



Cities-Regions and Companies working together

Guide for advancing towards zero-emission urban logistics by 2030

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About POLIS and ALICE-ETP

POLIS Network is the leading network of European cities and regions working together to develop innovative technologies and policies for local transport. Within the Urban Freight Working Group, cities and regions can discuss the challenges they face, share good practices and improve collaboration with companies, prioritise topics and accelerate deployment of innovative solutions.

The Alliance for Logistics Innovation through Collaboration in Europe (ALICE) is the industry lead alliance of the European leading experts and (160+) companies in implementing logistics and supply chain management innovation. ALICE has developed a comprehensive vision aiming at increasing performance and sustainability of freight transport and logistics through the development of the Physical Internet concept to achieve the transition to zero emission logistics in an affordable way. Our ambition is to accelerate the process by providing a collaboration framework to define new concepts, share ideas and knowledge, cross-fertilizing companies' initiatives and finding partners and collaborators for concrete innovation projects. ALICE provides advise to governments, companies, and civil society organizations.

POLIS and ALICE have established a permanent strategic dialogue since 2019. The vision of this group is to lead transformation in cities so urban freight and logistics is proactively responding to the pollution, congestion, safety and environmental challenges. We encourage stakeholders to join us in this path. This document is just one of our first milestone setting the basis of our collaboration areas and themes. Since the dialogue has started, productive collaborations have already emerged between companies and cities walking the talk.

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Disclaimer

POLIS and ALICE Boards do not guarantee the accuracy of the information included in this publication and do not accept responsibility for consequence of their use.

This guide aims to bring together the views of a wide range of stakeholders and experts to guide local and regional authorities, governments, companies, civil society organizations and citizens in their contribution to more sustainable and liveable cities. It aims at providing a framework for individual organizations to define their agenda in support of the objectives described in this document. The views expressed in this guide are a collection of those of the different stakeholders and experts consulted through different activities carried out such as workshops, surveys, etc. As such, not everyone involved in this initiative may necessarily fully support all the views expressed in the guide. All the stakeholders involved do share a common interest however: speed up urban freight and logistics decarbonization and transition to zero emissions while remaining fully competitive, supporting logistics innovation for a sustainable and competitive industry and liveable cities.

Design

Lorenzo Lorefice, POLIS

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Executive Summary

POLIS & ALICE call for cities and companies to **work together** to **achieve zero-emission urban logistics by 2030**
Join POLIS and ALICE networks in this collective effort!

The (increasing) challenges and expectations of urban logistics today

Urban freight and logistics ensure that shops and businesses are stocked, people access goods and services (including all forms of deliveries), equipment is installed and repaired, buildings are supplied, returns are collected, and waste is removed. Every place of activity requires deliveries, collection and servicing – which requires proper infrastructure and resources planning by companies and cities to make logistics serve the people, the planet, and the economic growth (profit) in an efficient and sustainable way.

These activities are necessary to keep city ecosystems functioning and welfare. However, logistics brings challenges including impacts on liveability, congestion, air pollution, CO2 emissions, noise, health and safety, resilience, and costs to the companies.

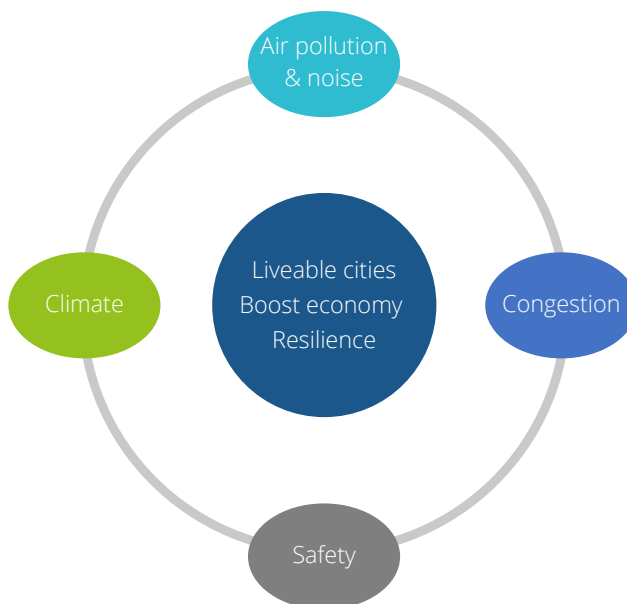


Figure 1. Urban freight and Cities Challenges & Expectations

Addressing the challenges effectively: collaboration is key!

Cooperation and coordination amongst local authorities, national governments and European institutions is needed to reach common grounds and together with companies, develop overarching accepted logistics models and practices. Commonly agreed frameworks, timelines and models across cities facilitate companies to reach the necessary economies of scale, to de-risk investments and accelerate the process to meet cities requirements addressing common challenges in an effective way.

Shifting to zero-emission vehicles and operations will require change and transition management.

The short-term focus needs to be on leveraging and finding new opportunities for efficiency gains in freight transport and logistics enabling an affordable transition to greener and cleaner.

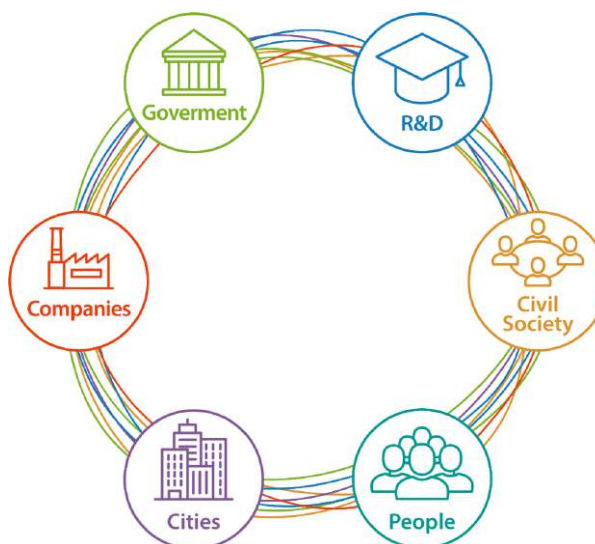


Figure 2. Stakeholders addressed and collaboration

vehicles, infrastructure, and energy in the urban domain. Working on open logistics services and sharing resources for seamlessly connected logistics networks will maximise vehicles and assets utilisation [1]. Fundamental approaches need to be discussed between local authorities and companies to generate new concepts, fast-track and implement them, to accelerate deployment of innovative and impactful solutions efficiently addressing common challenges.

The document includes key recommendations and guiding principles for each stakeholder group in (Figure 2) to take their part in the transformational process.

The goal of the public-private dialogue and of this joint guide

This joint guide is one of the results of the collaboration between POLIS (the network of European cities and regions working together for transport innovation) and ALICE (the network of European companies and experts' leaders in supply chain and logistics innovation implementation). It aims to bring together the views of a wide range of stakeholders and experts to guide local and regional authorities, national and EU governments, companies, civil society, and citizens in their contribution to more sustainable and liveable cities. It provides a framework for individual organizations to define their agenda in support of the objectives described in this document and calls these groups to join forces in this collaboration, as no single stakeholder can address these challenges in isolation.

POLIS & ALICE strategic collaboration will support each other's members in the process to accelerate transition as fast as and as effectively as possible by continuous gathering and sharing of initiatives, networking activities, and facilitating collaboration. We call interested companies, cities and regions to join the effort through our networks.

Main areas of intervention, overarching principles and key factors of success

POLIS and ALICE members identified five areas of intervention for urban logistics, in which public-private collaboration is essential (Figure 3). For each of these, solutions, learnings, gaps and ongoing initiatives are proposed.

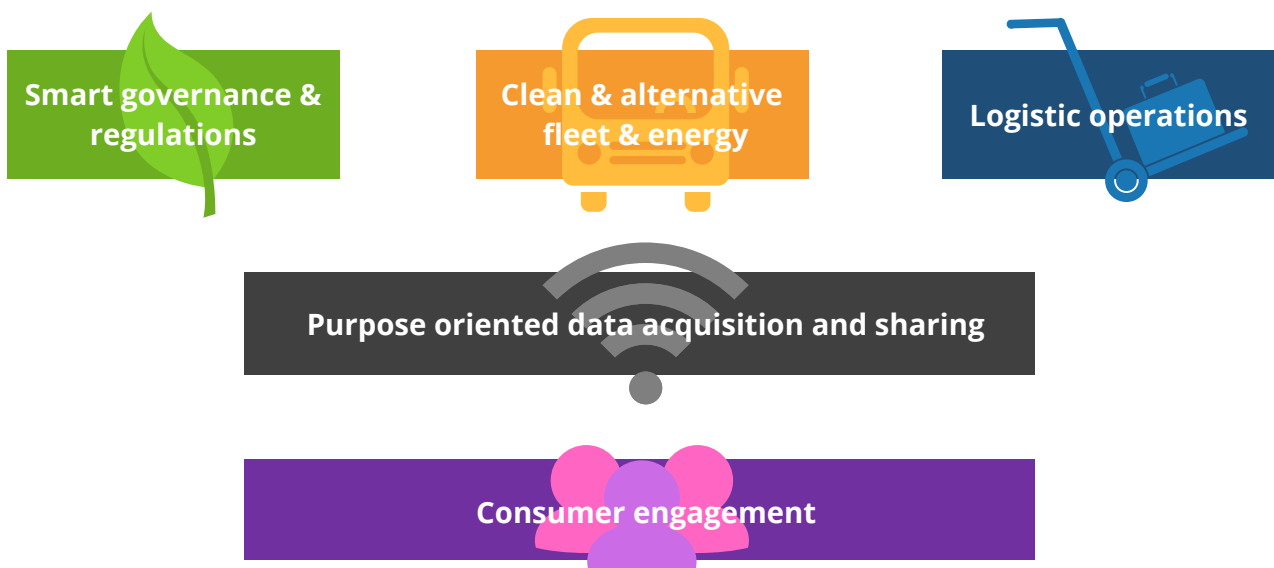


Figure 3. Main areas of intervention in which companies and local authorities' collaboration is key

1 Ballot É., B. Montreuil, R. Meller (2015), The Physical Internet: The Network of Logistics Networks, Documentation Française. For more information: ALICE-ETP, 2020. [Roadmap to the Physical Internet](#) and [watch a video](#).

