

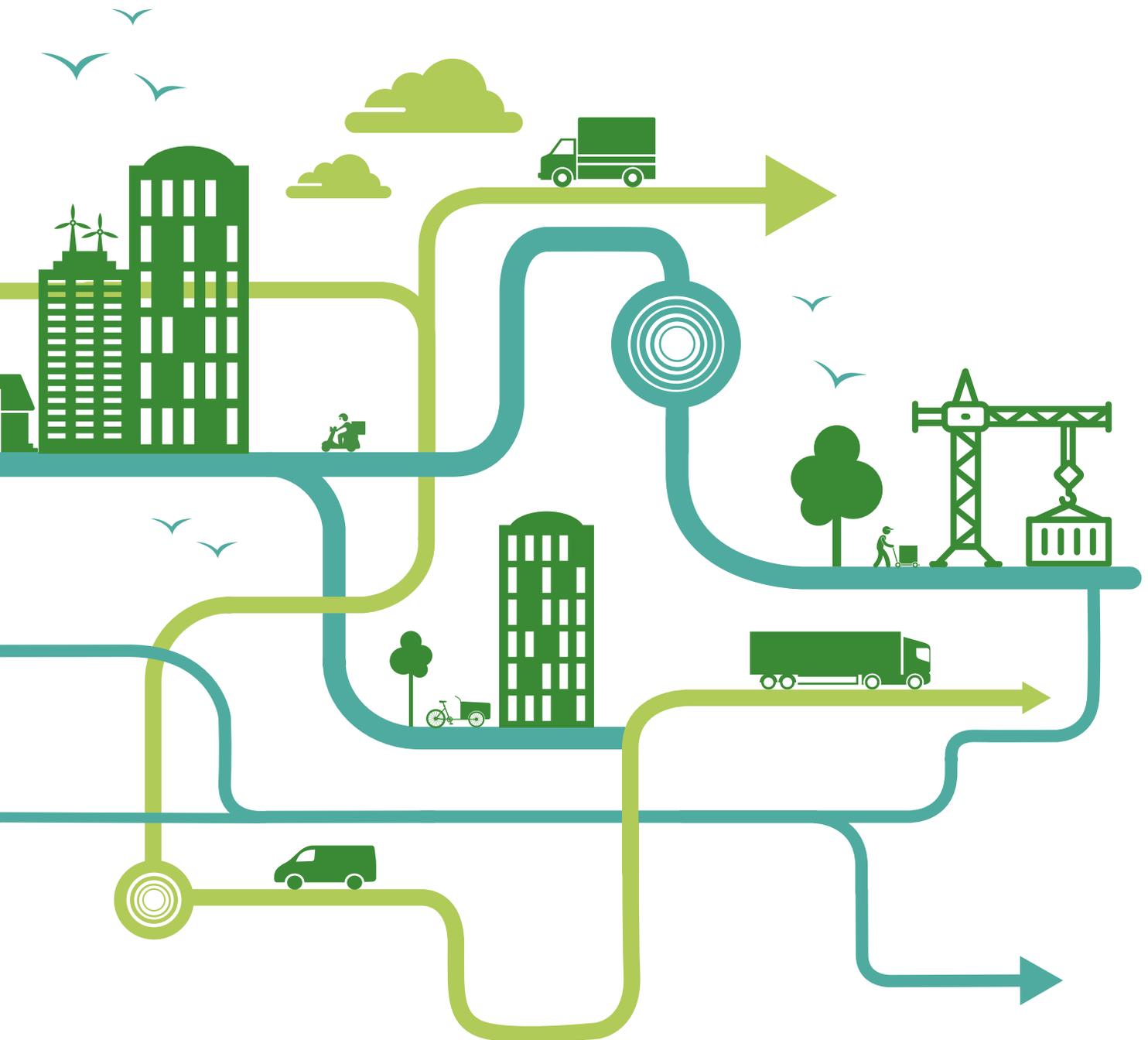
Zero Emission Urban Freight

A TDA whitepaper on how to reach zero emission urban freight
by uniting Countries, Cities/Regions and Companies

May 2019



TRANSPORT
DECARBONISATION
ALLIANCE



Mission statement

of the Community of Interest on Urban Freight

Zero emission urban freight: Countries, Cities/Regions and Companies are making it real. Are you in?

Urban freight matters

Cities are at the core of human life. Increasing urbanisation and high population growth, in combination with complex demand patterns, create continuous pressure on urban areas around the world. Although the topic is often overlooked, it is at the heart of numerous urban challenges, such as traffic safety, congestion, air pollution, noise and contribution to CO₂ emissions. A realistic and impactful objective is to start by addressing freight-related challenges, with a focus on zero air pollution and significantly contributing to the greenhouse gas (GHG) goals set in the Paris Agreement. It calls for the development of alternative ways to deal with this topic and resolve to widely implement sustainable solutions.

Challenges identified

Transforming urban freight to zero emission faces several challenges:

- **Structural:** high operational complexity in an urban context, high fragmentation of the freight sector and low margins
- **Ownership:** the responsibilities of Countries, Cities/Regions and Companies (the "3Cs") are often unclear with regard to who should take the lead in "cleaning" transport, combined with a reluctance to share data
- **Economical/technical:** a lack of economically viable solutions and zero emission freight vehicles on the market; a lack of economic incentives to upgrade fleets and change to other green logistics solutions, such as rail, electric cargo bikes and autonomous vehicles

This Community of Interest aims to tackle those challenges that need cooperation from the 3Cs, through a collaborative rather than an individual approach.

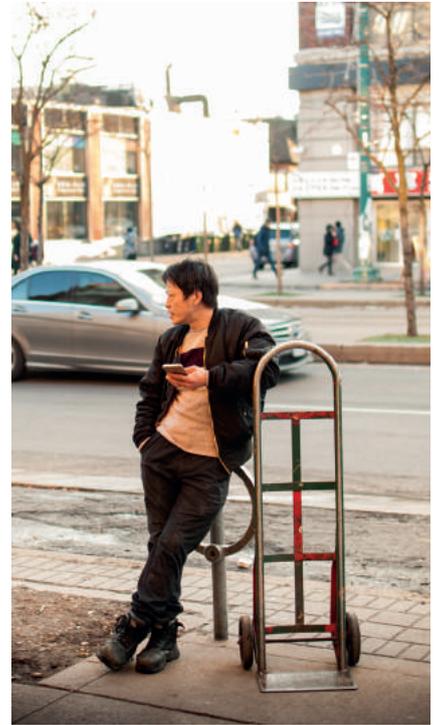
Cooperation is key

Further cooperation between the 3Cs is required to transform urban freight. Not only is there a need for sustainable technical solutions (electric vehicles, shift to urban rail, boat, cargo bikes, etc.) but also for stakeholders to cooperate, creating new urban freight rules and business models for the sector. This might include sharing data to create transparency, enabling green decision-making and stimulating innovation. Solutions will always have to be tailored to individual urban areas and supply chains, but there are some common denominators.

Act now

Frontrunners in the Community of Interest on Urban Freight are making it happen. They are already on their way to zero emission urban freight and have numerous solutions for some of the challenges they face. For the remaining challenges they voice what needs to change and advocate action. For example

- **National legislation.** Set the overall ambition for zero emission. For example, "All new urban freight vehicles sold from 2030 onwards must be zero emission."
- **Company targets.** Setting long-term environmental targets combined with short- to mid-term targets, including robust accounting systems and measurement planning. Public reporting (e.g. through Corporate Responsibility (CR) Reports and/or Annual Reports) and a strong commitment from the board will help create transparency and reach the targets.
- **A Sustainable Urban Logistics Plan (SULP) for each city. Looking at a tailor-made solution for each city,** considering multimodal zero emission solutions (zero emission vehicles, rail, boat, cargo bikes, city hubs) and building new logistical chains based on data sharing and integration for a liveable and future-proof urban area.
- **Set a clear goal: Zero Emission Freight Zones in all frontrunner cities by 2025.** Not only will this decrease pollution levels, it will also be a strong signal to the automotive industry to produce clean freight vehicles in larger quantities AND will force a shift to a different (data driven) way of transporting goods.
- **The 3Cs send a clear message to the automotive industry that more and cheaper zero emission freight vehicles should be produced, faster.** All frontrunners will sign a declaration of intent, urging the automotive industry to produce more zero emission freight vehicles, faster. The 3Cs will indicate the number of vehicles (both trucks and vans) they would be interested in purchasing (if available). This sends a clear message to the automotive industry that there is already a widespread demand. It also demonstrates the collaborative power of the 3Cs – although the issue affects all 3Cs individually, they need to work together to get results.



Executive summary

Almost all global trade originates from, traverses or is destined for a metropolitan area. However, very few cities and countries have developed structured and sustainable freight policies, dedicated programmes or partnerships with the private sector to address the core issues related to urban freight. In most cases, the issue is about lack of ownership: most national governments consider urban freight to be a local problem; many local authorities consider it to be a private sector problem; and the private sector often considers it to be an infrastructure and regulatory problem.

In a competitive landscape plagued by low margins, the private sector aggressively pursues economic efficiency – but the social and environmental costs keep adding up. Urban freight is responsible for a substantial share of pollution and CO₂ emissions¹. In the absence of sustainable freight planning, this is likely to be aggravated further with the rise of e-commerce and an increasing customer expectation of ever faster deliveries.

Many solutions exist, others must be enhanced. There is an immediate need for an accelerated development and adoption of sustainable technology solutions (electric vehicles, shift to urban rail, boat, cargo bikes, etc.). But it is equally important that there is extensive cooperation among all stakeholders to implement a variety of available operational solutions.

Countries, Cities/Regions and Companies need to work together to achieve the long-term strategy of transitioning to zero emission urban freight. However, achieving such an ambition requires critical early actions. This whitepaper is a resource for Countries, Cities/Regions and Companies to design, plan and implement successful zero emission urban freight measures by 2025.

The Transport Decarbonisation Alliance (TDA) would like to see pioneering international companies, together with cities/regions and countries spearhead transformational changes in the world of urban delivery, creating a network of frontrunners and virally spreading good practices through their stakeholders. Some examples of proposed actions are: total cost of ownership as the new standard, Green Deals between the 3Cs, zero emission zones in cities, and showcasing the demand for more electric vehicle options for large-scale freight fleets.

This document introduces a transformation methodology to help Countries, Cities/Regions and Companies to achieve local strategies for urban freight decarbonisation. Although solutions are specific for each situation, and they must be tailored to each urban area, there are some common denominators.

A five-step process methodology is detailed to facilitate joint action and risk alleviation when taking measures to reduce and eliminate urban freight emissions. This is based on the TDA Manifesto for transport decarbonisation.

The TDA advocates, through concrete examples and solutions, that zero emission is technically feasible, economically attractive, and brings broad social and environmental benefits. Thus, an important part of this whitepaper shows the major challenges and existing solutions to overcome them, such as the structure of the urban logistics sector, the ownership issues, and the lack of efficient implemented solutions. Each challenge is fully documented with identified solutions (aligned with the proposed methodology) and practical examples of real situations with implemented solutions. As well as proving their feasibility, this provides a wide array of knowledge and ideas for Countries, Cities/Regions and Companies. At the end of the document, a solution-mapping grid summarises a best practice approach to transforming urban freight. It provides a qualitative assessment of the proposed solutions in terms of anticipated level of investment, involvement and impact, and implementation timeframe.

1. C CIVITAS (2015) Smart choices for cities: Making urban freight logistics more sustainable – https://civitas.eu/sites/default/files/civ_pol-an5_urban_web.pdf

“There is a whole world of goods transportation supporting citizens’ lives: from an e-commerce order delivered to your doorstep by e-bike, to refuse collections, to fresh goods delivered to the neighbourhood grocery store or the paper for the office printer, to the concrete mixer trucks for new buildings and construction. Urban freight is all around us.”

Foreword



The transport of goods is not a goal in itself. It is the result of a customer order being delivered and therefore a means to an end. The urban freight capability allows a large number of people to live in urban areas and supports all aspects of city life. Without urban freight a city could not thrive.

