change of use then will be required to consolidate their deliveries;
- Working with the Business Improvement Districts (BIDs) to trial collective delivery areas, where deliveries and servicing activities are consolidated into as few operators as possible;
- Seeking a coordinated approach to last mile logistics across central London, working with neighbouring boroughs, Transport for London, the Greater London Authority and developers to identify sites that serve the Square Mile, including beyond the City boundary;
- Promoting cargo bike usage amongst businesses in London City and highlighting businesses that are adopting good practice in relation to cargo bike usage;
- Identifying opportunities to increase the use of the river for freight deliveries to the Square Mile, including exploring the potential for inward river freight at Walbrook Wharf; and
- Encourage freight into London City by rail.

This is a clear example of how councils and local authorities can consider many possible solutions to combatting Scope 3 emissions, and we hope to see these implemented by the City.

Lambeth Borough established its kerbside strategy as part of its Climate Action Plan to reduce traffic levels by 27%. One method in which this can be achieved is through utilising the kerbside for zero emission vehicles, as well as shared cargo bikes and electric delivery vehicles. Moreover, to reduce the distance FSD require to travel, consolidation options (for example parcel lockers) will be added along kerbsides allowing for multiple parcels to be left in a single place rather than transported to individual locations.

Manchester

Manchester plans on becoming a net-zero carbon city by 2038. Its Climate Action Plan includes activities the City Council can do to reduce emissions but to also support the wider city in decarbonising; reducing carbon emissions will be embedded in the actions which the council will take. For example, a 10% weighting on procurement is given to how contractors will reduce carbon emissions (38).

Within their top five priorities to becoming a net-zero carbon city lies the objective of decarbonising freight transport and moving towards rail and water, away from road transport in order to allow for greater efficiency in its freight practices. Manchester provides suggestions as to what businesses can do specifically to achieve this:

- Switching its car/van fleet to electric vehicles;
- Consider its charging infrastructure;
- When replacing other vehicles, purchase the least polluting and more efficient option; and
- Fleet maintenance to minimise emissions. (39)

Manchester has also introduced the "Greater Manchester's new Electric Vehicle Charging Infrastructure Strategy" with funding to help support local businesses upgrade to less carbon demanding vehicles. Demand for this infrastructure is increasing but the supply is not growing proportionally. Presently, there are approximately 360 EV chargers with 700 connectors, but by 2025 Greater Manchester approximate they will need 2700 "fast" chargers and 300 "rapid" chargers. Manchester City Council intends to invest in increasing this network, but undoubtedly, as more commercial operators set up their own EV network, this need for government spending will be reduced (40).

A further way the Council is encouraging locals to decarbonise its fleet is through an e-cargo bike for hire scheme, where 26 bikes and six trials will be made available for organisations, community groups and individuals. This initiative arose as a result of Manchester being awarded a £173,000 grant from the Energy Savings Trust and Department of Transport (41). Presently, the cargo bikes can be picked up at a central depot, and schemes are being finalised to expand this to a wider scale.

Appendix D – Logistic Provider Initiatives

Below is a table showing a sample of alternative fuels being rolled out currently by logistics operators in the UK and world-wide:

Operator	**Currently**	**Notes**
Royal Mail	5000 vehicles are electric delivery vans from 18 delivery offices around the UK, including Belfast, Cardiff, Edinburgh, Nottingham, and London.	From a fleet of 41,500 vans and 6,200 trucks.
UPS	Global fleet includes over 13,000 alternate fuel and advanced technology vehicles, including more than 1,000 electric and plugin hybrid electric vehicles.	Committed to purchase up to 10,000 EVs from UK startup, "Arrival". Plans to reach carbon neutrality by 2050 and achieve 40% alternative fuel in ground operations by 2025.
DHL	18% of its vehicle fleet comprises EVs for short distance and last mile services.	By 2030, it aims to increase the proportion of electric delivery cars to 60% of its worldwide fleet for the last mile – resulting in over 80,000 electric

		vehicles on the road. DHL has pledged a zero-emissions target by 2050.
DHL	HVO (Hydrotreated Vegetable Oil) fuel is being rolled out across the majority of its on-site fuelling stations throughout the UK with installation scheduled for completion by the end of 2023. HVO can be used for existing vehicles without compromising operational performance.	Transitioning to HVO fuel will deliver 80-90% carbon savings compared to diesel; with an estimated total of 15,000 tonnes of CO2e savings expected to be delivered.
DHL	DHL Express UK has launched new electric courier vans across the UK.	Part of its goal to run a 100% electric courier vehicle fleet by 2030.
Amazon	In March 2022 Amazon launched five electric Heavy Goods Vehicles in its delivery fleet in the UK. The 37-tonne fully electric vehicles operate from Amazon's fulfilment centres in Tilbury and Milton Keynes.	These vehicles replaced diesel HGVs associated with around 100,000 annual road miles preventing 170 tonnes of CO2e from being emitted. They join more than 1,000 electric delivery vans currently on the road in the UK.
Amazon	Amazon will make around 2.5 million deliveries in the UK every year via sustainable methods of transport such as electric cargo bikes and on-foot deliveries.	Amazon is aiming to reach net-zero carbon by 2040 and this using of alternative methods for these 2.5 million deliveries per year will remove the need for up to 28 vans in its fleet.