Conclusion, next steps and how to get engaged

This document is a milestone in the ongoing strategic collaboration between POLIS and ALICE networks and their members, including local joint initiatives² and collaborative innovation projects at the EU level.

The POLIS & ALICE strategic dialogue has become a strong alliance over the years. The networks jointly supported the European Commission's Directorate-General for Mobility and Transport (DG MOVE) in the organisation of the consultation workshop on the new EU Urban Mobility Initiative: *Urban freight transport and logistics*³. Both organisations play a central role in defining the needs of local authorities and companies to be addressed in R&I programmes such as Horizon Europe.

We envisage the following steps:

- Encourage cities-regions and companies to use the joint guide and join the collaboration framework enabled by POLIS and ALICE.
- Continue our dialogue and exchanges with the European Commission and other EU institutions.
- Forge synergies between projects, initiatives, cities-regions and companies to accelerate innovation.
- Engage with other relevant networks and external stakeholders through key events at EU level, such as the POLIS conference, the International Physical Internet Conference, the Transport Research Arena, the CIVITAS Forum and others.
- As soon as COVID-19 allows, re-start the organization of onsite visits and exchanges aiming at creating new collaboration opportunities.

² ALICE members Proximus and L'Oréal partner up for the delivery of telecom and hair salon products by electric bicycle with the participation of ALICE member VUB and with the support of Region Bruxelles Capital as ALICE member. More info: <https://www.proximus.com/news/2019/proximus-and-loreal-partner-up-for-the-delivery-of-telecom-and-hair-salon-products-by-electric-bicycle.html#>

³ Consultation workshop on the new EU Urban Mobility Initiative: Urban freight transport and logistics
<https://www.eltis.org/participate/events/consultation-workshop-new-eu-urban-mobility-initiative-urban-freight-transport>

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1

Challenges and expectations

Logistics issues are high on the agenda of both cities and companies. Local authorities need to ensure good quality of life which means securing healthy conditions while providing citizens with easy access to services and goods. Companies need to reach their customers while keeping themselves highly competitive and sustainable. Policies to address air pollution, congestion and safety challenges are gaining importance in cities, having critical implications to freight transport and logistics.

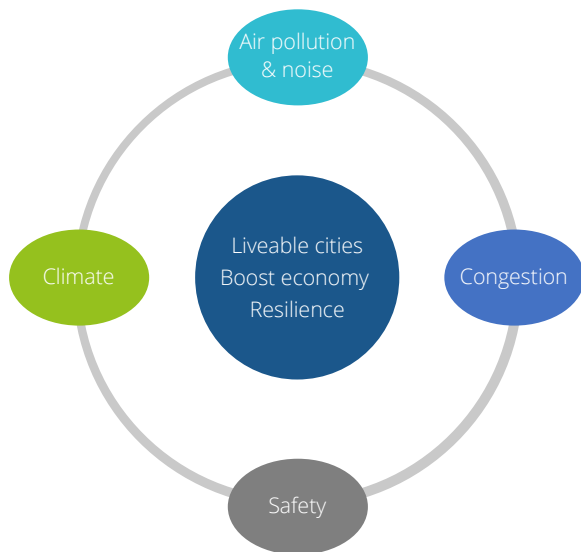


Figure 4. Urban freight and Cities Challenges & Expectations

Local governments and companies need to work together to create viable cities in which citizens and workers evolve together with innovative solutions focused on improving quality of life, boosting the economy and achieving resilient cities.

Commercial vehicle movements are necessary to deliver goods and services. However, such movements can have negative impacts in terms of emissions, noise, safety and traffic. Compared to other vehicles, freight vehicles have a disproportionate impact on traffic and the environment. In urban areas, freight vehicles make up between 15% and 25% of all vehicle kilometres travelled.

But they take up between 20% to 40% of all road space, contribute 20% - 40% of CO₂ emissions and are responsible for 30% to 50% of the main air pollutants (PM and NO_x) (Smart Freight Centre, 2017). Concentration of economic activities and population in European cities are both high and rising. These phenomena produce new challenges for urban freight distribution: cities are changing and so are freight customer demands.

Over the last few years, the distribution system of goods in European cities has suffered a strong fragmentation. The strong increased presence of small operators makes it more complex to coordinate and reorganize. The rising prices of real estate in city centres caused urban sprawl and demand for just-in-time deliveries and zero stock policies by retailers result in low vehicle load factors and a consequent increase of negative externalities.

The fragmentation in loads and trips also depends on the recent growth of e-commerce and instant deliveries, accelerated by the pandemic and contributing to an increase in the number of deliveries, while adding new types of 'light' freight traffic such as cargo-bikes, scooters, vans. The increase of small and unpredictable B2C deliveries creates strong downward competition amongst operators who are forced to deliver products as fast as possible, even with half-empty vehicles, to gain customer trust.

Empty returns represent a significant cost, for both transport companies and the community. In addition, out-dated freight vehicle fleets cause high levels of air and noise pollution.

Greening urban logistics has been high on the EU Transport agenda. The 2011 White Paper on Transport of the European Commission established the target to reach CO₂-free city logistics in major urban environments by 2030. Currently, the European Commission is launching the Urban Mobility Framework with the ambition to reach zero emission delivery in urban nodes (above 100 000 inhabitants) by 2030. However, bolder measures are needed to achieve such an ambitious target. Some scenarios today predict a 78% increase in last mile delivery by 2030. The subsequent increase in light commercial vehicles would cause a 21% increase in congestion, equivalent to approximately additional commuting minutes each passenger every day, compared to 2010 ([World Economic Forum, 2020](#)).

Public authorities and institutions have recently developed a growing awareness of the crucial role that freight transport and logistics play within the overall urban mobility system. Local authorities need to engage with logistics players and local businesses to come up with innovative strategies reconciling two potential conflicting elements: a freight distribution system satisfying the market demand, and a liveable, emission-free urban environment. Permanent and close public-private cooperation mechanisms can help identify solutions addressing this trade-off by maximizing the efficiency of the distribution services and trips thereby reducing negative impacts.

2

Existing roadmaps in the field of urban logistics

There are existing roadmaps and overarching studies which include key elements and backgrounds. We have listed some of these roadmaps which will be updated as new roadmaps are published. Urban logistics is fast evolving; therefore, we are only listing key documents produced in the last four years.

Table 1. Key existing roadmaps and white papers on urban logistics in the last four years

Scope	Source	Title and description
France	Comité interministériel de la Logistique (CILOG), French Gouvernement (2021)	Mission Logistics Urbaine Durable It is an institutional report that aims to give a holistic vision and define concrete proposals for action to achieve a more sustainable urban logistics.
Europe	FM LOGISTIC / Roland Berger (2020)	Ultra-urban logistics challenges: a white paper Facing these new challenges, the logistics specialist FM Logistic and the strategy consulting firm Roland Berger propose a reflection on the city supply chain of tomorrow. Increased cooperation between logistics players, the use of technologies and green transportation are some of the solutions discussed in this work.
Global	World Economic Forum (2020)	The Future of the Last-Mile Ecosystem. Transition Roadmaps for Public- and Private-Sector Players Integrated perspective on the future of the last-mile delivery ecosystem. The aim is to inform stakeholders' strategy discussions through a solid fact base, to encourage public-private partnerships and to accelerate the development and implementation of effective interventions.
Global	Transport Decarbonisation Alliance (2019)	Zero Emission Urban Freight A whitepaper on how to reach zero emission urban freight by uniting countries, cities/regions and companies.
Global	POLIS, C40 Cities, Transport Decarbonisation Alliance (2020)	How-to Guide on Zero-Emission Zones for Freight The guide presents experience and advice on developing a zero-emission zone for freight, from public and private-sector representatives around the world.
Netherlands	Top Sector Logistiek (2017)	Outlook City Logistics 2017 Overview of emissions trends and drivers for city logistics in the Netherlands. Covers emissions-reduction outlooks for different segments: parcel and express, facilities logistics, construction logistics, waste collection (2020-updated version , in Dutch).
Europe	ERTRAC, ERRAC, ALICE (2017)	Integrated Urban Mobility Roadmap Research paving the way towards an integrated urban mobility system. This roadmap identifies research priorities related to urban mobility and freight delivery with the aim to achieve a more convenient, competitive, sustainable and resource-efficient mobility system, which is essential to secure a high level of accessibility for passengers and goods as well as economic growth.

3

Areas of intervention: solutions, learnings and gaps

The group has identified five key areas of intervention to address the challenges associated to urban logistics, included in the figure below.

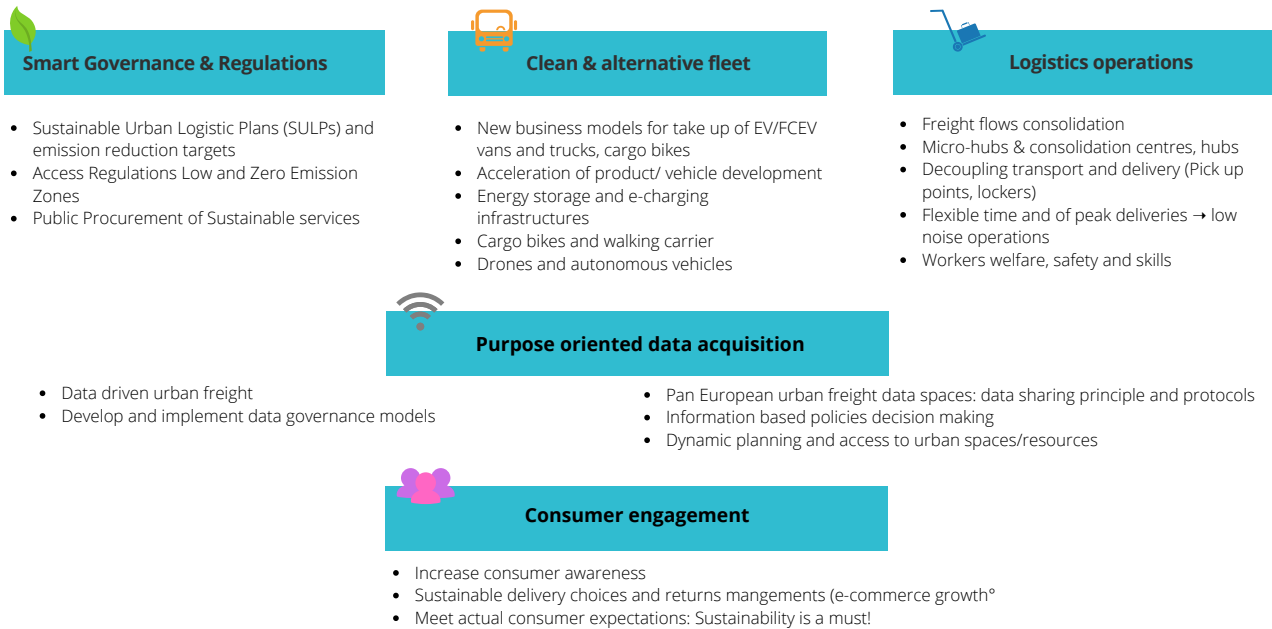


Figure 5. Main areas of intervention in which companies and local authorities' collaboration is key