Urban transport today is so much more than transporting people by car, train, tram, underground metro or plane. There is a whole world of goods transportation supporting citizens' lives: from an e-commerce order delivered to your doorstep by e-bike, to refuse collections, to fresh goods delivered to the neighbourhood grocery store or the paper for the office printer, to the concrete mixer trucks for new buildings and construction. Urban freight is all around us.

With growing urban populations and the increase in urban freight movements, cities are on the front line of the negative effects of increased urban freight. While high levels of airborne pollutants threaten quality of life, cities across the globe also face major challenges such as GHG emissions, the safety of people in the streets and the economic burden of congestion.

World Health Organization (WHO) reports clearly show that globally, most urban dwellers are exposed to levels of pollution well above recommended limits². And urban freight is a major cause. The latest report of the Intergovernmental Panel on Climate Change (IPCC)³ shows that urban freight is also responsible for a large share of CO₂ emissions in cities. It clearly warns us that not only do we need to get to zero pollutant emissions and net zero GHG emissions to limit global warming below 1.5°C or 2°C, we need to act now – and cities are the place to start.

Transport is one of the most difficult and complex sectors to transform. It is not just a matter of replacing current fossil fuel-powered trucks and vans with zero emission alternatives. It requires a deep system re-design which will affect and include all stakeholders. The transformation of urban freight needs commitment and action on all levels, uniting Countries, Cities/Regions and Companies with a common goal towards zero emission urban freight.

This whitepaper is a unique co-creation by pioneering Countries, Cities/Regions and Companies, and shows that urban freight can be given a fresh, new start and lead to zero emissions within the next decade. It is also an invitation for all to rise to the challenge. It can be done, starting today.

Zero emission urban freight starts now. Are you in?

José Mendes

TDA Chairman and First Secretary
of State for Mobility, Portugal

A handwritten signature in black ink, appearing to read "Mendes".

Sita Holtslag

Chair of the Community of Interest
on Urban Freight, The Netherlands

A handwritten signature in black ink, appearing to read "Sita Holtslag".

2. WHO – Air pollution levels rising in many of the world's poorest cities – <https://www.who.int/news-room/detail/12-05-2016-air-pollution-levels-rising-in-many-of-the-world-s-poorest-cities>

3. IPCC (2018) – <https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter5-1.pdf>

List of often used abbreviations

| | | | |
|------------------------|---|-----------------------|------------------------------------|
| 3C | Countries, Cities/Regions and Companies | LEV | Low Emission Vehicle |
| CO₂ | Carbon Dioxide | LHV | Longer Heavier Vehicle |
| CPO | Catalytic Particulate Oxidiser (CPO) | LSP | Logistics Service Provider |
| CR | Corporate Responsibility | NO_x | Nitrogen Oxide |
| ETC | Electronic Toll Collection | PM | Particulate Matter |
| EU | European Union | SULP | Sustainable Urban Logistics Plan |
| EV | Electric/Electrified Vehicles | TDA | Transport Decarbonisation Alliance |
| GDp_t | Gross Domestic Product | ULEZ | Ultra Low Emission Zone |
| GHG | Greenhouse Gas | WHO | World Health Organization |
| HGV | Heavy Goods Vehicle | ZE | Zero Emission |
| ICT | Information and Communication Technology | ZEV | Zero Emission Vehicle |
| IPCC | Intergovernmental Panel on Climate Change | ZEZ | Zero Emission Zone |
| L/U | Loading Unloading | | |



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NOTE TO THE READERS

The recommendations on possible actions and methods for getting to zero emission urban freight provided in this document are the result of a process of collective discussions and reflections facilitated through the Transport Decarbonisation Alliance (TDA). The recommendations are not binding and have not been endorsed individually by supporters of, or partners in the TDA. They result from a collaborative work that is still ongoing and might be adjusted and further enriched.

“The goal of this whitepaper is to provide a common vision for Countries, Cities/Regions and Companies (the “3Cs”) on the topic of zero emission urban freight. It aims to ensure cohesion.”



Introduction

This whitepaper discusses eradication of air pollution and drastic reduction of CO₂ emissions due to urban freight. It draws from the methodological concepts developed in the Transport Decarbonisation Alliance (TDA) Manifesto on how to transform and reach decarbonised mobility through uniting Countries, Cities/Regions and Companies. It uses best practices to allow a collaborative approach to adopting the right combination of solutions. These best practices rely on **four strategic imperatives**. They ensure that all actions work in synergy and leverage ASI (avoid-shift-improve) initiatives:

- **Imperative 1** Move away from oil and other fossil fuels to focus on very-low-GHG energy
- **Imperative 2** Lower the energy intensity of our mobility patterns (global economy & individual lifestyles)
- **Imperative 3** Prepare the physical and IT infrastructure needed to accompany those changes
- **Imperative 4** Inform, educate and train populations to embrace the transformation

Twelve pillars of transformation to activate levers in synergy and create favourable economic, technical and social conditions for the transition:

Collaborating to create an enabling framework

- 1 Adapt economic rules to transformation
Accelerate energy mix transformation
- 2 Harmonise regulations related to charging or filling, and to emission standards
- 3 Develop new mobility and energy curricula in universities, with associated R&D and workforce training

Collaborating to organise territories and change behaviours

- 5 Position Cities/Regions at the forefront of transformation implementation
- 6 Upgrade services of mass transit and promote its use
- 7 Catalyse movement towards long-distance nonmotorised mobility (inter, intracity and regional)
- 8 Develop decentralised mobility and decentralised energy systems simultaneously

Collaborating to foster change and innovation as an impulse for GHG reduction

- 9 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure
- 10 Impulse movement towards multimodal solutions for freight
- 11 Rely on digital tools to create shorter and smarter supply chains
- 12 Reorganise commuting habits

The goal of this whitepaper is to provide a **common vision** for Countries, Cities/Regions and Companies (the "3Cs") on the topic of zero emission urban freight. It aims to ensure cohesion, working together to take concrete steps towards tangible actions. As such, this paper does not intend to be an exhaustive review of existing strategies and tools but rather to provide a common preliminary knowledge base to build upon.

The TDA Manifesto has suggested a framework for the 3Cs to create and maintain an unprecedented level of coordination and enable large-scale initiatives. This framework is built around **four enabling prerequisites**. They represent the actions and attitudes necessary to act quickly and overcome existing or future roadblocks, bearing in mind that getting there is no easy task:

- **Prerequisite 1** Anticipate shifting effects
- **Prerequisite 2** Avoid inflexible approaches and make informed decisions
- **Prerequisite 3** Challenge all arguments for postponement
- **Prerequisite 4** Adapt the fiscal and regulatory environment to foster transformational investment

The ambition put forward by this paper of achieving zero emission urban freight in the next decade in frontrunning countries is in line with the commitment of certain countries to decarbonise their economies by 2050 and to respect the WHO pollutant limits in urban air as soon as possible.

Furthermore, most existing urban freight best practices or solutions are focused on a specific geographical zone. Solutions will always have to be tailored to individual urban areas. However, there are some common denominators.

A five-step process to facilitate joint action and risk alleviation, at the 3Cs level:

- **Step 1** Establish a firm "National Clean Freight Goal" involving all stakeholders in a spirit of irreversible commitment
- **Step 2** Develop 3C governance at the different scales to steer and monitor the transformation
- **Step 3** Establish proactive pathways towards goal and embark as many concerned 3Cs as possible on the journey, to create momentum and emulation through competition
- **Step 4** Unleash entrepreneurship and open pro-business initiatives to foster new services and new products
- **Step 5** Broaden experimentation to very different 3C clusters to ensure solution robustness and maximum efficiency of innovation

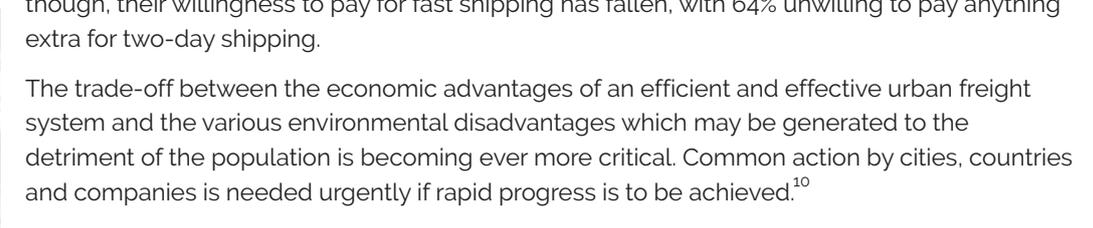
Urban freight matters to tackle key societal challenges

Urban freight is of primary importance for transport, as it is estimated that almost all global trade originates from, traverses or is destined for metropolitan areas, which act as major hubs in the global goods distribution network.⁴ As such, vehicles-kilometres for urban freight currently account for half of total road freight and are expected to grow further.⁵

Urban freight today is not always sustainable. It is responsible for a substantial share of CO₂ emissions.⁶ In the business-as-usual scenario, the environmental footprint of urban freight will continue to grow as it is impacted by fast urbanisation trends and the increase in direct delivery of products to households through e-commerce. The following estimates of goods generated in an urban context have been deduced from studies and analyses conducted for several urban areas: 0.1 delivery/pick-up per person per day; 1 delivery/pick-up per economic activity per week; between 300 and 400 freight vehicle trips per 1,000 persons per day; and between 30 and 50 tonnes per person per year.⁷ By 2025, cities are likely to be larger (60% of the world's population is expected to live in cities), information and communication technologies (ICTs) will be pervasive (more than 80 billion connected devices), and the online retail sector will have risen to nearly 20%⁸ of total retailing.

At the same time, consumers' expectations for shipping are rising. For example, a 2016 Deloitte study⁹ found that most consider "fast shipping" to be within two days, while just a year earlier most said it was within three or four days. Even as customers' expectations have increased, though, their willingness to pay for fast shipping has fallen, with 64% unwilling to pay anything extra for two-day shipping.

The trade-off between the economic advantages of an efficient and effective urban freight system and the various environmental disadvantages which may be generated to the detriment of the population is becoming ever more critical. Common action by cities, countries and companies is needed urgently if rapid progress is to be achieved.¹⁰



4. RPA-VREF (June 2016) Why Goods Movement Matters – <http://www.vref.se/download/18.1f1aa2af156b50867485a21/1471930162785/Why-Goods-Movement-Matters-ENG%20-%20June%202016.pdf>

5. OECD/ITF (2017) ITF Transport Outlook 2017 – <http://dx.doi.org/10.1787/9789282108000-en>

6. Smart Freight Centre (2017) Developing a Sustainable Urban Freight Plan: a guide – <https://www.smartfreightcentre.org/pdf/Developing-a-Sustainable-Urban-Freight-Plan-a-guide-SFC-Final-June2017.pdf>

7. Dablanc, L (2009) Freight Transport for Development Toolkit: Urban Freight. Transport Research Support – <http://siteresources.worldbank.org/INTTRANSPORT/Resources/336291-1239112757744/5997693-1266940498535/urban.pdf>

8. CIVITAS (2015) Smart choices for cities: Making urban freight logistics more sustainable – https://civitas.eu/sites/default/files/civ_pol-an5_urban_web.pdf

9. Deloitte (2017, June 28) The Future of Freight – <https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/future-of-freight-simplifying-last-mile-logistics.html>

10. CIVITAS (2015) Smart choices for cities: Making urban freight logistics more sustainable – https://civitas.eu/sites/default/files/civ_pol-an5_urban_web.pdf

Common action by Countries, Cities/Regions and Companies (3Cs)

Over the past few years, numerous (small-scale) projects and innovations have been developed or carried out with the goal of decreasing negative externalities of urban logistics. More structured strategies in favour of pollution-free urban freight are nonetheless often overlooked, with very few cities and countries having developed sustainable freight policies, dedicated programmes or partnerships with the private sector to address these issues.¹¹

In many cases, this is linked to an issue of perceived ownership: most national governments consider urban freight to be a local problem, which should be addressed by local authorities; many local authorities consider it to be a private sector problem, as it is generated by private commercial operations; and the private sector often considers it to be an infrastructure and regulatory problem, which needs to be addressed by national and local governments.