Appendix E – Other Possibilities

Waterways

Over the years, water freight has lessened in importance both relatively (as a result of a faster growing road network) and in absolute terms. However, this could be partially explained through a sudden decline in exports and a rise in imports over the previous decade. Presently, approximately 10% of goods are transported by water and rail. (33)

The ever-increasing demand to improve sustainability could improve the market share of the water transport system. On the other hand, the road transport network is simultaneously seeking to enhance its sustainability, with advancements being made in electrification and truck platooning, thus improving the competitiveness of road transport. Nevertheless, technology advancements and multi-modal delivery options could provide reasonable opportunities for the water transport network to be moved towards greater coordination and consolidation, enabling it to become a more efficient mode of transport.

The DfT is in the process of conducting a thorough review of the Mode Shift Revenue Support (MSRS) and Waterborne Freight Grant (WFG) schemes. These provide essential support for the freight industry and are set to conclude on 31st March 2025 and 31st March 2026 respectively (42). Both of these schemes are set to provide sustainable transport solutions for the UK's freight industry and are currently allocated an approximate £20 million per annum collectively. Through the programmes, freight operators and other organisations (if eligible) can receive financial incentives to adopt greener modes of transportation, included within this category are waterways and rail. The promotion of more sustainable alternatives has the overarching objective of reducing congestion on the road, lowering

carbon emissions, and establishing a more sustainable and resilient freight network. In 2022-23, MSRS was attributed to assisting in the removal of 900,000 lorry journeys in Britain, saving an equivalent of 40,000 tCO_2.

Examples of use of waterways within London include but are not limited to: Barking and Dagenham, Greenwich, and Bexley. These are now considered major ports, handling over one million tonnes of international trade each year (43). Moreover, the Port of London Authority (PLA) approximates that it has already removed the equivalent of 265,000 HGV movements from the road, with an ambition for 2025 to fulfil four million tonnes per annum of intra-wharf freight, equating to the removal of approximately 400,000 HGVs from London's roads (44). This is expected to expand year upon year, with demand forecast to increase by an approximate two million by 2041 (45).

Not only can inland waterways be used, but in 2018 the Government for Science conducted a review that found that short sea shipping (e.g. from Hull to London) could bring a 90% reduction in CO_2 emissions. Due to the UK's position with plenty of coastal cities, it is well placed to take full advantage of this.

Rail

Investing in logistics centres near railways encourages tenants to priories rail transport for long-distance goods. Rail offers significant emission reductions compared to lorries while maintaining efficiency. Rail freight hubs already exist in Doncaster and Birmingham, and the UK's extensive train network makes it very suitable for this type of goods transportation. According to the Department of Transport, rail is 76% more greenhouse gas efficient per freight tonne kilometre. Given a lot of the infrastructure already exists, it makes sense to adapt the existing systems when the benefit is this large.

Micro-hubs

Integrating micro-hubs with electric trams, shuttles or other forms of transportation for last-mile deliveries reduces individual vehicle use and congestion. Trials of micro-hubs have already been seen in London, Manchester, and Coventry (46) (47). Where possible, utilising existing transportation networks outside of peak hours is logically the best solution as it already exists and requires no new building. So, building micro-hubs at strategic locations along commuter routes that see much less traffic outside peak hours are very suitable for this adaptation.

Urban Air Mobility

This year, UPS is looking to introduce electric aircraft, capable of carrying over 600kg at 170mph, with the ability to take off and land vertically, will further reduce vehicle emissions, operating costs and transit times. Electric drones are already being used for deliveries of medical supplies in major urban areas like London, but urban air mobility has the potential to revolutionise freight deliveries in the UK. The Future Flight challenge, a budget of £125 million from the government and a further £175 million backed by the industry, will end this year, encouraging solutions to further advance electrification and autonomy of urban air mobility, while integrating it safely in the pre-existing infrastructure.

Glossary

GHG Emissions	Greenhouse gas emissions. These include CO_2, methane (CH_4), Ozone (O_3), Nitrous Oxides (NO_x) chlorofluorocarbons and water vapour.
$MtCO_2e$	Megatons (1,000,000) tons of CO_2 or gas with that equivalent impact on greenhouse gas emissions.
NO_x	Nitrogen Oxides, generally NO and NO_2 which are significant components of harmful air pollution.
$PM_{2.5}$	PM stands for particulate matter. The 2.5 denotes that the size is below 2.5 micrometres in diameter.
HGV/LGV	Heavy Goods Vehicle/Light Goods Vehicle

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