The work of POLIS-ALICE members has led to grouping the necessary interventions for urban logistics into five areas. For each of them, the **overarching principles & key factors of success** were first identified. These represent the shared perspectives of the public and private sectors, at least as regards the actors who participated in the drafting of the guide, which should guide policies on urban logistics. These are then declined in a list of **solutions and measures** suitable for each area of intervention. For each solution, a description is provided, as well as the learnings and gaps that characterize it, and some case studies and examples by the members and experts who contributed to the guide. In the following section, these are detailed in five tables, one per Area of Intervention. In particular:

- Solution title and description:** Description of what needs to change and what we expect will happen in the next few years.
- Learnings:** Reasons why the solution is relevant, and/or concrete elements that need to be considered upon implementation. The learnings refer to specific projects and initiatives, which are duly reported.
- Gaps:** How can cities and companies innovate at scale, moving beyond the pilot phase? What is missing to set up public-private partnerships that deliver innovation on the long term?. From these gaps, we derive recommendations to stakeholders as part of chapter 4.
- Case Studies/examples:** provide reference and key examples of the realization of a specific Solution. Most of the cases have been compiled as part of the POLIS-ALICE Strategic dialogue from POLIS and ALICE members allowing easy connection with those examples/experiences' owners.

The goal is to explain where and how to intervene, reporting the experience and lessons learned of those who have already done so, as well as examples that can be of inspiration for those who are starting now.

3.1

Smart Governance & Regulations



Urban freight and logistics are gaining importance for every city to ensure growth, quality of life while protecting environment, climate and liveability. Cities need to work seamlessly with companies to address common challenges. The Madrid team has had the opportunity to learn from the experience of the different ALICE and POLIS members and implement a new Sustainable Mobility Regulation building on the points raised in the Smart Governance & Regulations dialogue. The more we share and work on common points, the more efficient the transition will be for all stakeholders.

Lola Ortiz Sanchez, Director General for Mobility Infrastructure and Planning, Madrid City Council and POLIS Urban Freight Chair.

Actions and Solutions:

- **Sustainable Urban Logistics Plans (SULPs)** and **emission reduction targets Measures incentivising** the transition
- Smart management of **access regulations** and **controlled speed areas**
- **Public Procurement** of sustainable services
- Develop and manage shared spaces - **curb side management**
- **Co-creation** with key stakeholders

Overarching principles and key factors of success:

- **Local authorities need to understand the flows per type of activity** and have skilled staff working on logistics, so they can bring factual and objective arguments supporting measures.
- **Companies need to collaborate and define common needs and concepts** to be considered by local authorities.
- **Medium- and long-term plans facilitate companies** to adapt and are highly desirable.
- **Courage is needed** as interventions may change the dynamics of the urban logistics ecosystem.
- The more local authorities advance in **developing consistent targets and implementing harmonized practices** (vehicle access regulation, low and zero emissions zones, vehicle access types definitions, access processes, curb side management, etc.) the easier will be for companies to answer and meet the requirements.
- **Strategic collaboration frameworks** among **cities and companies** (e.g. POLIS & ALICE) is essential. Linking to EU countries' governments and the European Commission is instrumental to accelerate transition.
- For any governance or regulation measure in place, **enforcement is key**
- **Stakeholders' involvement is key** to ensure governance models are workable and functional.

Solutions Description	Learnings	Gaps	More info/Examples
Cities define Sustainable Urban Logistics Plans (SULPs) and emissions reduction target	<ol style="list-style-type: none"> 1. Freight and logistics need to be addressed specifically with a dedicated planning process. 2. When SULP is isolated, it may neglect the big picture, while as part of a SUMP it adds complexity but ensures that freight is not forgotten in overall transport planning. 3. Logistics planning require skills, resources and collaboration with Companies. 4. Once defined long-term targets, it is necessary to define together the pathway and a roadmap for the intermediary steps on the short-medium term. 5. Changing the status quo may require addressing conflicts with citizens and particular sectors. 6. Understanding of freight and logistics flows and needs is vital. A targeted transition to emission-free operations for each stakeholder segment is desirable (see Rotterdam case in Examples). 7. Considering the regional and transnational dimension and policymakers to partner with (see SULPITER in Examples) 8. Identifying local city typology and looking for best practices as a first step. 	<ol style="list-style-type: none"> 1. Few cities think of freight as a priority and have defined clear objectives and targets, although there are clear signs of growing awareness. 2. Few cities have SULPs and fewer have actual action plans to implement them. 3. SULP guidelines may need to include the perspective and strategic input from companies. 4. Lack of inhouse staff with freight skills working there. 5. Missing clear understanding of the different flows and categorization of actual logistics needs. 6. Lack of link between specific issues and their causes (e.g. which activities are actually generating congestion?) 	<p>Topic Guide Sustainable Urban Logistics Planning (2019)</p> <p>ELTIS SULP Guidelines Summary (2019)</p> <p>SULPITER project Including examples of SULPs in Bologna, Brescia, Budapest, Maribor, Poznan, Rijeka and Stuttgart.</p> <p>Stakeholder segmentation best practice in Rotterdam Zero Emissions City Logistics in 2025.</p> <p>ENCLOSE. Including guidelines on SULP for Small and Medium Cities and zero emission zones currently developed in SURF project</p>
Measures incentivising the transition: Rewarding, recognition, incentives, subsidies schemes and enforcement of measures.	<ol style="list-style-type: none"> 1. Extended delivery windows, preferential lanes or parking, exclusive loading unloading areas have showed to be a good incentive for the adoption of clean vehicles (e.g.: Turin, Padua, Rome). 2. Small and Medium Enterprises (SMEs) require additional effort to make them engaged and supportive. 3. UK Fleet Operator Recognition Scheme is having significant impacts regarding economic savings and social benefits. 	<ol style="list-style-type: none"> 1. Not enough best practices are available. Sometimes there is no agreed position amongst city departments. 2. Actual requirements/needs for incentives or subsidies useful for companies to invest in e-vehicles aren't always clear. 3. Very fragmented schemes across Europe. 	<p>Trieste's rewarding scheme for consumers picking deliveries to Pick-up Drop-off locations (PuDo)</p> <p>EIT Urban Mobility living labs report published (2021)</p>

Smart management of access regulations and controlled speed areas.

Urban Vehicle Access Regulation (UVAR) is a measure "to regulate vehicular access to urban infrastructure"¹. Examples of UVAR include Low/Zero Emissions Zones, Congestion Charges, Traffic Limited Zones. It [regulates under what conditions certain vehicles are allowed to access certain parts of a city](#). Geofencing and other technologies can help control speed and enforce access to sensitive city areas.

1. When designing such schemes, early engagement with local stakeholders is key. Enough resources need to be dedicated to this step.
2. Access regulation should be integrated in the national / federal systems, otherwise cities will miss tools to make emission free delivery more attractive to the delivery operators.
3. Enforcement (physical, electronic, or virtual) is key to having a level playing field: regulation without enforcement is counterproductive as it only impacts those willing to follow.

1. Definition of zones, procedures and vehicles access is not harmonized across Europe, so it is complicated for users to understand access and to develop scalable solutions.
2. Schemes are not always properly enforced.
3. Legal frameworks vary across countries and cities. National frameworks are needed to expand best practices.
4. Modelling, simulation and quantification of impacts is needed to understand the effects of UVAR schemes..

[UVAR Box project](#). Digitising data of UVARs across Europe.

[Urban Access Regulations](#)

[UVAR Exchange](#) project, to enhance the experience of road users by improving the communication of information to drivers in the vicinity of UVARs.

[Dynaxibility4CE](#): to expand existing UVAR schemes to integrate the Functional Urban Area.

[Civitas Reveal Project](#): Regulating Vehicle Access for Improved Liveability

[Emilia-Romagna region](#) working on rules harmonization in the cities of the region.

[The Netherlands applies certain objectives in a homogeneous way for all cities](#) (2021)

[GeoSence project](#): geofencing solutions for urban traffic management and planning.

Public Procurement to enhance and speed up introduction of sustainable solutions.

Public bodies can lead by example by including sustainable procurement requirements in public tenders (e.g. office and hospitals supplies, waste collection, maintenance, etc.) with low/zero emission vehicles and by requiring suppliers to consolidate deliveries.

1. Public procurement of innovative solutions for zero-emission urban delivery of goods and services can create a market condition to speed up infrastructure and new vehicles development creating trust in the market.
2. Engaging with suppliers before tendering contracts is critical to this process, to both understand potential zero-emission options and readiness of the solution requested.
4. Sharing resources (EVs and charging points, loading, and unloading points) amongst logistics companies is a way to optimize their usage and allow for smart management and operation of logistics activities.

5. Lack of scalable models of public procurement of sustainable solutions

[Big Buyers](#): European Commission Initiative for promoting strategic public procurement

Stockholm city made a tender within the [ECCENTRIC](#) project on off-peak solutions([link](#)).

[BuyZET project](#) created a [handbook](#) for procuring zero emission delivery of goods and services.

¹ 2013 European Commission Staff Working Document on Access Regulations " A call for smarter urban vehicle access regulations" SWM (2013) 526

Develop and manage shared spaces for logistics

The way urban space is distributed and designed has a major impact. New concepts, techniques, and practices enable local authorities to effectively allocate the use of urban space. This includes the curbs, dedicated lanes, delivery loading/ unloading and other high- demand areas that can be booked and managed dynamically.