The state of affairs is reinforced by the fact that the current freight system works fine from an economic point of view: goods are delivered at a reasonable price due to the atomisation of the market structure, city logistics works efficiently, the stores are delivered to regularly, including fresh products, companies receive their supplies, e-commerce grows, etc. However, while these operations are carried out without obvious dysfunction, they come at a high social and environmental cost. In other words, the transition towards zero emission urban freight is driven by environmental concerns rather than a purely economic goal. Consequently and at least in the short term, the transition costs are likely to be high and not necessarily rational from an economic point of view.

As a result, the ownership of the issue of urban freight pollution is an overarching challenge. Moving towards a clean and efficient urban freight system would, however, have undeniable co-benefits for Countries, Cities/Regions and Companies, as they are all affected at different levels.

Country perspective: As cities are major centres for economic growth with the largest concentration of citizens, associated urban freight is important for national economies but causes negative externalities in its current form, especially on the environment and on public health.

City perspective: Freight is crucial to the functioning of the city and the wellbeing of its inhabitants. In managing urban freight, cities must cope with three main types of flow:

- the arrival of massive quantities of goods to the urban areas
- the discrete distribution of those goods to the end user at competitive cost
- flows linked to outgoing freight, including waste

Cities also struggle with the relocation and concentration of logistics facilities in suburban areas, also known as logistics sprawl, and are directly impacted by freight-caused congestion and air pollution.

Company perspective: Logistics service providers (LSPs) work in a competitive field with many supply chain actors, a high level of subcontracting, low margins and high social stakes, especially since the development of the recent Uber model for freight. Consequently, efficiency is key in the sector, as customers, located within the urban area, are now used to fast and flexible services at a low cost.

Meanwhile, shippers are impacted by the diversity of their supply chain needs, leading to major difficulties in innovation transferability and universality.

Efficient and clean urban freight would thus help companies anticipate changes in environmental regulations, including tax exemptions, subsidies and licences to operate. It could also help companies adapt to new working conditions, such as additional delivery times (e.g. at night) and could help ensure lower noise levels through the use of electric vehicles (EVs), lower maintenance and repair costs, lower energy costs thanks to green energy, and widespread acceptance by city inhabitants. As such, green freight opens new fields of positive differentiation (premiums for green).

In order to ensure that such co-benefits materialise through the widespread development of clean and efficient urban freight, a coordinated and harmonised approach among Countries, Cities/Regions and Companies is thus needed.

11. Smart Freight Centre (2015) Green Freight Programs Worldwide – <http://www.globalgreenfreight.org/resources/green-freight-10>

Methodology: A five-step process to facilitate joint action and risk alleviation

Many excellent methodologies already exist on the topic of urban freight decarbonisation, including ENCLOSE¹², which has good material for historic towns, the Smart Freight Centre 2017 methodology¹³ and others, which lays down the different steps towards the development of a sustainable urban freight plan.¹⁴ We will elaborate on the five-step process based on the TDA Manifesto¹⁵:



Step 1: Establish a firm "National Clean Freight Goal" involving all stakeholders in a spirit of irreversible commitment

An ambitious goal will help define the optimal desired future end state of urban freight. It is therefore long term in nature and may seem almost impossible to achieve. However, by being deliberately ambitious and requiring commitment, it acts as a focus to address the cities' challenges and helps to provide guidance and inspiration to key stakeholders. A possible example of a vision statement would be the GoGreen strategy motto of Deutsche Post DHL Group, entitled "Mission 2050: Zero Emissions".¹⁶

Step 2: Develop governance at Country, City and Company level to steer and monitor the transformation

It is necessary to ensure that coordination between the 3Cs lasts after the establishment of a common goal. Appropriate governance must be set up, drawing on what already exists in the Countries and Cities/Regions.

Step 3: Establish proactive pathways towards goals and bring as many concerned 3Cs as possible on the journey, to create momentum and emulation through competition

This step consists of translating the overarching vision of zero emission urban freight into concrete sub-goals that will help reduce emissions. They create direction and clarity for Countries, Cities/Regions and Companies to take more initiatives and accelerate the transition. Taking again the example of Deutsche Post DHL Group's GoGreen strategy, it clearly states the commitment of the Group to operate 70% of its own first-and last-mile services with clean solutions by 2025.¹⁷

12. ENCLOSE (2015) Energy efficiency in city logistics services for small and mid-sized European historic towns - <http://www.enclose.eu/content.php?p=61>

13. Smart Freight Centre (2017) Developing a Sustainable Urban Freight Plan: a guide - <https://www.smartfreightcentre.org/pdf/Developing-a-Sustainable-Urban-Freight-Plan-a-guide-SFC-Final-June2017.pdf>

14. PIARC (n.d.) A Guide to Implement Road Freight Transport Management in Urban Environment: PIARC Technical Committee B.4 Freight Transport and Inter-Modality - http://www.logistics.or.jp/jils_news/files/PIARC%20TCB4%20report%20Guide19709%2C2012R16-EN.pdf

15. Transport Decarbonisation Alliance - <http://tda-mobility.org/coi-fast-track/>

16. DHL GoGreen - www.dpdhl.com/gogreen

17. Other examples can be found at: 2013 Paris Charter for Sustainable Urban Logistics with its objective of having 50% delivery vehicles as non-diesel by 2017; the Gothenburg 2035 Transport Strategy for a Close Knit City; the 2014 Stockholm Freight Plan

This step aims to identify necessary levers and activities to create a tailor-made action plan to reach the pre-defined sub-goals and overcome the barriers. It should include an assessment of the role of each party (Country, City, Company) in order to reach the desired solution. A key element is also to decide which issues or goals should be prioritised and which timeline is envisioned, so as to decide what to do first (quick wins) and what to initiate and monitor for a longer period of time.

This step consists of a thorough understanding of the current situation of a specific actor or of a specific urban area with regard to urban freight, so as to better assess the efforts needed. This includes the evaluation of three main dimensions:

- **Dimension 1 – Freight activity and its impacts:** This dimension essentially focuses on painting a general overview of freight activity, for instance in terms of volumes or flows of traffic. It also includes an analysis of the drivers behind the transport demand, to understand the specificities of the different supply chains and their constraints, and an assessment of the key impacts to be addressed, whether in terms of congestion, pollution, road safety, transport efficiency or noise.
- **Dimension 2 – Challenges:** This dimension aims to identify the level of complexity of the challenges facing specific actors or specific areas with regard to urban freight: this could include demographic trends or consumers' changing behaviours.
- **Dimension 3 – Existing efforts:** This dimension focuses on the need to understand current efforts, projects and strategies, including plans underway.

Step 4: Unleash entrepreneurship and open pro-business initiatives to foster new services and new products

Unleash entrepreneurial spirit among stakeholders to foster innovation and business creation around the transformational project. Economic and fiscal solutions should be proposed to:

Allow more synergies between public and private solutions to boost innovation and quality of service, in all parts of territories, fostering healthy competition between new business models (from product to service) and other innovative solutions.

Encourage private investments and healthy competition via adapted economic incentives relying, for instance, on green fiscality to increase the returns of green investments.

Step 5: Broaden experimentation to very different 3C clusters to ensure solution robustness and maximum efficiency of innovation

To get to net zero emission urban freight by 2050 and align to the pathways up to 2025, cooperation between the 3Cs within national borders, using the method proposed above, will be essential. However, to ensure global impact and ensure agreement on major issues such as international transport, access to finance for transport decarbonisation, or the development of international methods and tools, cooperation is also needed beyond borders. Therefore, it will be essential to broaden the experimentation and take it to very different 3C clusters to ensure solution robustness. Learning from these different clusters can inform the overall solution and deliver maximum efficiency of innovation.



“Urban freight today is not always sustainable. It is responsible for a substantial share of CO₂ emissions. In the business-as-usual scenario, the environmental footprint of urban freight will continue to grow as it is impacted by fast urbanisation trends and the increase in direct delivery of products to households through e-commerce.”



Solutions to address challenges towards zero emission urban freight

Many solutions exist, others must be enhanced. Concrete solutions available for clean urban freight need to be deployed at scale under the 3C framework. Other identified solutions must be enhanced for future deployment at scale. Some of the challenges related to urban freight have been listed below along with identified solutions and best practices from around the world.

LEGEND

| | | | |
|---|---|---|---|
|  |  |  |  |
| Best Practice | Description | Actor | Pillar of transformation adressed |

Structure of the sector



LOW MARGINS AND UNDER-VALUATION OF TRANSPORT SOCIO-ECONOMIC IMPORTANCE AND COSTS

Low margins are an important challenge to urban freight decarbonization since they lead to a lack of capital for investments in "green" freight alternatives, such as LEVs or ZEVs. Low margins are the result of price pressures imposed to sub-contractors/operators bidding for the same contract and of consumer expectations of free delivery or low-price deliveries. As a result, freight transport is not valued at its right price.

Identified solutions

Minimum bidding price for "green" fleet

Work with operators to reach an agreement on a minimum bidding price to secure a margin that allows companies to invest, if such margins are invested into a "green" fleet.

Company / City

Adapt economic rules of transformation

Financial incentives for green freight

Economic rules should encourage the use of green freight alternatives. Feebates is a system of charges and rebates whereby energy-efficient or environmentally friendly practices are rewarded while failure to adhere to such practices is penalised. Financial incentives, including tax cuts or subsidies and/or regulations penalising polluting vehicles allow for factoring in of the socio-economic cost of different freight options.

Country

Adapt economic rules of transformation

In practice

Incentives in Portugal

Following the trend from recent years, electric vehicle purchases in 2019 are subsidised by the central government, including:

- EV 100% electric, including freight: €3,000 (private) or €2,250 (companies)
- electric motorcycles: €400
- electric bicycles: €250

For the time being, electricity is free of charge in public slow and semi-fast chargers. Within Lisbon, EV parking is being offered for free.

Subsidies and privileges in Rotterdam

Rotterdam has subsidies and privileges for zero emission vans and trucks. Many entrepreneurs from the city and surrounding area use vans for business transport needs. To promote the purchase and use of electric vehicles, the following privileges are offered:

- a €5,000 grant for the purchase or lease of a fully electric van
- electric taxis, private buses and trucks can travel on 19 bus lanes in the city, avoiding congestion delays
- more loading and unloading times in pedestrian areas, which have restricted access for vehicles

Île-de-France region subsidies

Subsidies are offered for alternative fuel vehicles (electric, gas, hydrogen), with limits according to the type of vehicle (up to €9,000 for vehicles > 3,5 T):

- Paris – subsidies for alternative fuel vehicles: 15% of the price of the vehicle with some limits (up to €9,000)

The Netherlands subsidy scheme

The Demonstration scheme on Climate Technologies and Innovations in Transport (DKTI-Transport)¹⁸ focuses specifically on entrepreneurs and partners in the transport chain who want to invest in low carbon solutions. The goal of the programme is to accelerate the transition to low carbon energy carriers in transport – such as electricity, hydrogen and advanced biofuels – by supporting the development of low carbon vehicles and vessels, and the deployment of the corresponding charging and refuelling infrastructure. The programme supports the development and demonstration of innovative low carbon technologies and solutions in real-life situations. Grants are provided for living labs, experimental development and feasibility studies. The programme also co-finances charging and refuelling infrastructure. The solutions that will be supported are innovations that are not yet ready for market introduction, but nevertheless have a strong business case and are viable in the long term. In the first round of the programme in 2018, 33 projects were granted a subsidy of €32 million in total. The second round of the programme will be launched in the spring of 2019 with a subsidy budget of €30 million.

¹⁸ Demonstration scheme: Climate Technologies and Innovations in Transport – www.rvo.nl/DKTI-Transport



HIGH MARKET FRAGMENTATION WITH OWN ACCOUNT TRANSPORT

The urban freight sector is often highly fragmented with a lot of small individual businesses. Own account transport is commercially invisible but its importance in urban freight is significant, as it is estimated to represent half of urban deliveries.

Identified solutions

Mutualised management demand and capacity platforms enabling increased efficiency and effectiveness

Freight matching platforms that seek to match a vehicle's load capacity with nearby companies who are looking to ship goods. This will allow for increased efficiency and effectiveness, and make urban freight cheaper and more sustainable.