- 1.It is key that local authorities and stakeholders identify together the spaces needed for logistics and delivery operations, as well as their strategic positioning and associated services.
- 2.
- 3.Using bus lanes for zero emissions vehicles may be considered in some cases, e.g. for operators joining access or recognition schemes.
- 4.The curb side management mindset is important when it comes to densification and urban development of the city. This is broader than just freight and includes all modes of transport.
- 5.Enforcement is key to make regulation work, but it requires substantial effort.

- 1.With multiple modes competing for curb space, understanding and defining the space needs for urban freight and logistics operations (e.g. double parking) is needed to reduce congestion.
- 2.There are no proven strategies and practices yet on dynamic curb side management and related effects, as cities are only in the piloting phase of testing solutions.
- 3.Need for replicable and scalable approaches to understand the desirable level and the availability/scarcity of freight logistics spaces.
- 4.Enforcement is still complex and time consuming. Digital enforcement is widely missing.

New projects on “digital loading zones” are testing the usage of digital app solutions to regulate the traffic in the loading zones (Madrid, Stuttgart, Barcelona, the Netherlands amongst others).

[SPROUT Project – Connected delivery spaces in Kalisz](#) (Poland)

[Urban Radar](#)

[Coding the Curbs](#)

[Park Unload](#)

In the United States, transport departments have partnered with [curbFlow](#) and [Coord](#). The US based [Urban Freight Lab](#) is currently working on a parking prediction app as well.

Co-creation with key stakeholders

Co-creation labs focused on urban freight have proven to be effective. These involve different city departments and freight quality partnerships i.e. permanent working groups involving all stakeholders groups and companies to discuss the main issues related to urban freight distribution

- 1.Living Labs are a recognised avenue to assure a real shift from the existing paradigm of incremental change to fundamental transformation of the present urban mobility system creating cooperation between stakeholders.
- 2.Cities require a segmentation of problems and stakeholders as different flows (e.g. waste, construction, parcel delivery, e-commerce, groceries and retail), involve different stakeholders and have different implications to manage urban freight.
- 3.Training, trust building, and sharing activities should be in a city's agenda, increasing capability for cross sector planning and de-conflicting interests of different city users.
- 4.Having a neutral organization as moderator may help as cities are already part of the direct stakeholder's involvement and may not be able to remain neutral.

- 1.Companies are often reluctant to participate in these forums and can find it difficult to agree with competitors on certain issues and solutions.
 - 2.Timespan for the development of Sulp is often too slow compared to the rapidly changing trends in urban logistics. .
 - 3.Standardised processes s would help cities build consensus and co-define and co-implement measure.
 - 4.Need to accelerate uptake of best practice and replicable solutions tested in the living labs
 - 5.Need to improve knowledge of user needs, habits and preferences in terms of deliveries by public-private schemes for data collection and sharing.
-



3.2

Clean & alternative fleet

"Scaling up the use of electric vehicles and transportation means of all sizes and modes requires a system perspective on the availability of renewable electricity, grid capacity and charging infrastructure. The chain is not stronger than the weakest link and we need to cooperate and coordinate our activities in all sectors accordingly"

Magnus Blinge, Research Manager, SCANIA Innovation office, ALICE Urban Logistics Vice-chair.



Actions and Solutions:

- **New business models** for the adoption of electric and fuel cell electric vans and trucks, cargo bikes
- **Acceleration of product and vehicle development**
- Large scale deployment of **energy storage and e-charging infrastructure**
- **Use of smaller vehicles, cargo bikes and walking carrier**
- **Drones and autonomous vehicles** for specific deliveries

Overarching principles and key factors of success:

- **Alternative fleet** operations **need to be affordable** considering Total Cost of Ownership and Return on Investment principles. This may consider regulatory measures (incentives and taxes), customer requirements, new models or a combination of them.
- **More intensive use of electric vehicles** results in better **economics** than with traditional vehicle due to cost structure, i.e. higher investment but lower operational and maintenance cost. Hence, transition is enabled by collaboration, sharing of vehicles, extending of delivery windows, night operations, mixed use of space (passenger and freight) and any other measure in the direction of 24/7 use (see section 3.3)
- Some **business models with low usage of vehicles and means**, e.g. in which the vehicle is not only used for transportation but for storage or when the vehicle is not heavily used (e.g. Hotel, Restaurants, Cafeterias, Convenience Stores, Groceries) **may need to be restructured** in a zero emission context.
- It is of critical importance to **address infrastructure needs for the different types of vehicles and flows**. Upgrading the electricity grid to address public charging points and reaching depots (to ensure night charging) is critical to enable electrification at scale.
- Small **electric vehicles and cargo bikes** can increase speed and delivery quality in specific segments.
- **Vans and trucks continue to play an important role** in the urban logistics system.
- **Inland waterways could play a bigger role for city freight distribution**. Still, this represents a niche application in the overall cities landscape, as well as **robots and drones**: they may have niche markets and be in the pool of solutions but there is **no evidence they can support the objectives mainstream**.

Solutions Description	Learnings	Gaps	More info
<p>New business models for the adoption of low-emission vehicles (electric EV / fuel cell electric FCEV vans and trucks) and for intensive use of infrastructure.</p> <p>Use of low and zero emission freight vehicles in city logistics operations should be as affordable as traditional ones. The extensive use of the vehicles is key to facilitating increased adoption and transition towards these vehicles.</p>	<ol style="list-style-type: none"> 1. Investment cost is higher for Electric Vehicles compared to traditional vehicles while maintenance and operation costs are lower. 2. Stricter regulations, like Zero Emission Zones in cities, might be necessary to ensure the use of Zero Emissions Vehicles for urban freight. 3. Points 1 & 2 may require new Business Models for which adoption of zero emissions vehicles is more suitable/competitive than using conventional vehicles. This may include government incentives and subsidies. 	<ol style="list-style-type: none"> 1. Demonstrated business models and practices to facilitate the extensive use of efficient vehicles: e.g. collaboration, sharing of vehicles, extending delivery windows, night operations, mixed use (people and goods). 2. Demonstrated business models and use cases to decouple the city operations (under zero emissions) and regional/long distance transportation to outside the city distribution centres on other modes. 3. Deep understanding of the implications and possible options for a large scale roll out of Battery Electric Vehicles BEV/FCEV: logistics case, infrastructure requirements, financial needs, operational models (charging in depot or charging at stops) 	<p>FREVIEW aimed to prove that electric vans and trucks could offer a viable alternative to diesel vehicles_(2017)</p> <p>TDA's Call for zero emission freight vehicles signed by 84 organizations.</p> <p>Decarbonisation of logistics in Mercamadrid , the largest platform for the distribution, marketing, transformation and movement of fresh food in Spain.</p> <p>ECCENTRIC focused on sustainable mobility in peripheral areas and innovative urban freight logistics.</p>
<p>Acceleration of product/ vehicle development programmes through multistakeholder partnerships.</p> <p>Cooperation between companies, cities and other relevant stakeholders to develop and test new vehicle technologies, define infrastructure needs and logistics changes required.</p>	<ol style="list-style-type: none"> 1. These partnerships create a framework to address common problems from different angles creating better understanding and identifying overarching concepts 	<ol style="list-style-type: none"> 1. Present BEV technology is not sufficient for long range heavy weight transport services like some applications for garbage trucks. Further development of BEV/FCEVs is needed. 	<p>Towards zero emission road transport (2Zero partnership)</p> <p>ECCENTRIC (Civitas) designed from scratch and user needs a 7,5 tons electric truck.</p> <p>DenCity develops solutions for sustainable and surface-effective transport.</p>
<p>Large scale deployment of energy storage and e-charging infrastructure.</p> <p>Energy Storage systems are needed to re-balance production and demand. Charging infrastructure</p>	<ol style="list-style-type: none"> 1. Batteries in vehicles together with mobile and stationary charging units at strategic locations, e.g., construction sites, urban logistics hubs, retailers' centres, depots, can be used to facilitate energy supply and demand. 	<ol style="list-style-type: none"> 1. This is a market in development so innovation and acceleration of management, distribution, ownership, payment models, etc. needs to be further developed. 2. Mismatch between the public investment needs on grids and the actual enablers for companies to invest in electric fleets. 	<p>CleanMobilEnergy project integrated various renewable energy sources, storage devices, electric vehicles and optimisation of energy consumption through one unique smart energy management system</p>

<p>needs to be conceived based on actual operations demands. For full fleet electrification, sufficient grid capacity is needed.</p>	<ol style="list-style-type: none"> Moving battery energy storage is considered dangerous transport and must have especial permission. For most of the courier/parcel delivery companies charging at night in the depot is the adequate model. Investments in electric fleets at scale is already economically viable but it is not possible for efficient fleet charging due to limited grid capacity reaching the depots. To make charging stations economically viable they must have a high utilization level. Good planning/booking systems are needed to avoid logistics losses (waiting times, etc.). 	<ol style="list-style-type: none"> Lack of adequate fleet management systems to plan routes + charging in certain segments. Medium duty trucks. Lack of a European Framework for (non-electricity companies) producing, consuming, storing and selling electricity Lack of interoperability of payment systems. Lack of understanding of actual freight needs (flows origin, destinations, stops, weights, etc.) to adequately plan charging infrastructure 	<p>Electric Worksite II project test how electric machines can work in real urban environments</p> <p>ASSURED project. Integration of urban commercial electric vehicles with high power fast-charging infrastructure</p> <p>USER-CHI project co-create and demonstrate smart charging solutions</p>
<p>Use of small electric vehicles, cargo bikes and walking carriers.</p> <p>The fast development of batteries has made Light Electric Vehicles (LEV), e.g., cargo bikes, into a viable sustainable alternative for last mile distribution. Home delivery by bike will have the biggest impact on total "green delivery share"</p>	<ol style="list-style-type: none"> Congested cities, small streets that are difficult to navigate by large trucks, introduction of micro delivery and fulfilment hubs, expanded delivery times and more make this option the most efficient to deliver certain type of goods. The penetration of cargo bikes in last mile operations requires a set of complementary measures by the city authority (i.e. extension of bike lanes together with zero-emission zones). Securing the safety of the driver is a high priority for companies and cities. 	<ol style="list-style-type: none"> Tools supporting fleet owners in making informed choices about their future fleet composition in terms of LEVs. Not enough knowledge on LEVs fit for central business district logistics (e.g. e-bikes, cargo-bikes, 4-wheelers, kick-bikes, walking carriers) . 	<p>LEAD project for shared-connected and low-emission logistics operations</p> <p>H2020 SPROUT Cities cooperating towards urban mobility transition</p> <p>H2020 NOVELOG advance the knowledge of freight distribution and service trips</p> <p>BSR electric project Enhance the use of electric vehicles in city transport systems.</p>
<p>Autonomous vehicles including drones and robots.</p> <p>In the field of logistics, automation means the ability to use drones, droids, automated vehicles (AV) for deliveries.</p>	<ol style="list-style-type: none"> Drones are not a mainstream solution for urban freight and city logistics. AVs and drones could reduce CO2 emissions in a scenario of mixed delivery system based on integration with vans and other delivery vehicles in residential areas and for very specific use cases. Optimal use of autonomous vehicles, in the short term, can be for night delivery between logistic hubs or locations with high concentration of deliveries. 	<ol style="list-style-type: none"> Address the potential conflict in pedestrian areas. Need of clear delivery times. Lack of unloading bays and conflict with mixed uses of existing infrastructure. Legal framework still uncertain, as well as liabilities. Drones and robots do not have the range or payload capacity that other LEVs have. 	<p>COEXIST Enabling cities to get "automation ready"</p> <p>KUL project. Electric, connected and automated last mile deliveries</p>

Logistics operations



Actions and Solutions:

- Freight flows consolidation strategies
- Consolidation centres, hubs & micro-hubs
- Decoupling transport and delivery (Pick up points, parcel lockers)
- Flexible delivery options, off-peak and night deliveries
- Workers’ welfare, safety, and skills

Overarching principles and key factors of success:

- **Zero emissions delivery solutions** (beyond vehicles) need to be **competitive in costs to be sustainable in time.**
- **Consolidation and sharing must be the norm for urban freight and logistics.** This requires: (i) the adoption of Physical Internet concepts; (ii) the development and application of new collaboration models addressing different flows, B2B & B2C hybridization, multi-industries reverse flows; (iii) companies’ leadership and public support such as easing implementation, incentives, access regulations; the use of consolidation centres to shorten last-mile delivery distances, enable consolidation and the use of clean vehicles.
- **Parcel lockers, pickup points,** and other unattended delivery solutions, as well as **off-peak deliveries** play a key role to improve efficiency, by decoupling transport and delivery operations.
- Possibly, **limit quick delivery** to only strict necessary goods and services.
- Fragmentation of flows (e-commerce) and the need to transition to zero emission modes accelerate these trends.
- **Training drivers and ensuring responsible labour conditions** favour eco-driving and safe operations, which in turn improve the environment, health and safety of citizens and workers.

Solutions Description	Learnings	Gaps	More info & examples
<p>Implement freight flows consolidation strategies. Fragmentation of freight flows and deliveries cause a variety of inefficiencies in urban logistics: low load factors, low number of deliveries per stop and too many kms driven. Some solutions are: Mutualization of B2B flows, Combination of different flows (B2B, B2C, Direct and reverse/returns,) combined use of transport for people and goods, crowdsourced deliveries where the delivery of a package is taken care of by an independent individual in a personal mobility trip.</p>	<ol style="list-style-type: none"> 1.Shared transport by multiple logistics providers can be profitable with proper order management, operational adjustments and process adaptation. Several key success factors include an order process management team or automatic tool, client cooperation and customers who accept flexibility in fulfilment. 2.In some cases, city restrictions (access, etc.) create the level playing field to achieve shared logistics. (e.g. Antwerp CULT program). 3.Adoption of Zero emissions vehicles (see section 3.2) increases the importance of being efficient and increase the use favouring consolidation strategies. 4.The flows are extremely fragmented and current logistics systems lack interoperability make mutualization complex. 	<ol style="list-style-type: none"> 1.In many cases, the efficiency gained by consolidation does not outweigh the cost of organizing and managing consolidation. 2.Lack of interoperability of physical systems (including automation) used by manufacturers and retailers create friction and sometimes are a barrier for consolidation. 3.Current models apply in very particular contexts and are complex to scale-up. 4.It is unclear if crowdsourcing deliveries offers value from a sustainability and social point of view. 	<p>Application of pooling practices and consolidation through a Logistics Service Provider (FM Logistic Pooling and Citylogin) Proximus and L'Oréal partner up for the delivery of telecom and hair salon products by electric bicycle electric bicycle (Link CULT Collaborative Urban Logistics & Transport CITY LAB Project on an innovative circular recycling system that integrated direct and reverse logistic flows in the urban area of Rome For crowdsourcing see Dynahubs project or Pick me (France)</p>
<p>Making use of Consolidation Centres/hubs. Urban consolidation centres and hubs allow opportunities to decouple the operations of transportation, sorting and handling, making it possible to arrange last mile transportation in a more efficient way. Some options for the consolidation centres are: Multipurpose (vs. product or company specific) consolidation centres, dedicated consolidated centres, temporary location/pop up consolidated centres and mobile hubs.</p>	<ol style="list-style-type: none"> 1.Although using consolidation centres and hubs increase efficiency and reduce transportation, higher real estate costs may make this solution unsustainable from an economic point of view. 2.Most of the successful cases and projects worked only while there was a subsidy or there is a regulatory obligation to work through a consolidation centre. 3.There are three types of spaces best suited to maximize the use of urban hubs in cities or at the entrance to cities: mixed use facilities, vertical spaces, vacant-temporary spaces. 4.Difficult to find locations adapted for logistics usage; legal authorization to operate is complex to get especially when looking for a temporary use. 	<ol style="list-style-type: none"> 1.Few examples and no best practices are in place to use shared consolidation centers and hubs. 	<p>RATP shared part of its bus depots in Paris. During the day, the place is used for parcel distribution and during the night, as a bus parking. Paris: P4 project Porte de Pantin Pré saint gervais -installation of a hub in a tiny space under the highway (link) Paris : La chapelle Internationale mixed usage and Air2 Logistique as example of vertical space, Praha There are different experiments with the city of Paris and Stuart, UPS, transgourmet and Geodis using mobile micro hubs.</p>

Decoupling transport and delivery including Division of deliveries in different segments:

transport by truck to the edge of the city and then scooter, bike or foot for the last mile and last 50 meters, Pick up points: A location for collecting items ordered online with a staff member on site to support the process. They can be spaces dedicated to logistics or part of an existing shop; Lockers are a storage container, with no human presence. Different types of lockers exist such as mobile lockers, connected or smart lockers, and locker walls in apartment buildings. They can be dedicated to one company or shared.

- 1.This solution is mainly used for B2C deliveries.
- 2.It is usually a preferred solution vs. home deliveries from a sustainable point of view if the recipient collects the delivery on soft modes or on foot.

- 1.Standard processes and operations need to be developed (e.g. Physical Internet concept) to make sure Logistics Service Providers/Couriers/retailers can seamlessly integrate pick up points and lockers as delivery points independently of the asset owner.

[Delivering](#) - home delivery of large and bulky items in France
SPROUT Project - [Connected parcel lockers in metro stations in Valencia](#)
SESAM - [Business model and technical platform for digital locks](#)
City of Stockholm introducing [delivery boxes](#) open to all actors

Flexible and broad delivery options including off-peak and night deliveries.

Urban infrastructure and space is in high demand during the day but less so during off-peak hours when logistics operations can be much more efficient and favour the use of zero emission vehicles. This is a suitable solution for groceries, retail stores and proximity shops. Additionally, flexible delivery windows may support using zero emission

- 1.Noise is one of the main barriers for night deliveries. Currently, many technologies are in place to avoid these nuisances
- 2.The benefits of night deliveries and positive effects on congestion during days should be highlighted to ease public acceptance
- 3.Off-peak and night deliveries combined with other usages may favour fleet electrification

- 1.Managerial tools for cities to simulate and model the effects of these measures in cities.
- 2.Citizens understanding of the benefits of night deliveries.
- 3.Better technology for noise management as well as security inside stores. It is ideal if the driver has secure access to the business and therefore no store employee needs to be present for delivery.
- 4.Night deliveries increase in costs to be balanced with the benefits for the whole society and mitigated with additional social and health policies for night workers.

[ZEUS project](#): Zero Emission off-peak Urban Deliveries.
[ECCENTRIC project](#): goods transport operations at night in Stockholm.

vehicles and reduced congestion.

Ensuring worker welfare, safety and improving skills.

Require heavy vehicle safety accreditation schemes for road safety in urban freight and ensure healthy working conditions and level playing field for logistics employees, including riders.

- 1.Ensure safety for everyone (urban logistics workers, road users and pedestrians)
- 2.The question of the workers type of contracts is critical to increase working conditions, attract and retain workers and enable proper trainings whether on quality, safety or environment.

- 1.Only a few cases of regulation for riders stablishing common level playing field. Still a new arena.
- 2.Not enough push from companies, governments, and citizens for ethical deliveries in which there are fewer incidents and people are paid appropriately.
- 3.Direct involvement of drivers and transport workers help find agile solutions to increase loading and efficiency of the system.

Club Demeter has created [L'academie Demeter](#), to provide trainings to drivers on different topics such as new technologies

Purpose Oriented Data Acquisition and Sharing



Actions and Solutions:

- Embrace the **value of data-driven policies** for urban freight
- Establish **data governance models** for urban freight
- Define **Pan-European urban freight data spaces**: data sharing principles and protocols
- Achieve **information-based policies** and decision making
- **Fast-track dynamic planning and access** to urban spaces and resources

Overarching principles and key factors of success:

- Implementing **information-based policies and decision-making processes** should be at the core of the city's vision.
- **Cities support** (digital and non-digital) **interaction and data sharing with** companies for managing and optimizing logistics processes on transport access regulation, curb side and traffic management, etc.
- **Companies openly collaborate and share information and data with public authorities**, complying with regulations required to seamlessly arrange logistics activities: access to specific zones, delivery windows, comply with access regulations, access to loading and unloading spaces, access to traffic and city status information, etc.
- Companies and cities jointly **build and exchange experience in purpose-oriented data acquisition and sharing**, and work towards a governance model based on that experience.
- Cities and companies collaborating in the urban domain embrace overarching and pan-European data sharing principles and **liaise with experiences and initiatives in other domains** (Ports, Customs, etc.).)