Company

Rely on digital tools to create shorter and smarter supply chains

Delivery as a service for businesses

As businesses encounter more and more difficulties delivering their own goods in urban areas, due to congestion and restrictions, new players enter the market and goods are delivered by a third party. Smart software supports these new third-party deliveries and they are tailored to the needs of the specific product.

Company

Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

In practice

Temperature-controlled cargo bike in the Netherlands

TringTring specialises in supplying hospitality companies in the centre of large cities. As pioneers in the field of transport by cargo bike, they have been working for years on solving an ever-increasing logistical problem: city centres becoming car-free. By building smart software, choosing innovative means of transport and opening strategically located hubs, they can offer a service in the city that no delivery van can compete with. They are proud to transport products for many renowned producers every day.¹⁹

Construction consolidation centres

They are appropriately located distribution facilities, where multiple bulk material deliveries are stored and transported to construction sites. They offer opportunities to improve operational efficiency, which results in reduced congestion and delays, and improved safety. Materials are delivered from suppliers, checked and held in the centre, and stock is then picked and packed into consolidated loads as required. Vehicles can then be used to bring waste, damaged goods, pallets and stillages back to the consolidation centre on the return journey.

Construction consolidation centres benefit developers, contractors, local authorities and society by reducing congestion and delivery costs, increasing supply security, reducing likelihood of project over-run, lowering the environmental impact of development sites and improving safety.²⁰

Copenhagen

The Danish city established an urban consolidation centre that takes inwards deliveries of non-food items from Monday to Friday between 07:00 and 16:00. These are delivered to end users using zero emission vehicles. Retailers are charged a monthly subscription fee and operations are subsidised by Copenhagen's local authority by approximately 40%.



19. TringTring - <https://tringtring.nl/over-tringtring.html>

20. Transport for London (TfL) (March 2019) Freight and servicing action plan: Making London's streets safer, cleaner and more efficient - <http://content.tfl.gov.uk/freight-servicing-action-plan.pdf>

Challenge **3**

MANAGING CONSUMER EXPECTATIONS

The boom of e-commerce has led to the fragmentation and increase in frequency of deliveries, making it difficult for logistics firms to efficiently consolidate shipments. While this renders last-mile logistics increasingly unsustainable, there are very few incentives for consumers to reduce the number of deliveries they receive.

Identified solutions

Green choice for customer/citizen

 Procurement in city logistics, e-commerce and home deliveries can change when the customer is given the choice of a greener alternative. Consequently, raising awareness at the customer and citizen level is a particularly powerful lever for decarbonised urban freight promotion.

 Company / Citizen and Customer

 Develop decentralised mobility and decentralised energy systems simultaneously

Automated locker boxes

 Goods are delivered to locker boxes and recipients can collect them at a time convenient for them. This is a more efficient process for delivery companies because it allows for higher productivity with fewer vehicles. Locker boxes are typically positioned close to additional services and facilities, allowing the customer to collect their goods at the same time as completing another errand, thereby eliminating the last-mile delivery. Removing the need for someone to be on hand to receive the delivery also opens up options for delivery companies to move distribution to non-peak hours, hence further increasing road capacity. This freight mobility solution is expected to grow alongside new business models, such as free delivery to locker boxes, community-based logistics solutions etc.

 Company

 Rely on digital tools to create shorter and smarter supply chains

Merchandise pick-up points

 Merchandise pick-up points would ensure it is no longer necessary to go to the city by car for big purchases. The idea is to install merchandise pick-up points at accessible locations like railway stations where people can pick up their purchases. Urban freight traffic could be limited by storing goods at or near the pick-up point instead of in the centre. This straightforward solution could have wide-ranging positive impacts on congestion, noise, the distance freight has to travel and the ease for urban customers to collect city-bought goods. With merchandise pick-up points in metro or train stations, rail could also be used to transport goods to these pick-up points, which would reduce the number of trucks.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Micro-distribution

 Smaller, more sustainable vehicles provide new freight mobility possibilities for last-mile delivery. In order to ensure fitness for purpose, implementing companies need to have a clear picture of delivery patterns and the type of packages being delivered. This will ensure that productivity measures are being maintained while also delivering against key indicators such as reducing overall air and noise pollution. The logistics market is a key target market for makers of micro-mobility vehicles; interest and uptake in this mobility solution is forecast.

 Company

 Develop decentralised mobility and decentralised energy systems simultaneously

Local urban delivery platform

 Fully automated online or app booking platforms offering anything from any retailer or restaurant in under an hour in city centres have recently seen a boom. This service is essentially offered by new entrants financed by venture capitalists. Large retailers are following this trend, starting to offer same-day delivery. Such delivery systems rely on bikes, cars and scooters to achieve their promise. The benefits are a faster service, with increased convenience, and indirectly providing more pleasure for end users (better answer to their needs). Also, creating a new service/market is an opportunity to create more jobs.

 City / Company

 Develop decentralised mobility and decentralised energy systems simultaneously

Individually optimised transport solution

 Customised home delivery options would enable consumers to determine when deliveries are shipped, with options to reroute and change timeframes. Advances in technology and systems to accommodate real-time preference changes now exist, and they deliver benefits both to customers (less time spent waiting for goods to arrive) and logistics companies (fewer return trips due to pick-up failure). Such systems, where implemented correctly, deliver against convenience, flexibility and efficiency indicators. Services are developed but will become more refined over time, and can be expected to become more intelligent/collaborative in the future.

 Company

 Rely on digital tools to create shorter and smarter supply chains

In practice

Merchandise pick-up points

Amazon has installed lockers for consumers to collect purchases at Gare Saint-Lazare in Paris. Amazon, along with Gares & Connexions, a subsidiary of SNCF, is expected to deploy 1,000 bins in 980 stations in France.²¹

Automated locker boxes

German 'Packstations' have been in action since 2001, with Deutsche Post DHL Group (DPDHL) starting this business almost 20 years ago. The company now runs some 3,500 locker boxes in Germany alone.

Deutsche Post DHL Group "climate neutral" – Green choice for customer/citizen:

Calculating carbon footprints of products and services creates transparency for customers. Offsetting the emissions caused by their shipments gives consumers a choice to go for climate neutral consumption. DPDHL offers these choices to business and private customers through its GoGreen program²² worldwide. Climate neutral shipments can be achieved either as an additional service or as a standard feature within the delivery process. Offsetting is realised by various climate protection projects, including DPDHL's own cooking stove project in Lesotho. All projects in the portfolio are Gold Standard certified. The whole process is verified by an external certification body.

Green delivery "Bewust Bezorgd"

The Dutch e-commerce sector is the first sector to commit to the climate agreement with the aim of reducing CO₂ emissions by 50% by 2025 compared to 2018. The Bewust Bezorgd calculation tool helps deliver packages to consumers even more efficiently, calculating the most sustainable delivery option. It also has a user-friendly tool for online retailers to link this to their own website via the Bewust Bezorgd logo. There is a separate page with information for consumers.

21. Gazzola, I (June 20, 2018) Les Amazon Lockers s'implantent dans les gares françaises – <https://www.voxlog.fr/actualite/3022/les-amazon-lockers-s-implantent-dans-les-gares-francaises>
22. DHL GoGreen – www.dpdhl.com/gogreen

Challenge **4**

LACK OF KNOWLEDGE ON THE TOPIC OF URBAN FREIGHT

The lack of transparency and knowledge exchange among urban freight stakeholders, for instance between cities and companies, makes it difficult for all parties to understand each other's challenges.

Identified solutions

Lightbulb **Labelling and certification programme**

Magnifying glass Implementing a labelling and certification programme could help educate consumers about the environmental costs and impacts of different delivery scenarios.

Person Country

Column Adapt economic rules to transformation

Lightbulb **Standardised measurement methodology**

Magnifying glass One standard measurement methodology for both government and industry in freight transport would help communication and implementation.

Person Country

Column Harmonise regulations related to charging or filling, and to emission standards

Lightbulb **Dissemination of this whitepaper and other relevant documents to 3C stakeholders**

Magnifying glass Solutions exist and this needs to be communicated to 3C stakeholders. Information on these solutions will help stakeholders to evaluate their options.

Person Country / City / Company

Column Position Cities/Regions at the forefront of transformation implementation

Lightbulb **More (online) low threshold courses for practitioners**

Magnifying glass Besides the academic courses being offered by universities and colleges, there should be a broad offer of (online) courses aimed at those currently working in the sector.

Person Country / City / Company

Column Develop new mobility and energy curricula in universities, with associated R&D and workforce training

In practice

GLEC Framework²³

is the leading methodology for freight transport. It allows companies to consistently calculate their GHG footprint across the global multimodal supply chain and inform their business decisions and efforts to reduce emissions. The GLEC Framework:

- can be implemented by shippers, carriers and logistics service providers
 - covers all modes of transport and transshipment centres across the global logistics supply chain
 - combines existing standards and methodologies
 - is built on the Greenhouse Gas Protocol Mark
- Leading multinationals including DB Schenker, Deutsche Post DHL Group, HP Inc, Kuehne + Nagel, Hewlett Packard Enterprise, GEODIS, Damco and Fret SNCF have already committed to adopting the GLEC Framework, leading the way for adoption across the industry.

Free online courses from edX

There are many free online courses on this platform. Courses are developed in collaboration with the best universities worldwide and can be followed at one's own pace. For example, **Sustainable Urban Freight Transport: A Global Perspective**. Learn key strategies for optimising urban freight transport based on recent developments in market understanding, vehicle technology and cooperative ventures.²⁴

LoCITY expert forums and free tools, London

During the forums operators can share their experience, highlight best practice and seek impartial advice. There are also live vehicle events, which are an excellent way to influence fleet managers, enabling them to see the vehicles and talk to those already running them. New tools include an online training course for drivers and fleet managers, a commercial vehicle finder tool with information on fuel technology, a fleet advice tool, and a facts and fiction toolkit that contains toolbox talks, videos and a best practice guide. The LoCITY approach has been successful in engaging new audiences, and has been replicated by other cities across the UK.²⁵ All LoCITY events are free to attend. The three industry working groups meet regularly throughout the year and focus on vans, heavy goods vehicles (HGVs), and waste and construction.

23. Global Logistics Emissions Council (GLEC) – <https://www.smartfreightcentre.org/en/smart-freight-glec/>

24. edX – Sustainable Urban Freight Transport: A Global Perspective – <https://www.edx.org/course/sustainable-urban-freight-transport-a-global-perspective>

25. For more information or to register for an event, visit locity.org.uk or contact LoCITY@tfl.gov.uk

DIVERSITY OF SUPPLY CHAINS AMONG SHIPPERS AND RECEIVERS

A one-size-fits-all solution is not possible when it comes to developing green freight for companies. Consequently, solutions must always be designed to fit the diversity of supply chain needs.

Identified solutions

Bike couriers

 Bike couriers deliver and transport parcels or goods with a low volume or weight. Such a mode of delivery is proven to be fast and reliable within congested urban areas, as couriers can go quickly from one place to another in the city. It also contributes to more diversity in mobility and impacts noise and air pollution levels, since cycling is more environmentally friendly. This solution is most appropriate in cities with an already existing bike lane network, as mixing bike couriers with other vehicles in traffic might have a negative effect on safety.

 Company

 Catalyse movement towards long distance non-motorised mobility (inter, intracity and regional)

City distribution by boat

 Freight traffic is a problem in the old city centre of Utrecht. The city has started taking advantage of the centre's good accessibility by waterway, developing waterborne freight distribution. Filters should be installed on the boats to remedy the negative effects of air pollution, or zero emission electric vessels could be used. Such a solution could be envisioned on a broader scale for cities encountering similar issues.

 City / Company

 Impulse movement towards multimodal solutions for freight

Mobile depots

 A trailer/truck fitted with all depot facilities (e.g. loading docks, labelling, data entry) carries deliveries to a transshipment area. This is more convenient for the consumer as it allows them to collect the delivery at a time that suits them, reducing missed deliveries. It also consolidates the delivery of goods to fewer locations (e.g. stations/public land uses) and thus eliminates some delivery calling points.