Solutions Description	Learnings	Gaps	More info
<p>Embracing the value of data driven urban freight. Data supports understanding of urban freight and facilitates planning, decision making, measuring performance and fact-based interaction with stakeholders.</p>	<ol style="list-style-type: none"> 1.Effective data driven UF planning and operational performance implies fewer conflicts amongst different city players and better understanding of UF measures on policy implications (e.g., incentives and enforcement). Development and application of simulation instruments can structure this process and strongly support it. 2.Information build based on data allows building capacity, creating trust, training and understanding on the interdependence between UF and other policies. This allows balanced decision-making to match all priorities and needs and to make the right and necessary investments 3.Growing need for process oriented multistakeholder interactions including transactions, dynamic management of urban space occupancy with pricing, planning, fair incentive system and effective enforcement, traffic management data gathering and provision. 4.New revenue gains for the city (e.g., not just from parking fees), new jobs creation and additional GDP can be generated by quantitative UF data knowledge. 5.Data driven urban freight interdependencies with other usages of city space is key (e.g., waste, ride hailing, public transport and utilities). 	<ol style="list-style-type: none"> 1.Not underdeveloped data driven urban freight frameworks that are cost effective for cities regarding value. Relevant issues are: availability of quality data and lack of quantitative problem analysis and difficulties to derive policy goals and measures. 2.Concrete use cases for urban freight data collection and use are scarce and underdeveloped. Associated processes are missing. More shared knowledge on what data to collect, where and from whom it is needed: city authorities find difficulties in collecting UF insightful and focused data and linking it to specific policy. 3.Dashboards for cities do not have enough granularity on the usage of urban spaces for urban freight operations. 4.New technologies and methods for data collection are not well known and it is difficult to get a good overview. 5.Creation of Digital Twins is seen as a potential enabler for value generation. Products still in low technology readiness levels. 	<p>Designing Urban Logistics for the Future This article includes information on how integrated IT platforms can increase efficiency in the urban freight logistics sector</p> <p>Harmony 2020 Recommendations to update spatial and transport strategies, using up-to-date simulation tools</p> <p>Shenzhen city's 10 green logistics zones: Stakeholders co-created right criteria for setting "zones" regulations and boundaries have been established based on emissions hotspot data and modelling</p> <p>The Logistics City Chair is research on urban logistics with a focus on urban and peri-urban logistics real estate and on trends and new consumer practices and their impact on urban logistics and its real estate. "Welcome to Logistics City" is a white paper to capture new developments and contribute to providing methods for understanding today's urban logistics.</p> <p>LEAD Project: Digital Twins of urban logistics networks</p>
<p>Establish cross sectorial and cross stakeholder governance models for urban freight data</p>	<ol style="list-style-type: none"> 1.Sound governance on UF data allows the identification of roles for different stakeholders and understands asset value sharing potential to unlock barriers for a clearer understanding of data power focusing on dynamic decisions. 2.Cross sector cooperation is needed to establish clear leadership and principles to set balanced measures and timed / punctual interventions. New business models shall guide governance to generate new (and appropriate) revenue streams and tariffs for all mobility users. 3.Neutral 3rd parties are suitable to lead in order to guarantee equal treatments, social implications, safety, 	<ol style="list-style-type: none"> 1.Not yet available governance models and best practices on data sharing in the urban domain. 2.Small private companies are difficult to involve, as they are not adequately engaged in the process with clear roles and defined targets to achieve. 3.From the local authority side, it is not easy to understand which competences from local authorities are suitable to manage the complexity of UF regulation. 	<p>EVOLUE A platform on urban logistics (on a voluntary basis) governed by Chamber of Commerce in France. It was established to create a tool to model the flow of goods, and then organise urban logistics efficiently</p>

and sustainable solutions - and set conditions to ensure that conflicts are mitigated. Neutral governance may lead to better quality of data (and better focus), allowing policies to be addressed for the right stakeholders.

4. Cities and operators can jointly act to identify impactful pilots for defining tools & solutions that can facilitate trust and allow for seamless integration of data, technology, and digital instruments adoption.

Create scale across cities and companies supporting the definition and adoption of urban freight data protocols, processes standards and governance models. All players need to be able to communicate either by speaking the same language or seamless connectivity of systems and have an understanding of rules and benefits when sharing data. Cities need to base policies upon common definitions: e.g., vehicles type, access regulation, data requirements for access etc.

1. Neutral parties can often guarantee a trusted environment amongst logistics players.
2. Cities and companies need to agree on common data sharing principles and set criteria on which data to collect and how. Data owners must be motivated – with meaningful arguments - to get the most out of this joint opportunity for the city and for the companies.
1. Seamless integration and harmonization of data governance models and standard protocols across cities can facilitate the scaling of solutions and market penetration.
2. General acceptance and use of data definitions, standards and protocols by cities may be supplied by an international board (e.g., DTLF) – new clouds for UF data spaces.
3. Common principles can be the basis for UF city community systems (like in the port community) enabling digital processes to be managed seamlessly.
4. Scale is key to reduced costs and easy adoption.

1. No trusted body with a vision and mission, able to make stakeholders converge on commonly accepted agreements, understand rules of the game, within a neutral framework that can establish proper conditions for an open dialogue and mitigate barriers in UF data sharing.
2. Little experience and only very recently adopted B2G processes in cities (linked to access regulation, vehicle certification, management of city space, loading and unloading).

[Alliance for Parking Data Standards](#) for a uniform global standard to share parking data across platforms worldwide.

[The DTLF](#) is a team of experts that brings together stakeholders with the goal to build a common vision and road map for digital transport and logistics.

[WBCSD Enabling data sharing. Emerging principles for transforming urban mobility.](#) Report to create common ground between stakeholders, by developing a shared understanding of the problem and defining a set of principles that can shape a model and standards for data sharing in mobility.

[Populus Mobility Data Standards.](#) This report highlights key city use cases that necessitate mobility data, current standards, and key policy issues.

[NxtPort](#) - This initiative connects all data providers via a state-of-the-art data sharing platform where data governance provides trust - an enabler for open data from port community systems.

Achieve information-based policies and decision making. The large legitimacy of a political decision in a city is linked to the

1. The adoption of simulation tools for UF by city authorities can smooth the integration of existing data knowledge and give evidence of the level of performance of the logistics system of a city. Cities need to adopt harmonized data calculation, collection, and sharing to make prioritized decision. This allows for appropriate

1. Institutional capacity and use / adoption of existing tools (underused) is not often sufficient for making the right decision and taking the lead for implementing smart and dynamic urban planning, as well as

[EVOLUE](#) A platform on urban logistics (on a voluntary basis) governed by Chamber of Commerce in France. It was established to create a tool to model the flow of goods, and then organise urban logistics efficiently

ability to deliver focused and clear outcomes that are based on crystal clear evidence. Such outcomes must be generated by reliable, quantifiable, and purpose-oriented data, to transform a political decision into clear, measurable, and effective initiatives for all.

investments as well as informed and comprehensive urban planning. Simulation tools can establish and process local needs, by assigning priorities according to the function played by the stakeholder and the urban space used for moving and servicing. Furthermore, they should be able to continuously assess the performance of the UF system, deconflicting services and operations needs from other city users' needs. Simulation tools should also enable managing enforcement and incentives systems, based on the value of the urban space considered (real estate) and define a data and collection method that is suitable to achieve different scopes.

2. Exploiting all potential options to have well informed (and quantifiable) data sets, allows decision makers to empower their role in performing dynamic decisions, by defining priorities according to city and its neighborhoods' functions and services.

motivating stakeholders to share data, on trust principles.

2. There is a gap in adequately manage complex demand in UF and mobility in general, and its dynamic evolution.
3. There is the looming future of driverless cars requiring available curb space to stop and exchange passengers: it can be an opportunity for the city.

Fast-track dynamic planning and access to urban spaces, zones and resources

1. Dynamic planning and access allow city authorities to intervene with effective and tailored decisions to manage scarcity of urban space and achieve an adequate level of satisfaction for all city space users.
2. Freight vehicles can be motivated to reduce time in loading zones and reduce the time to find a loading zone or dedicated space, avoiding double park or far / private parking
3. Dynamic regulation on freight operations requires a very efficient exchange of information between cities and operators. Furthermore, every neighbourhood has different purposes, functions, and needs in a city. A prioritization can maximise the effectiveness of operations and mobility at every city level (e.g., residential, commercial, recreational-free time, industrial areas, etc) and dynamically distribute modes via space allocation and pricing in a synchronised way.
4. Having curb data information and road user category requirements, can make possible to understand how to reduce conflicts and how the actual road use can vary in space and time.

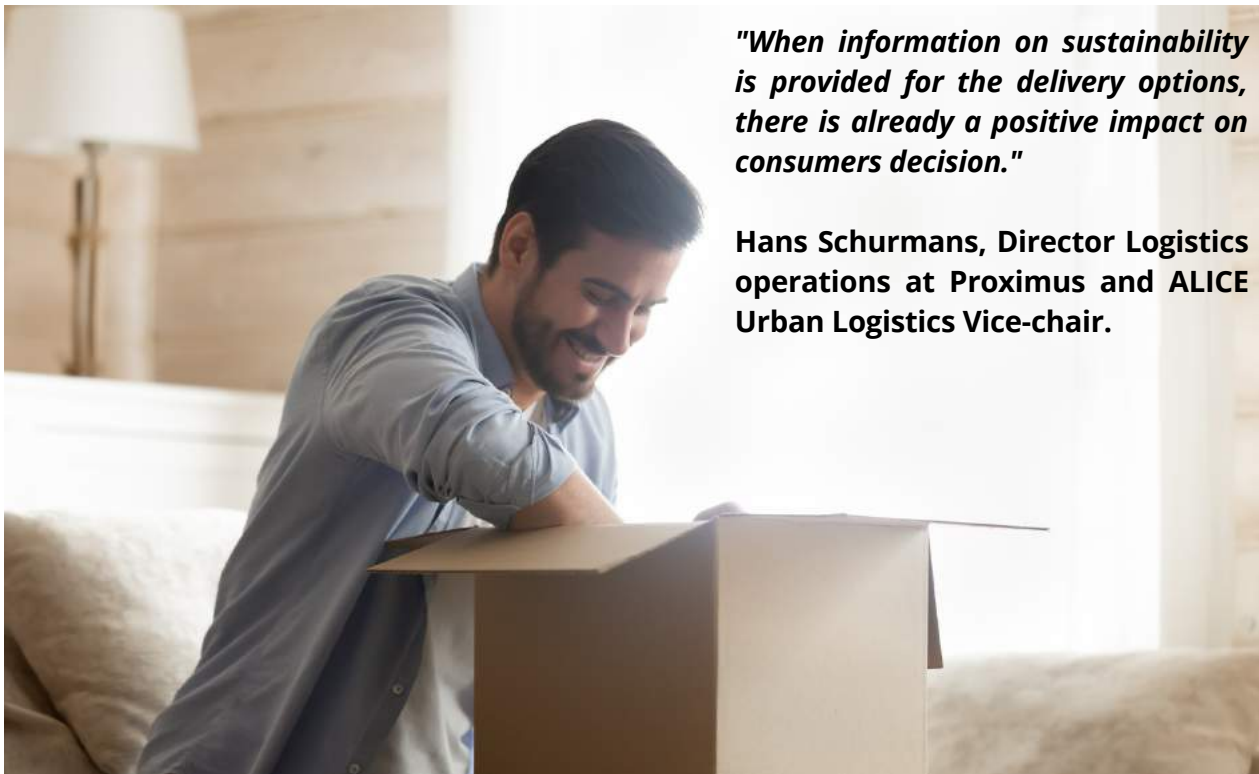
1. There are big gaps between technical capability, knowledge, and consequential correlation to spatial-temporal planning policy, harming the implementation of dynamic planning in UF.
2. Not enough available best practices of dynamic planning and access to urban spaces/zones/resources.