 City / Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Co-modality

 Co-modality consists of capitalising on an existing railway infrastructure (metro, mainline, etc.) to transport not only vast numbers of passengers but also goods, with minimal add-on costs. It either uses the spare freight capacity of third-party service providers or runs freight vehicles on those infrastructures during available time-slots.

 Country / City / Company

 Impulse movement towards multimodal solutions for freight

In practice

Paris, 18ème Chapelle International²⁶

This large architecture project is being built on the site of a former rail station. Some 45,000 m² will be dedicated to a multimodal logistics hotel that will include an urban railway terminal for the transport of goods to food supermarkets, clothing stores and housing, an urban space distribution centre (EUD) for urban express mail, a business incubator and a school for professional training in logistics.

Development of light electric vehicles in the Netherlands

Businesses are finding clever ways to capitalise on the development of light electric vehicles. In Amsterdam, Albert Heijn – the largest supermarket chain in the Netherlands – delivers customers' groceries to their kitchens using electric cargo bikes from Urban Arrow. Online supermarket Picnic and parcel delivery services DHL and PostNL are also using various types of light electric vehicle. Major Dutch bicycle brands such as Gazelle, Batavus and Sparta have developed dozens of electric bicycle models. QWIC has even chosen to specialise exclusively in the manufacture of high-quality electric bicycles, with more than 350 outlets across the Netherlands, Belgium, the UK and Germany. Ebretti and Bolt Mobility are developing electric scooters for the consumer and corporate markets, while food delivery service Thuisbezorgd.nl (Takeaway.com) now delivers all its orders by electric bicycle.

Shared passenger-cargo-tram in Frankfurt

The German city of Frankfurt recently announced a pilot to employ a shared passenger-cargo-tram to deliver goods. Other examples of such intermodal transport using trams exist in Switzerland to transport garbage, in France to transport goods to supermarkets, and in the German city of Dresden to supply materials to the Volkswagen car factory.

²⁶ Sogaris – Paris 18ème Chapelle International – <http://www.sogaris.fr/plateforme/paris-18eme-chapelle-international/>

Webshop Wehkamp in the Netherlands is constantly looking for new sustainable distribution solutions, so they started delivering by bicycle together with DHL and Fietskoeriers.nl. Customers of online supermarket Picnic can also give their Wehkamp returns to the deliverer of their groceries. The Wehkamp packages are also cut to size, saving space during transport and therefore CO₂ emissions.

Lisbon, Portugal

Chronopost has set a different example, using cargo bikes to do last-mile deliveries in the city.

DHL Express is operating cargo bikes in more than 12 countries, in about 60 cities and on more than 100 routes. In the Netherlands alone, DHL Express is operating more than 10% of DHL routes with cargo bikes. These bikes replace vans for inner city deliveries and can be combined with city hub concepts.

City distribution by boat

PortLiner has provided the first fully electric inland vessels in the Netherlands, Belgium and Germany. They are developed and built in three different classes by PortLiner, which wants to be a game changer for sustainability in its sector. The small vessels are equipped with a lithium battery pack a similar size to a 20-foot container. This provides a range of 15 hours. The larger ships have four battery packs on the deck, good for 35 hours of sailing. There is room for 270 containers on board. This makes them suitable for specific shipping routes, for example for the transport of bulk shipments and containers between De Kempen and Antwerp

DHL Express Netherlands operates in a multimodal way

DHL Express in Amsterdam operates an unconventional logistics chain. First, shipments arrive at Amsterdam's Schiphol Airport, then electric vans take them to Amsterdam. This means zero emissions on the 22 km journey from the airport to the city. Once in the city, the logistics chain becomes more unconventional. At a dock, shipments are transferred onto a specially adapted boat, the DHL Express floating service centre. They travel down Amsterdam's iconic canals to an inner-city micro depot. From there, cargo bikes take the shipments to their destination. A multimodal, emissions-avoiding link in the last-mile transport chain

Modal shift to rail, London

Rail is well suited to removing large volumes of bulk materials from roads. Between 2013 and 2015, Crossrail, as part of its tunnelling project, transported 1.9 million tonnes of spoil. The equivalent of 95,000 trucks were removed from the London road network.



Ownership issues



URBAN FREIGHT PLANNING

Only a few cities have comprehensive urban logistics strategies or have the correct tools, but most are not making comprehensive use of the available tools. Freight is often seen as a private sector issue and more needs to be done by cities and countries to take ownership of the issue, but companies remain an important stakeholder in urban freight planning for cities

Identified solutions

National freight decarbonisation plan

 Designing and implementing a national freight decarbonisation plan could help countries define their strategic vision. It could show every actor involved in freight, and more particularly urban freight, the right direction to take.

 Country / Regions

 Position Cities/Regions at the forefront of transformation implementation

Land use planning policies

 Land use planning policies can make a major contribution to the development of adequate parking spaces for freight vehicles in urban areas. In particular, the developers of any new office or retail development in urban areas should be required to plan for freight activity, with the development of off-street loading/unloading bays for new developments over a certain size.

 Country / City

 Position Cities/Regions at the forefront of transformation implementation

Green urban planning

 Urban planning should consider freight elements, with the goal to limit logistics sprawl and to promote the re-location of logistics facilities in city centres.

 City

 Position Cities/Regions at the forefront of transformation implementation

Diversified driving licence legislation to promote ZE vehicles

 In many EU countries, the type of driving licence you need for a specific vehicle is linked to the weight of the vehicle. With ZE vehicles weighing more due to battery packs, the current sizes no longer correspond to the weight classes. The driving licence required no longer corresponds with the size and use of the truck.

 Country

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Multi-purpose use of space

 Multi-purpose parking spaces, loading and unloading docks and other open spaces can help bring efficiency in land use within cities.

 Cities

 Position Cities/Regions at the forefront of transformation implementation

Sharing city hubs and warehouses

 Business solutions can be deployed to support sharing physical infrastructure at warehouses and city hubs. Technology tools and platforms can improve efficiency by ensuring optimal use of physical assets. This can be done without the need for regulation.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Sharing fleets

 Business solutions can be deployed to support sharing fleets. Technology tools and platforms can improve efficiency by ensuring optimal use of fleet vehicles.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

In practice

European Union template Sustainable Urban Mobility Plan (SUMP)

The EU offers a broad range of tools, templates and best practice guidelines. The concept describes the main features of a modern and sustainable urban mobility and transport plan.²⁷

Utrecht

The Dutch city introduced a scheme that restricts the number of vehicles in the city centre pedestrian zone to five at any one time. Goods are delivered to urban distribution centres and distributed in the city using electric vehicles with trailers called cargo hoppers.

London *Freight and servicing action plan*²⁸

This action plan sets out how the industry can continue to meet the freight and servicing needs of London's growing population and economy, while reducing the number of trucks and light commercial vehicles entering central London during the morning peak by 10% by 2026. Stakeholders will work together to scale up these examples of best practice. It also shows how they will protect land for logistics so space will be available for consolidation. Having depots in the right places will reduce the miles travelled by freight vehicles. Local planning policies can ensure that deliveries and servicing are planned into developments from the start. There are many competing demands for space in this growing city. City Hall, Transport for London, the boroughs and the freight industry will work together to make the best decisions about how this space is used.

Lisbon regulation

Lisbon has regulations, but enforcement is very difficult, as enforcement officers struggle to know if a certain parked vehicle is being used for loading/unloading (L/U) or not

Driving licence exemption for ZE vehicles

The Netherlands will start a trial with exemption from driving licence C for emission-free delivery vans. Drivers with a single driving licence B may take a delivery van with a maximum weight of between 3,500 kg and 4,520 kg (which normally requires a driving licence C). This pilot runs from 2019 to 2022. Drivers of the adapted delivery vans take an additional course in addition to the B licence.

Roma ZTL

Delivery vehicles in Rome need a permit to enter restricted traffic areas (zona a traffico limitato, or ZTL) for loading and unloading. Loading and unloading in the ZTL Merci (includes ZTL Centro Storico) and ZTL Trastevere is allowed for a maximum of 30 minutes. Access time slots depend on the weight, power and Euro standard of the vehicle.

Budapest Freight Transport Strategy

There are 15 restricted and 11 protected zones in Budapest to mitigate damage to the environment, improve quality of life for Budapest's residents and protect certain areas. The freight access system optimises goods delivery to reduce road traffic and both air and noise pollution. An online access system calculates a charge to be paid in proportion to a vehicle's total weight. In the interest of environmental protection, users of higher emission vehicles pay a higher charge.

City Hub.nl

This is a smart logistics platform for bundling and cooperation in the supply chain. With intelligent white label distribution centres on the outskirts of the city, City Hub wants to relieve inner cities of traffic congestion and air pollution. Different orders are collected at the distribution centres and transported to the centre with a wide range of zero emission transport vehicles. There are currently City Hub branches in Amsterdam, Utrecht and Roermond, with plans to expand to other Dutch cities, creating a national network. To achieve this goal, they work closely with landlords, franchisers, transporters and shippers. City Hub provides logistic service providers, shippers and customers with a flexible pay-per-use solution for sustainable urban logistics. Cooperation is based on My Green Connection, a multi-use IT platform for optimising urban logistic flows and with multi-purpose dashboards.

Urby – Groupe La Poste

This is a global system of urban logistics based on pooling and optimising deliveries. From several sites, Urby offers urban storage and delivery services to carriers, messengers, traders, artisans, communities, businesses and individuals, using low emission vehicles and bikes. The Urby network is operational in seven French cities: Grenoble, Toulouse, Lyon, Montpellier, Clermont-Ferrand, Saint-Etienne and Bordeaux.

Avoid construction and waste traffic with on-site reuse

Transport for London supported on-site recycling during demolition and construction at 19–23 Blackfriars Road, London. As a result, demolition material was crushed on site and stored for use as the piling for the new development. This saved 1,633 tipper movements to and from the site.

Bwala Africa in Kenya

This is a collaborative logistics platform. It reduces the number of empty truckload returns by connecting various private truck drivers to cargo owners at delivery locations. It also offers

27. Eltis (March 22, 2018) The SUMP concept - <http://www.eltis.org/mobility-plans/sump-concept>

28. Transport for London (March 2019) Freight and servicing action plan: Making London's streets safer, cleaner and more a - <http://content.tfl.gov.uk/freight-servicing-action-plan.pdf>

MARKET INERTIA

Some companies only respond to the minimum requirements set by regulations or customers.

Identified solutions

-  **Business models for monetary value to CO₂ emissions**
-  New business models are often not scaled up because there is no common vision on what the solutions should be, with each stakeholder working separately on the same issue. There is a need to develop rules and tools to measure and quantify the impact of green solutions through a commonly agreeable framework that would fill in the gaps of existing methodologies.
-  Company / Country
-  Harmonise regulations related to charging or filling, and to emission standards

-  **Promote the champions**
-  Some companies are very active and have a motivation to accelerate the transition. These companies can be applauded and used as good examples for the rest of the sector.
-  Company
-  Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

-  **Lead by example**
-  Companies should lead by example by adopting electrified vehicles and showcase their adoption to peers.
-  Company
-  Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

In practice

Deutsche Post DHL Group (DPDHL)

As part of its corporate responsibility strategy, is generating value for business and society with its GoGreen program. With "Mission 2050: Zero Emissions" the company aims to reduce their logistics-related emissions to net zero by 2050. To ensure they achieve this target, DPDHL has set four interim goals for 2025. One of these targets is called "Local Target", with the aim to improve quality of life in cities by operating 70% of their own first and last mile with clean solutions, such as (cargo) bike delivery and electro-mobility. In 2014 DPDHL acquired StreetScooter, a company that developed fully electric delivery vehicles. Since then the StreetScooter vans have been deployed in DPDHL's delivery fleet and also sold externally. At present, the Group is already using more than 9,000 of these vehicles, which have covered more than 56 million kilometres and save around 27,000 tons of CO₂ per year.

PostNL's ambition is to deliver emission free in 25 Dutch inner cities by 2025. As part of this, the logistics service provider has already replaced more than 60 car journeys in Amsterdam with electric cargo bikes. Leeuwarden is the first city centre where PostNL delivers emission free. In 2018, the company replaced all vehicles with electric delivery vans and small vehicles. The packages are delivered from a central transfer point in the city. PostNL is also focusing on completely emission-free delivery on the Dutch Wadden Islands. On a weekday, they deliver an average of 800,000 packages and 7 million letters in the Benelux region. Based on its climate objectives, the company is committed to a transition to sustainable transport.

La Poste

It has the world's largest fleet of electric vehicles. Every day, their drivers travel the equivalent of five times around the Earth in electric vehicles (cars and quads). The company's objective is to become the reference operator in terms of responsible urban logistics, reduce its CO₂ emissions per household served by 20% (between 2008 and 2020) and improve living conditions for the drivers.



Challenge **8**

EMPHASIS ON PASSENGER TRANSPORT VIS-À-VIS URBAN FREIGHT

More emphasis is currently put on passenger transport decarbonisation but freight, and more specifically urban freight, has an important role to play in this respect

Identified solutions

💡 Priority lanes for clean goods vehicles

🔍 Priority lanes for clean goods vehicles allow those that meet a pre-determined standard to use priority lanes. Vehicles running only on locally produced biofuels could also be considered as clean. The implementation is decided by local government. As the measure prioritises clean vehicles, emission levels and total traffic demand decrease. This solution can have adverse effects on congestion if using public transport lanes.

👤 Country / City

🏛️ Position Cities/Regions at the forefront of transformation implementation

💡 Priority for trucks at certain intersections/truck platooning

🔍 The ultimate objective is to reduce energy usage and CO₂ emissions by trucks in cities by 25%. The general idea is that cities will give priority to trucks at certain intersections (on certain roads and/or certain times of day) and provide this as an incentive to truck fleets that implement speed limiters and provide eco-driving support to their drivers. This is achieved through a system of communication between traffic lights and trucks as well as "in-car" systems that encourage efficient driving. In addition, cities will also provide systems to dynamically book and re-schedule delivery spaces.

👤 City / Company

🏛️ Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

In practice

ZE trucks use bus lanes in Rotterdam

Emission-free vehicles like taxis, private buses and freight transport in Rotterdam can apply for the shared use of 19 open and suitable bus lanes in the city

Truck platooning in the Netherlands

With truck platooning, lorries are electronically linked to each other, with the front truck determining the speed and route. The other trucks follow automatically, without the help of the driver being needed. The Netherlands invests a lot in the new technology. In 2015, truck manufacturer Scania was the first to test the system on Dutch roads, and there was large-scale testing in 2017. The European Automotive Telecom Alliance (EATA) also wants to start a pilot for truck platooning. Germany has also announced a major practical test





Challenge **9**

FEAR OF SHARING DATA BETWEEN COMPANIES AND CITIES

Achieving data transparency in the logistics chain and between companies and cities without interfering with competition between logistics companies is difficult. Although data about freight in cities is broadly collected by individual parties in Europe, especially as a lot of delivery vehicles are GPS-tracked and piloted, such data is rarely accessible by public authorities. Meanwhile, in American cities, data on truck and van movements is almost non-existent. Furthermore, measuring freight traffic separately from passenger transport can prove difficult, while GPS data is insufficient to understand the drivers of urban transport demand.

Identified solutions

-  **Neutral, trustworthy platform for data sharing**
-  A neutral, trustworthy platform is needed where information can be shared without being fully available to the public. Accessing the platform would only be possible if entities also share their own data. No judgement or ranking should be made – the goal would be to improve and enable green procurement.
-  Company / City
-  Rely on digital tools to create shorter and smarter supply chains

-  **Freight transport delivery mapping**
-  Freight transport delivery mapping is an ICT system that directly maps field freight transport terminology to exact transport operational actions. Most diverse large fleets will usually have a large urban component, and by not having good support ICT systems large fleet and operational inefficiencies can easily develop. This best practice system is integral for both existing and future urban transport operations, while fostering the achievement of urban operational efficiencies and sustainability targets. This indirectly results in fewer freight vehicles and thus a decrease of total traffic demand, better fuel efficiency, less air pollution and less noise.
-  Company / City
-  Rely on digital tools to create shorter and smarter supply chains

In practice

London open data

London's freight and servicing action plan opens up data to provide clear information and guidance on existing and planned restrictions and regulations across London. This can be used by operators and software developers to develop look-up tools.²⁹

29. Transport for London (March 2019) Freight and servicing action plan: Making London's streets safer, cleaner and more efficient – <http://content.tfl.gov.uk/freight-servicing-action-plan.pdf>

Challenge **10**

LACK OF COOPERATION AMONG ACTORS

Considering the complexity of urban freight dynamics and of the related challenges, the lack of cooperation between Countries, Cities/Regions and Companies (including logistics companies, shops and retailers) to tackle the problem may be a considerable barrier to the implementation of urban freight solutions.

Identified solutions

💡 Regional consolidation centre

🔍 A freight consolidation scheme is a measure where goods/ freight of participating retailers are bundled in order to transport them more efficiently. Collaboration between retailers, transport companies and the local authorities is required, and subsidies are necessary in most cases. The scheme is implemented in several cities with, for instance, a successful implementation in Bristol (United Kingdom). The freight consolidation scheme reduces conflicts between vehicles in loading areas and thus reduces the number of incidents. By reducing the number of vehicles, it directly reduces air pollution and noise levels, improves transport efficiency and lowers operational costs. With one transporter delivering, it is easier to define the delivery times.

👤 City / Company

🏢 Rely on digital tools to create shorter and smarter supply chains

💡 Green Deals between the 3Cs

🔍 A Green Deal³⁰ is a mutual agreement or covenant under private law between a coalition of companies, civil society organisations and local and regional government. The deal defines the innovative initiative, actions (in terms of quantitative aims or output, if possible) and input by the participants as clearly as possible. The Green Deal approach is an accessible way for companies, other stakeholder organisations, local and regional government and interest groups to work with central government on green growth and social issues. The aim is to remove barriers to help sustainable initiatives and to accelerate this process where possible. The Green Deal approach is one element in a standard range of policy instruments. It is used to supplement existing instruments, such as legislation and regulation, market and financial incentives, and measures to stimulate innovation. The Green Deal approach is particularly suitable when innovations are actually put into practice, a phase during which projects often encounter barriers. Green Deals bring central government closer to companies, stakeholder organisations and interest groups. They give government a more readily identifiable presence and the other players a clear point of contact.

👤 Cities / Countries / Companies

🏢 Position Cities/Regions at the forefront of transformation implementation

30. Green Deal - <https://www.greendeals.nl/english>



In practice

Charter for Sustainable Urban Logistics, France

A comprehensive guide produced by ADEME (the French Environment & Energy Management Agency) with the Ministry of Environment to encourage voluntary commitments from all parties: cities, shippers, logistics service providers, merchants, residents.³¹

Very few French cities have implemented a structured, cooperative process and actions to optimise urban logistics issues. A few have taken this approach (for example Paris, Lyon, Grenoble, Montpellier) but the vast majority (especially middle-sized cities) face a lack of resources and/or competencies to take a dynamic approach.

Three parts of the guide relate to cities:

- understanding urban logistics and its issues
- how to cooperate – understanding a city's individual circumstances
- action plan: 15 actions with indicators related to urban planning, individual cities' own tools and regulations, and collaborative actions

The guide is publicly available and the deployment of this approach to bring support to the cities is ongoing.

Green Deal Zero Emission Urban Logistics, Netherlands

Parties in the Green Deal Zero Emission Urban Logistics are logistics service providers, public authorities, knowledge institutions and manufacturers. All parties share the goal of urban deliveries with the lowest possible emissions by 2025, the ultimate aim being to reduce harmful emissions (CO₂, NO_x, particulate matter) due to urban logistics to zero. The parties are also striving to limit noise emissions. While today there is not yet any large-scale production of heavy-duty zero emission commercial vehicles, electric delivery vans are

³¹ ADEME (April 2018) Engagement volontaire en faveur de la logistique urbaine – <https://www.ademe.fr/engagement-volontaire-faveur-logistique-urbaine>

available. The first heavier, customised zero emission trucks are now in use. In addition, commercial vehicles with hybrid drive trains are in development whereby conventional fuel will be used on motorways, but for the “last mile” in the city zero emission technology can be used. The reduction of the number of vehicles needed to supply the city is also an important goal. Some goods are already being delivered in an efficient way, particularly those stocks whereby logistics service providers and companies have organised the (clustered) flow of goods well. Traffic for internet orders is also being significantly optimised by logistics parties, largely through making good agreements with buyers.

AYR Credits

CEiiA, in Portugal, has developed an agnostic mobility management platform.³² A worldwide benchmark, it is the first to account for the saved CO₂ emissions in real time – the technology has allowed CEiiA to place itself as a strategic partner of the United Nations. CEiiA and the city of Matosinhos are working together to create a sustainability token (AYR (Are You Ready) Credits) based on carbon emissions saved. This can be used as an incentive for companies and consumers to make sustainable decisions (environmental, climate and social), as well as to make companies cooperate in shaping an ecosystem of greener services and products. AYR Credits can be traded for new “green” products or services that stimulate the local economy based on sustainability. The concept is not limited to the creation of a tradable token – quite the opposite. It is the enabler to integrate sustainability into citizens' lifestyles, thus accelerating the transformation to a more sustainable economy. Based on blockchain technology, CEiiA has created a virtual wallet that allows users to store and manage AYR, as well as to make transactions and shares. AYR will be awarded as a reward for sustainable behaviour, such as using an electric vehicle, using a bicycle, using public transport or ordering a package to be delivered in a greener way. The objective is concrete: to democratise access to carbon markets through the valuation of carbon savings, thus allowing anyone to transact the value of their sustainable behaviour.

³² Mobility management platform (developed by CEiiA) – mobi-me



Lack of economically efficient solutions

Economic vehicle options are very limited and charging infrastructure is sparse, especially for use by urban freight providers. Latent demand may exist, but it needs to be showcased to get manufacturers to launch new products and charging infrastructure providers to invest in charging infrastructure.



LACK OF ECONOMICALLY ATTRACTIVE VEHICLE OPTIONS FOR SMOOTH TRANSITION

Offers to provide freight EVs on a large scale currently remain non-existent.

Identified solutions

Financial incentives for acquisition of clean freight vehicles

 Financial incentives, including tax cuts or subsidies, could be developed to encourage the use of green freight alternatives by shipping companies but also to support the acquisition of clean freight vehicles for logistics service providers.

 Country

 Adapt economic rules to transformation

Research charging options for trucks

 Not only are the vehicles necessary, the charging infrastructure has to meet the needs of the customer in the specific area/route.

 Country / Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Showcase demand for more electric vehicle options for large-scale freight fleets

 Vehicle options need to be created to provide freight EVs on a large scale as they remain non-existent. Demand needs to be showcased to manufacturers so that relevant products can be created. This is especially true for freight vehicles.

 City / Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Support investments in public charging infrastructure

 Public charging infrastructure remains sparse and cannot support large-scale transition in its current form. Investments in public charging should be supported through incentives and regulations.

 Country / City / Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Low-cost electric tilting 3-wheel vehicle

 The development of an electric tilting three-wheel vehicle for freight offers new possibilities. This is through the integration of novel mechanical and electrical technologies in the arrangement of a vehicle for sustainable urban mobility. The vehicle retains the performance of a light internal-combustion vehicle with two or four wheels (acceleration, maximum speed, range) while exhibiting zero road emissions and superior manoeuvrability and stability.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Leasing (batteries) instead of purchase

 Some consumers are not yet ready to adopt EVs due to the relatively higher purchasing price of ZE vehicles, the perceived risk of the battery life and the maintenance. Therefore, leasing a vehicle or the battery can be a smart option. The benefit of a lease is that the monthly cost includes the vehicle (or battery), there is a guarantee on the battery's condition, and it can include vehicle maintenance and insurance.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Total cost of ownership as the new standard

 If public and private sectors can use total cost of ownership as the standard for all procurement decisions, zero emission vehicles will get a boost due to their low cost of operation. All public procurement tenders should strive for total cost of ownership as a new standard for an economic comparison between vehicle options.