[Smart Loading Zones in Chalmers](#) Using data analytics for smart loading zones management in cities.

[Flexible access & space management working session](#) POLIS (Cities), ALICE (logistics), EPA (Parking) are exploring the opportunities to improve parking management and urban logistics with the support of FIT and Erasmus University. These associations are looking into the potential of access management integrated with flexible and shared use of urban space and parking.

[Populus Curb Innovation Cohort](#) - Populus provides cities with a holistic view of demand, and the digital tools they need to efficiently manage access to their curbs.

Consumer engagement



"When information on sustainability is provided for the delivery options, there is already a positive impact on consumers decision."

Hans Schurmans, Director Logistics operations at Proximus and ALICE Urban Logistics Vice-chair.

Actions and Solutions:

- Increase consumer awareness
- Develop sustainable delivery choices and proper management of returns.
- Meet actual consumer expectations: sustainability is a must!

Overarching principles and key factors of success:

- As for consumer delivery preferences, **price is the main factor** for decision, **followed by time**.
- **Consumers do not receive sufficient information** on the implications of their delivery choices in regards of sustainability.
- **Sustainability information works**. When information on sustainability is provided, there is a positive impact on consumers decision (e.g., longer delivery times have a positive impact on sustainability).
- **Retailers may positively contribute to the process by offering proper information** and providing different alternatives for urban delivery.

These overarching principles and key factors were checked with several experts consulted and form the consensus reached based on individual companies' studies in different regions and product segments.

Solutions Description	Learnings	Gaps	More info
<p>Increase consumer awareness.</p> <p>It is important that consumers are aware of the implications for sustainability of their delivery choices and behaviours. Price has biggest impact on delivery choice. Timing and method have limited impact. Every method with a fee is less attractive. No sustainability claim = strongest preference for home delivery.</p>	<ol style="list-style-type: none"> 1. Consumers are increasingly requesting information on how products are delivered. 2. Retailers that adapt their websites and increase customer awareness by showing transport CO₂ impacts and offering green delivery methods achieve more sustainable consumers choices. 3. It is key to explain the sources of emissions including those derived from the recipients' behaviours (e.g. collecting goods by personal car is usually worse than whichever other option) 4. Bringing forward green delivery options (first choice) has direct impact. Pricing is the most important factor and delivery time less so. 	<ol style="list-style-type: none"> 1. Consistent information needs to be provided to consumers that currently do not have an easy way to understand the implication of their decisions. 2. Complexity of quantifying delivery options' emissions and agreed standards for calculation 3. Transparency from online retailers on the emissions of delivery choices (see 2) 4. Not enough awareness of the usual implications of instant deliveries. 5. Limited role so far from governments/cities to nudge consumers decisions on deliveries. 	<p>Proximus detailed survey results</p>
<p>Develop sustainable delivery choices and proper management of returns. Retail may provide different delivery options and support decisions to achieve more sustainable delivery processes. Offering free returns usually creates unnecessary transport and needs to be managed properly.</p>	<ol style="list-style-type: none"> 1. When offering different delivery alternatives, make sure this does not create additional fragmentation in flows as this could have a negative impact (i.e. having the regular vehicle and the low/zero emissions vehicle delivering instead of only one). 2. Local sourcing or positioning inventory close to consumption are good practices to reduce emissions. 3. Instant or shorter delivery times increases complexity and most of the time, increases emissions. Still, this has been used to attract consumers even if in most of the cases, consumers do not require such urgency. 4. There is less and less push from retailers on instant deliveries and retailers are less and less subsidizing this practice. 5. Retailers are less and less offering free returns, but it is still part of the commercial offer, and they still have legal obligations to follow. 	<ol style="list-style-type: none"> 1. Same day or short lead times deliveries are offered to attract consumers even if there is no urgency by consumers and if not managed properly, generates transport inefficiencies. 2. Promotion of local sourcing is not exploited enough yet. 3. Management of returns solutions need to be improved (<i>see solution: Implement freight flows consolidation strategies</i>). 	<p>OCADO is offering green slots for home delivery so when there is space for additional deliveries on a planned route, the consumers could choose that delivery slot, so goods are consolidated increasing the number of deliveries per stop.</p> <p>OGOSHIP operates an open transportation and warehouse network that repositions inventory of smaller manufacturers/retailers in their logistics network close to the consumption points.</p>

Meet consumer expectations:

Sustainability is not an option but a must.

Still, prices and time are important elements in consumer decisions. Zero emissions delivery plans are the only strategies being built based on future consumer expectations. Committed companies and brands need to define clear objectives and timelines for transition. In the meantime, price and delivery time are manageable variables for sustainability.

1. Some companies are already including emissions as a cost in the P&L future scenarios (between 80-200 € Tn).
2. Consumers accept longer delivery times if transport is green, but clearly communication and transparency is a must.
3. Faster is not always better for a lot of consumers that prioritize reliability.
4. Even premium fees that are paid for an instant delivery are not paying the cost difference in comparison with D+2/D+3 delivery.
5. D+3 deliveries for B2B in cities are much more efficient and easier to plan than traditional timeframes.
6. Fee for grey deliveries reinforces sustainability claim

1. Cities may relax delivery time windows for zero emissions deliveries.
2. Is it possible to achieve the vision of having Instant/same day and efficient deliveries together?

[European Carbon Emission Trading System prices](#)

[VINTED](#) works with D+5 for second hand closet market.

4

Role of stakeholders & recommendations

The added value of this dialogue is that, unlike other steering documents on urban freight and logistics, this is conceived together by cities, regions, public authorities, and companies: shippers, retailers, logistics service providers, couriers and vehicle manufacturers working together and having regular exchanges.

Every city needs to have a clear understanding of the most relevant contributors to urban freight so problems can be segmented, and solutions be framed for that specific segment, e.g. local authorities have dedicated dialogues with waste, construction and small companies as part of their local dialogues at the city level.

The main effort has been to try to bring together the governance models and good practices implemented in different contexts into a framework to address common challenges moving from actions to overarching principles, and thereby creating this guide.

The main authors of this framework are local authorities, companies, and R&D organisations, but it also includes recommendations for other relevant actors, such as national governments, EU institutions, Civil Society and Citizens.

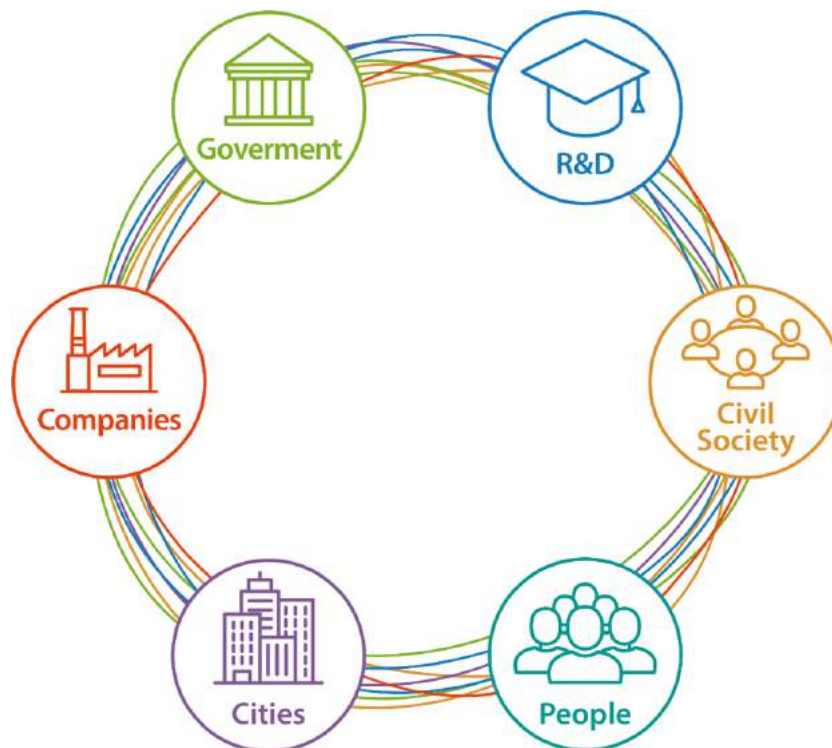


Figure 6. Stakeholders involved in urban freight and logistics

Recommendation for Companies

Private and public companies include manufacturers of goods, retailers, Logistics Service Providers (LSPs), courier companies, carriers, operators, but also OEMs, technology suppliers, infrastructure providers, energy suppliers and financial institutions, consultancies, associations, and others. The table below gives examples for mostly OEMs, shippers, LSPs and courier companies carriers as the key actors in implementing the solutions described previously.