 City / Company

 Adapt economic rules to transformation

In practice

Financial and fiscal stimulation in the Netherlands

In the draft climate agreement (Q1 of 2019) the following measures are described: Exemption of purchase tax and (national) road tax for zero emission vehicles until 2025 and lower surcharge on income tax for company vehicles compared to conventional vehicles until 2025.

Urban freight electrification roadmap for companies by Voltia, the Netherlands

Voltia is an e-mobility solutions provider which helps companies switch their light commercial vehicle fleets to electric – now. It offers customised roadmaps for companies looking to switch all or parts of their fleet to electric, and custom-made electric vehicles to address gaps in the last-mile urban delivery market. In the Netherlands Voltia provides vans “as a service”, where companies can lease a van and the monthly cost includes the van, service, maintenance and insurance.

Test side for truck-charging, the Netherlands

VDL, an international industrial and manufacturing company, has a test site for heavy electric vehicles such as trucks and buses. To allow different autonomous systems, solutions and loading equipment to communicate or collaborate with each other, the test loading area has a modular design. It has the most recent charging equipment from the most important suppliers that are linked to the various fast charging connections. In addition to the standard and liquid-cooled charging plugs, various pantograph solutions are available.

Smart Grid use by Picnic

The online supermarket Picnic is developing a Smart Grid. The pilot project will be the largest of its kind. The aim is to optimise Picnic’s energy use and design a scalable energy model that can be replicated by other businesses. They aim to maximise energy efficiency, source their electricity from 100% renewables and ensure that energy is used when supply is high and demand is low. A Smart Grid is an interconnected network between the energy consumer, energy storage and energy production. An energy management system includes a digital toolbox of self-learning algorithms, and demand is accurately planned, predicted and coordinated, while responding to changing production. As part of the pilot project, 160 electric Picnic vehicles will be equipped with smart batteries. These will harness energy harvested from the solar panels on the roof of a Hub.





Challenge

12

AVAILABILITY OF DEPENDABLE AND FUTURE-PROOF DECARBONISED INFRASTRUCTURE

An important challenge of urban freight decarbonisation is how linked it is to the “energy transition”. In this respect, collaboration among Countries, Cities, Companies and transport users could help tailor the energy network and its capacity to the needs of the city with regard to decarbonised urban freight, for instance through improved data sharing. This would help better distribute the investment burden and create opportunities for utility and energy companies.

Identified solutions

Renewable power procurement for vehicle charging infrastructure

 Penetration of renewable energy is increasing across the world. The need is to continue and enhance the momentum. The low cost of renewable energy to power mobility and increased demand for enhancing renewable energy capacities are both win-win propositions.

 Countries / companies

 Accelerate energy mix transformation

Fast charging tailor made for lorries and freight vehicles

 Charging infrastructure is still sparse, and largely non-existent for lorries and freight. To ensure that vehicle utilisation is high, investments in infrastructure needs to enable fast charging.

 Companies

 Harmonise regulations related to charging or filling, and to emission standards

In practice

Public fast charging network, Lisbon

Lisbon has a significant public charging network, but the municipality considers it is not enough. Therefore it will invest in at least 20 public fast chargers in 2019.

Opportunity charging by Heliox, the Netherlands

Heliox is developing chargers for opportunity charging, depot charging and small-fleet charging. During the day, Heliox can deliver 300 kW of capacity to bus batteries via its fast-charging pantographs. While the driver is enjoying a short break, the batteries are fully charged, and the buses are all set to drive another 100 to 200 km. At night, the buses are charged with a capacity of 30 kW in the depot, which means they can start their scheduled service with a full battery the next day. In May 2017, Heliox won a tender from Connexion for 23 x 450 kW opportunity chargers and 86 x 30 kW fast chargers for a new fleet of electric buses to serve Amsterdam's Schiphol Airport. Heliox is the market leader in opportunity charging for buses, and has been drawing international attention. They now offer a charger with a capacity of 600 kW. Buses all over Europe are charged using Heliox's chargers, and these numbers are continuing to rise. In order to keep up with the growth and demand for additional services, Heliox is working on an international network of mechanics, service technicians and other service providers.



Challenge

13

SOLUTIONS CAN BE DIFFICULT TO SCALE UP

Good solutions can sometimes fail to scale up due to financial constraints and lack of awareness and initiative from the demand-side.

Identified solutions

Zero emission (ZE) procurement

 Public authorities have a big role to play as “freight attractors” in cities (including construction orders and permissions). Public procurement typically represents 10–20% of gross domestic product (GDP) within EU member states, and the public sector is therefore a major market actor. Public procurement can thus be used as a strategic instrument for helping to meet specific policy goals of an organisation through its influence on supply chains, and not simply as an administrative function.

ZE procurement can be done on three levels:

1. Own fleet (cleaning trucks, buses, municipal vehicles)
2. Purchased transport service (buses, waste disposal etc.)
3. Delivery of goods, works and services (construction, office supplies, catering)

Furthermore, when defining procurement criteria, Countries, Cities/Regions and Companies could consider adding green freight criteria, for instance imposing that goods be transported using zero emission vehicles or with a set target of carbon emissions.

 Country / City / Company

 Adapt economic rules to transformation

Zero Emission Zones (ZEZ)

 A Zero Emission Zone is an area within a city where certain traffic restrictions apply due to the area's sensitivity to air pollution, noise and congestion. These areas usually feature apartment buildings, have streets used by pedestrians and cyclists, and contain parks or green areas. The implementation of Zero Emission Zones is essentially a political choice. With only clean heavy goods vehicles allowed in city centres, the total demand of traffic decreases and the actual emission level improves, while the noise level is also diminished.

 Country / City / Company

 Position Cities/Regions at the forefront of transformation implementation

Collective pre-order of freight low emission vehicles

 As a strong communal signal to the automotive industry, voluntary Countries, Cities or Companies could consider pre-ordering clean freight vehicles at the same time. Given that such vehicles are not yet widely available and manufacturers seem to be waiting for a signal from the market, this could help kick-start production.

 Country / City / Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

LACK OF LOADING AND UNLOADING SPACES

In practice

The city of Lisbon

leads by example and now has 100% of light duty electric vehicles. However, a lack of market options means freight fleets are difficult to change.

City policy in Amsterdam

aims to achieve as much zero emission traffic as possible by 2025, including zero emission transport. Becoming a zero emission city would not only help keep Amsterdammers healthy, but it would also significantly reduce the city's CO₂ emissions. To achieve this goal, the city government wants to have as many zero emission taxis and delivery vans on the road as possible by 2025. Municipal vehicles and tour boats must also be emission-free by that time.

Oxfordshire county, a Zero Emission Zone

Oxford City Council and Oxfordshire County Council in the UK have published updated proposals for a Zero Emission Zone (ZEZ) in Oxford city centre. The updated proposals follow 15 months of listening to businesses, residents, transport operators and health experts in Oxfordshire. They set a journey to zero transport emissions in Oxford by 2035. From 2020, the ZEZ will see restrictions on some vehicles and journey types, which will increase gradually to all vehicles in the following years.

London's Ultra Low Emission Zone (ULEZ)

has been in place in Central London from 8 April 2019 in the same area as the Congestion Charge. Most vehicles including cars and vans will need to meet new, tighter exhaust emission standards (ULEZ standards) or be liable for a daily charge to drive within the ULEZ area.

Collective European procurement project funded by the EU³³

The BuyZET project is a partnership of EU cities aiming to achieve zero emission urban delivery of goods and services, by understanding the transportation footprint and developing innovative procurement plans. The impact public procurement has on transportation patterns in cities is far reaching. Almost every product or service we buy leads to vehicle trips within cities – from waste collection trucks, to the delivery of office supplies; from bus services to road maintenance staff travelling to a work site. The BuyZET Priority Areas are the following:

1. Maintenance and repair service contracts (all cities)
2. Waste collection trucks (Oslo)
3. Consolidation of supplies (multiple goods) (Copenhagen)
4. Construction materials (Rotterdam)

Insufficient loading and unloading spaces result in difficulties transferring loads from a truck to a smaller vehicle, including bikes.

Identified solutions

 **Incentives to shift loading and unloading times to non-peak hours**

 Spreading out loading and unloading times, especially in non-peak hours and overnight, could ensure traffic fluidity. Incentives to encourage non-peak timing for freight movement could be coupled with traffic, parking and access regulations.

 City

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

 **Longer heavier vehicles (LHVs) or eco-combi**

 A huge disadvantage of using small trucks in cities and large trucks for transport outside cities is the handling necessary to transfer goods from one truck to another (and the resulting issues on liabilities and the extra costs). These handling activities are necessary in city distribution centres. Here, the idea of the decoupling location is that carriers (more specifically the truck drivers) decouple the trucks themselves. After decoupling, the truck can carry one city trailer to a store, return to the decoupling location and then make another delivery with the remaining city trailer. It is also possible to have the remaining city trailer picked up by another truck. To minimise total empty LHV-runs, the city trailers can also collect return loads.

 Company

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

In practice

The city of Lisbon

is proposing an increase in the number of loading/unloading bays. Furthermore, it is focusing on increasing efficiency, proposing a check-in/check-out scheme to increase rotation and facilitate enforcement. Lisbon is developing and implementing a new solution that will better enforcement and help mitigate specific traffic problems. This solution may consider three technology schemes:

- an App that will allow check-in/check-out and parking payments
- adapted parking meters that issue special tickets for 20 minutes of free loading/unloading
- sensors that detect the presence of a vehicle in the loading/ unloading bay and informs the control centre

33. BuyZET - <http://www.buyzet.eu/about/why-buyzet/>

Common urban issues



CITY CONGESTION, AIR QUALITY, CO₂ EMISSIONS, SAFETY AND NOIS

Enhanced customer expectations from e-commerce services and other demand drivers of urban freight in already congested cities will have a negative impact on city congestion, air quality, CO₂ emissions and noise.

Identified solutions

Congestion charging

 Congestion charging consists of making a restricted area accessible to users by paying a fee or a tax, usually within a city centre, as part of a demand management strategy to relieve traffic congestion within that area. The implementation of this solution is supported and actioned by governments to address traffic and its social costs, such as air pollution, noise, traffic accidents, and environmental and urban deterioration. It also addresses the extra costs and delays imposed by traffic congestion on other drivers when additional users enter a congested road. This actively promotes the use of other cheaper (operational and capital costs) and faster modes of transport.

 Country / City

 Position Cities/Regions at the forefront of transformation implementation

Free-flow tolling

 Free-flow tolling is an advanced electronic toll collection (ETC) system, based on gantries whereby users are able to drive through the toll plaza at highway speeds without having to slow down to pay the toll. Incorporating this solution to replace physical tolls improves transport efficiency and reduces travel time. Not having to stop at tolls reduces congestion and is more fuel efficient for vehicles, and indirectly lowers emissions which occur through traffic. It is widespread in the US, Canada, Norway and the UK.

 Country / City

 Innovate beyond state-of-the-art, and rapidly deploy innovation in mobility services and infrastructure

Off-peak deliveries

 Off-peak deliveries refer to deliveries made early morning or during the night. Such "out of hours" deliveries lessen the traffic load at peak times and result in improved efficiency and road safety. This solution requires little upfront investment: while additional staff training may be required and staff costs may increase given the hours being worked, this cost is expected to be lower than the savings generated from increases in overall productivity.

 City / Company

 Position Cities/Regions at the forefront of transformation implementation

Carbon tax

 The implementation of a carbon tax could ensure that carbon emissions related externalities are considered by the market.

 Country / City / Company

 Adapt economic rules to transformation

Underground delivery bays and underground access

 Common logistics functions for shopping centres or large companies could include underground delivery bays and on-site warehouse areas but also underground access for areas and buildings goods distribution. Underground access is a costly but improving way to access buildings and avoid goods vehicle parking in the city centre. This is a decision to be made by the government, keeping in mind the high costs. It helps reduce conflicts with other transport vehicles, limits emissions and noise levels and improves safety.