Solution Area	Activity description	Main actor	Required public-private cooperation
Smart Governance & Regulations	Get engaged and directly contribute to the development of Sustainable Urban Logistics Plans, and actively participate in urban living labs to co-create new solutions. While reviewing and supporting data-driven guidelines development.	LSPs, Retailers, Courier/postal	Local authorities, Countries, EC
	Share needs and priorities regarding the timing and modes of operations, and the incentives needed to undertake sustainable behaviours.	LSPs, Retailers, Courier/postal	Local authorities
	Participate in joint procurement actions, also together with the local and public authorities, to unveil the hidden demand of clean vehicles.	LSPs, Retailers, Courier/postal	Local authorities
	Develop solutions and tools for dynamic curb side and space management in cities and mixed use of urban space.	IT companies	Local authorities and Companies
Clean & alternative fleet	Further test and investigate new autonomous technology like modular electric self-driving pods for mixed freight and passenger transportation and its regulatory framework	OEMs, Tier 1	Local authorities, LSPs, Courier
	Test and implement zero emissions fleets and operations	LSPs, Retailers, Courier/postal	Local authorities
	Develop Modular Light Electric vehicles and interoperable load units	OEMs	LSPs, Courier
	Develop sufficient charging infrastructure for scaling up BEV fleets	Electricity companies	Local authorities, Regions
Logistics Operations	Develop new logistics concepts and solutions to accelerate deployment of zero emission vehicles	LSPs, Courier/postal	EC / National / Local authorities and R&D
	Explore new logistics models decoupling transport and delivery, addressing the last meter	LSPs, Courier/postal	EC / National / Local authorities and R&D
	Develop open systems and protocols driving flows consolidation (Physical Internet concepts)	LSPs, Courier/postal	EC / National / Local authorities and R&D
	Involve employees in the design of sustainable operations and raise awareness and incentive them on exemplary behaviours regarding safety and environment	LSPs,	

Data Acquisition and Sharing	Establish open collaboration platforms with local authorities to share data and adopt new digital technologies for data acquisition to reduce inefficiencies and costs, favouring overall operational and logistics performance	LSPs, Courier, Postal	EC / Local authorities / Companies
	Enhance large scale sharing of impactful pilots, tools and solutions to motivate data sharing, integration and dynamic planning	LSPs, Courier, Postal	EC / Local authorities / Companies
Consumer engagement	Offer proper and transparent information on impacts and sustainability implications for different delivery choice	Retailers	LSPs / Postal / Courier
	Offer green delivery options for B2C and B2B city deliveries	LSP's, retailers	

Recommendations for local authorities

Solution Area	Activity description	Main actor	Required public-private cooperation
Smart Governance & Regulations	Set clear pathway and emissions reduction targets by 2025-2030 - and beyond - supported by the implementation of Sustainable Urban Logistics Plans		Countries, EC, Companies
	Integrate freight transport and logistics concepts into plans in different domains, both within and beyond mobility.	Energy, infrastructure, planning depts.	
	Ensure sustainable and joint public procurement is a common practice.	Local authorities	
	Create frameworks for innovation and testing of solutions/Living Labs by companies and operators.	Local authorities	Companies
	Understand freight flows segmentation, map operators space needs and impacts on the city mobility.	Local authorities	Companies
	Develop inhouse knowledge on freight transport and logistics	Local authorities	
	Develop strong enforcement mechanisms	Local authorities	Companies
Clean & alternative fleet	Increase procurement of zero emission fleet and services (waste, maintenance and repair, deliveries to public offices, etc.)	Local authorities	Companies
	Adopt harmonised regulations and policies for allowing silent electric vehicles for off-peak deliveries and access to other sensitive areas	Local authorities	Regions, Nations, EU
Logistics Operations	Impulse initiatives aiming for new models of collaboration, such as incentives, subsidy schemes, restrictions forcing cooperation	Local authorities	Companies
	Encourage consolidation with incentives and regulatory measures	Local authorities	
	Provide authorization or ease implementation through buildings accesses of logistics hubs enabling to shorten distance and consolidate last mile flows	Local authorities	
Data Acquisition and Sharing	Create institutional and technical capacity building framework for freight-focused and data driven policies, to manage the complexity of regulation and demand needs.	Local authorities	Companies, EC. Countries
	Collaboration platforms to create harmonized framework for data sharing	Local authorities	EC /Countries, Companies
	Fact-base problem definition and simulation modelling tools/dashboards are common practice across local authorities.	Local authorities	
Consumer engagement	Support retailers offering information on emissions implications on delivery solutions	Local authorities	Retailers
	Build science-based campaigns to increase knowledge and awareness of citizens	Local authorities	Civil Society Organizations / R&D

Recommendations for national governments and European Commission

Solution Area	Activity description	Main actor	Required public-private cooperation
Smart Governance & Regulations	Support and boost harmonization processes across local authorities at scale in terms of access regulation, low zero emission zones, data sharing principles (single market creation).	EC	Countries
	It is critical that the CIVITAS initiative is enlarged to enable private companies to be part of the discussion and or establish collaboration frameworks with industry organizations. Today, the initiative is focussed on local authorities only	EC, CIVITAS	Companies associations/ALICE
	Keep supporting the development of SULPs and support best practices sharing across local authorities	CIVITAS, ELTIS	Countries, Local authorities
Clean & alternative fleet	Upgrade electricity grid infrastructure plans according to urban freight needs (depots/hubs and charging points)	Countries, EC	Local authorities, Companies
	Understanding needs for zero emissions infrastructure and plans that are implemented transparently.	Countries, EC	Local authorities, Companies
	Increase efforts to produce renewable electricity and phase out fossil gas and coal.	Countries, EC	Companies
	Develop regulation framework for autonomous freight vehicles	Countries, EC	Local authorities, Companies
Data Acquisition and Sharing	Setting clear requirements for the definition of trusted neutral body, to establish pan-European data sharing common principles and acceptance of data owners	Countries, EC	Local authorities, Companies
	Create a subgroup on data sharing principles within the Expert Group on Urban Mobility (EGUM) ²	EC	Companies, Local authorities
	Support the large-scale adoption of digital tools for dynamic decision making, fostering pan-European collaboration on data sharing principles in the urban domain	Countries, EC	Local authorities, Companies

² For more information: <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?do=groupDetail.groupDetail&groupID=3165>

Recommendations for research & development partners and academia

Solution Area	Activity description	Required public-private cooperation
Smart Governance & Regulations	Support local authorities in monitoring and evaluating the measures and solutions implemented within the SULP.	Local authorities
Clean & alternative fleet	Further research on how to overcome BEV and FCEVs limitations	OEMs, Tier1, Tier 2
	System analyses for avoiding queues and delays due to charging time	OEMs, Local authorities
	Further development of batteries and fuel cells/hydrogen	OEMs, cell producers
Logistics Operations	Assess the benefits in terms of sustainability and social impact of crowd deliveries	Local authorities, Companies
	Develop models to measure impacts of delivery toward end consumers	Local authorities, Companies
Data Acquisition & Sharing	Act as a trusted third party to foster dialogue and the sharing and understanding of information between the public and private sectors, also through the coordination of Logistics Living Labs	Local authorities, Companies
Consumer engagement	Define survey techniques and models to help cities and companies understand consumer preferences and policy acceptability	Local authorities, Companies

Recommendations for civil society and citizens

Solution Area	Activity description	Required public-private cooperation
Responsible consumption	Consume only what you really need: almost all the emissions are due to the manufacture and use of products.	EC, Countries, Local authorities
	Prefer the delivery at parcel lockers and pick-up points and low-carbon transport modes to collect your parcel and reduce fast deliveries to a strict minimum.	Companies
	Group different purchases into a single delivery	Companies, Local authorities
	Buy more local	Companies, Local authorities

5

Conclusions, next steps and how to get engaged

This document is a milestone in the ongoing strategic collaboration between POLIS and ALICE networks and their members. Some initiatives⁶ were already kicked off during the first months on top of ongoing collaborative innovation projects. Collaboration slowed down because of COVID-19 outbreak until early 2021 when the collaboration was revamped.

POLIS & ALICE strategic dialogue has become a strong Alliance as reflected by the European Commission's Directorate-General for Mobility and Transport (DG MOVE), that organized a consultation workshop on the new EU Urban Mobility Initiative: Urban freight transport and logistics, in cooperation with POLIS and ALICE⁷. Both networks are frequently consulted to define Local authorities and Companies needs to be addressed in R&I programmes such as Horizon Europe.

For all those companies and cities willing to contribute to this ongoing effort and advance collaboratively to achieve zero emission delivery and logistics in cities in an efficient and affordable way, **we invite you to become member of POLIS or ALICE and join forces**

So far, the path has been full of learnings from both sides, local authorities, and companies. A strong commitment is sensed from local authorities to help companies and companies to help local authorities in finding smart pathways to achieve common objectives as fast as possible and in an affordable way. We foresee the following next steps:

- **Encourage POLIS and ALICE members to use the joint document** to define their own roadmaps and plans putting in practice the initiatives and recommendations leveraging knowledge and expertise in the network.
- **Enable connections between projects, initiatives, local authorities and companies to accelerate innovation.** Develop training materials and knowledge sharing activities (e.g. workshops and webinars).
- **Continue sharing practices, ongoing projects results and discussing new concepts and opportunities** in the network through regular internal workshops and webinars.
- As soon as COVID-19 allows, **re-start the organization of onsite visits and exchanges aiming at creating new collaboration opportunities.**
- **Continue our dialogue and exchanges with the European Commission** in the frame of the Expert Group on Urban Mobility and in view of the publication in December 2021 of the New Urban Mobility Initiative for which we have already been heavily involved. Provide advice and priorities for R&I funding programmes (e.g., Horizon Europe Programme).
- **Engage with other relevant networks** (e.g. EMEurope, and OPEN ENLoCC⁸, Promoting the collaboration and integrate new local authorities and companies to enrich the dialogue.
- Engage with external stakeholders through **POLIS conference**, the **International Physical Internet Conference** and the **Transport Research Arena** where POLIS and ALICE have a key role in their programme development.

⁶ ALICE members Proximus and L'Oréal partner up for the delivery of telecom and hair salon products by electric bicycle with the participation of ALICE member VUB and with the support of Region Bruxelles Capital as ALICE member. More info: <https://www.proximus.com/news/2019/proximus-and-loreal-partner-up-for-the-delivery-of-telecom-and-hair-salon-products-by-electric-bicycle.html>

⁷ Consultation workshop on the new EU Urban Mobility Initiative: Urban freight transport and logistics: <https://www.eltis.org/participate/events/consultation-workshop-new-eu-urban-mobility-initiative-urban-freight-transport>

⁸ See: <https://www.electricmobilityeurope.eu/> and <https://www.openenlocc.net/>