 City / Company

 Position Cities/Regions at the forefront of transformation implementation

Micro (shared) logistics hubs

 Paris City Council carried out a large programme in order to improve last-kilometre deliveries. The city initiated several experiments based on new concepts of "Urban Logistics Spaces" (ULS). ULS were seen as a more efficient solution than urban consolidation centres. ULS were typically dedicated delivery (pick up/drop off) areas for businesses using underused (and low rent) space in the city centre (e.g. underground parking).

 City / Company

 Position Cities/Regions at the forefront of transformation implementation

34. United States–European Commission Urban Freight Twinning Initiative – <https://ops.fhwa.dot.gov/publications/fhwahop17020/summary8.htm>

35. Transport for London Congestion Charge – <https://tfl.gov.uk/modes/driving/congestion-charge>

36. Berlin.de (May 30, 2018) Modellprojekt in Berlin startet: Lieferverkehr mit Lastenrädern nachhaltig gestalten – https://www.berlin.de/sen/uvk/presse/pressemitteilungen/2018/pressemitteilung_706285.php



In practice

The Stockholm off-peak delivery pilot³⁴

This project was launched in 2014. From 2015 to 2016, the project tested night-time distribution in Stockholm city centre using one hybrid and one biogas vehicle for delivering goods to three retail establishments, and to a variety of hotels and restaurants. The outcomes were analysed for four different aspects: transport efficiency, environmental impacts of noise, policy measures and stakeholders' perceptions.

The London Congestion Charge

is a fee charged on most fossil fuel vehicles operating within the Congestion Charge Zone in Central London between 07:00 and 18:00 Mondays to Fridays. The charge was introduced in 2003. As of 2017, the London charge zone remained as one of the largest congestion charge zones in the world. The charge aims to reduce high traffic flow and pollution in the central area and raise investment funds for London's transport system.³⁵

Micro City Hub in Berlin, KoMoDo

The Kooperative Nutzung von Mikrodepots (KoMoDo) project is a pilot in Berlin where the city provides a number of shipping containers, all stationary, placed in one central point in the city. These are supplied with parcels by larger vehicles from different parcel operators: Hermes, DHL, DPD, UPS and GLS. Cargo bikes then arrive at the shipping container for loading and do the last-mile delivery.³⁶



“A one-size-fits-all solution is not possible when it comes to developing green freight for companies. Consequently, solutions must always be designed to fit the diversity of supply chain needs.”



Solution mapping – best practices towards zero-emission urban freight

LEGEND

| Solutions to challenges | Anticipated level of impact | Indicative level of investment | Level of involvement | | | Timeframe for implementation |
|-------------------------|-----------------------------|--------------------------------|----------------------|---------|---------|------------------------------|
| | | | City | Country | Company | |
| | High | High | High | High | High | High |
| | Medium | Medium | Medium | Medium | Medium | Medium |
| | Low | Low | Low | Low | Low | Low |

STURCTURE OF THE SECTOR

| Solutions to challenges | Anticipated level of impact | Indicative level of investment | Level of involvement | | | Timeframe for implementation |
|-------------------------|-----------------------------|--------------------------------|----------------------|---------|---------|------------------------------|
| | | | City | Country | Company | |

Challenge 1: Low margins and under-valuation of transport socio-economic importance and costs

| | | | | | | |
|---|-------------|------|-----------|------------|-------------|-----------|
| Minimum bidding price for "green" fleet | Light Green | Grey | Dark Blue | Light Blue | Medium Blue | Dark Grey |
| Financial incentives and feebates | Green | Grey | Dark Blue | Light Blue | Dark Blue | Dark Grey |

Challenge 2: High market fragmentation with own account transport

| | | | | | | |
|---|-------------|--------------|------------|--|-----------|-----------|
| Mutualised management demand and capacity platforms enabling increased efficiency and effectiveness | Light Green | Light Yellow | Light Blue | | | Dark Grey |
| Delivery as a service for businesses | Light Green | Light Yellow | Light Blue | | Dark Blue | Dark Grey |

Challenge 3: Managing consumer expectations

| | | | | | | |
|---|-------------|--------------|------------|-------------|-----------|-----------|
| Green choice for customer/citizen | Light Green | Light Yellow | Light Blue | Medium Blue | Dark Blue | Dark Grey |
| Automated locker boxes | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Dark Grey |
| Merchandise pick-up points | Light Green | Light Yellow | Light Blue | | | Dark Grey |
| Micro-distribution | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Dark Grey |
| Local urban delivery platform | Light Green | Light Yellow | Dark Blue | Light Blue | Dark Blue | Dark Grey |
| Individually optimised transport solution | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Dark Grey |

Challenge 4: Lack of knowledge on the topic of urban freight

| | | | | | | |
|--|-------------|--------------|------------|-------------|-------------|-----------|
| Labelling and certification programme | Light Green | Grey | Light Blue | Medium Blue | | Dark Grey |
| Standardised measurement methodology | Light Green | Light Yellow | Light Blue | Medium Blue | | Dark Grey |
| Dissemination of this whitepaper and other relevant documents to 3C stakeholders | Light Green | Light Yellow | Light Blue | | | Dark Grey |
| More (online) low threshold courses for practitioners | Light Green | Light Yellow | Light Blue | Light Blue | Medium Blue | Dark Grey |

Challenge 5: Diversity of supply chains among shippers and receivers

| | | | | | | |
|---------------------------|-------------|--------------|------------|------------|-------------|-----------|
| Bike couriers | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Dark Grey |
| City distribution by boat | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Dark Grey |
| Co-modality | Green | Grey | Dark Blue | Light Blue | Medium Blue | Dark Grey |
| Mobile depots | Light Green | Light Yellow | Dark Blue | Light Blue | Dark Blue | Dark Grey |

| OWNERSHIP ISSUES | | | | | | |
|---|-----------------------------|--------------------------------|----------------------|------------|------------|------------------------------|
| Solutions to challenges | Anticipated level of impact | Indicative level of investment | Level of involvement | | | Timeframe for implementation |
| | | | City | Country | Company | |
| Challenge 6: Urban freight planning | | | | | | |
| National freight decarbonisation plan | Green | Grey | Light Blue | Dark Blue | Light Blue | Grey |
| Land use planning policies | Light Green | Grey | Dark Blue | Light Blue | | Grey |
| Green urban planning | Green | Grey | Dark Blue | Light Blue | | Grey |
| Diversified driving licence legislation to promote ZE vehicles | Light Green | White | Light Blue | Dark Blue | Light Blue | Light Grey |
| Multi-purpose use of space | Light Green | Grey | Dark Blue | Light Blue | Light Blue | Light Grey |
| Sharing city hubs and warehouses | Light Green | Grey | Light Blue | | Dark Blue | Light Grey |
| Sharing fleets | Light Green | Grey | Light Blue | | Dark Blue | Light Grey |
| Challenge 7: Market inertia | | | | | | |
| Business models for monetary value to CO2 emissions | Green | Grey | Light Blue | | Dark Blue | Grey |
| Promote the champions | Green | White | Light Blue | Light Blue | Light Blue | Light Grey |
| Lead by example | Light Green | White | Light Blue | Light Blue | Dark Blue | Light Grey |
| Challenge 8: Emphasis on passenger transport vis-à-vis urban freight | | | | | | |
| Priority lanes for clean goods vehicles | Light Green | Grey | Dark Blue | Light Blue | Light Blue | Grey |
| Priority for trucks at certain intersections/truck platooning | Light Green | Grey | Dark Blue | Light Blue | Light Blue | Grey |
| Challenge 9: Fear of sharing data between companies and cities | | | | | | |
| Neutral, trustworthy platform for data sharing | Green | Grey | Dark Blue | Light Blue | Dark Blue | Grey |
| Freight transport delivery mapping | Light Green | Grey | Light Blue | Light Blue | Dark Blue | Grey |
| Challenge 10: Lack of cooperation among actors | | | | | | |
| Regional consolidation centre | Light Green | Grey | Dark Blue | Light Blue | Light Blue | Grey |
| Green Deals between the 3Cs | Green | Grey | Dark Blue | | | Grey |

LACK OF ECONOMICALLY EFFICIENT SOLUTIONS

| Solutions to challenges | Anticipated level of impact | Indicative level of investment | Level of involvement | | | Timeframe for implementation |
|-------------------------|-----------------------------|--------------------------------|----------------------|---------|---------|------------------------------|
| | | | City | Country | Company | |

Challenge 11: Lack of economically attractive vehicle options for a smooth transition

| | | | | | | |
|--|-------------|-------|------------|------------|------------|------------|
| Financial incentives for acquisition of clean freight vehicles | Green | Grey | Light Blue | Dark Blue | Light Blue | Light Grey |
| Research charging options for trucks | Light Green | Grey | Light Blue | Light Blue | Light Blue | Dark Grey |
| Showcase demand for more electric vehicle options for large-scale freight fleets | Green | White | Light Blue | Light Blue | Dark Blue | Light Grey |
| Support investments in public charging infrastructure | Light Green | Grey | Dark Blue | Dark Blue | Light Blue | Light Grey |
| Low cost electric tilting 3-wheel vehicle | Light Green | White | Light Blue | Light Blue | Dark Blue | Light Grey |
| Leasing (batteries) instead of purchase | Light Green | White | Light Blue | Light Blue | Dark Blue | Dark Grey |
| Total cost of ownership as the new standard | Green | White | Light Blue | Light Blue | Dark Blue | Dark Grey |

Challenge 12: Availability of dependable and future-proof decarbonised energy infrastructure

| | | | | | | |
|---|-------------|------|------------|------------|------------|-----------|
| Renewable power procurement for vehicle charging infrastructure | Light Green | Grey | Light Blue | Dark Blue | Light Blue | Dark Grey |
| Fast charging tailor made for lorries and freight vehicles | Light Green | Grey | Light Blue | Light Blue | Light Blue | Dark Grey |

Challenge 13: Solutions can be difficult to scale up

| | | | | | | |
|---|-------------|-------|------------|------------|------------|------------|
| Zero emission (ZE) procurement | Light Green | Grey | Dark Blue | Light Blue | Dark Blue | Dark Grey |
| Collective pre-order of freight low emission vehicles | Green | White | Light Blue | Light Blue | Dark Blue | Light Grey |
| Zero Emission Zones (ZEZ) | Light Green | Grey | Dark Blue | Light Blue | Light Blue | Light Grey |

Challenge 14: Lack of loading and unloading spaces

| | | | | | | |
|---|-------------|-------|------------|------------|------------|------------|
| Neutral, trustworthy platform for data sharing | Light Green | White | Dark Blue | Light Blue | Dark Blue | Light Grey |
| Incentives to shift loading and unloading times to non-peak hours | Light Green | Grey | Light Blue | Light Blue | Light Blue | Light Grey |

COMMON URBAN ISSUES

| Solutions to challenges | Anticipated level of impact | Indicative level of investment | Level of involvement | | | Timeframe for implementation |
|---|-----------------------------|--------------------------------|----------------------|------------|------------|------------------------------|
| | | | City | Country | Company | |
| Challenge 15: City congestion, air quality, CO₂ emissions, safety and noise | | | | | | |
| Filters for older vehicles/fleets | Green | Grey | Light Blue | Dark Blue | Dark Blue | Grey |
| Congestion charging | Green | Grey | Dark Blue | Light Blue | Dark Blue | Grey |
| Free-flow tolling | Green | Grey | Dark Blue | Light Blue | Light Blue | Grey |
| Off-peak deliveries | Green | Grey | Light Blue | Light Blue | Dark Blue | Grey |
| Micro (shared) logistics hubs | Green | Grey | Light Blue | Light Blue | Dark Blue | Grey |
| Underground delivery bays and underground access | Green | Grey | Dark Blue | Light Blue | Light Blue | Dark Grey |
| Carbon tax | Green | Grey | Light Blue | Dark Blue | Dark Blue | Dark Grey |



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About TDA

The Transport Decarbonisation Alliance – a “coalition of the willing” to decarbonise transport

TDA brings together Countries, Cities/Regions and Companies, the “3Cs”, as the major drivers in sustainable, low carbon mobility.

TDA members as of May 2019:



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Costa Rica



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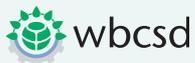


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