



URBAN FREIGHT LOGISTICS SOLUTION BOOKLET

Smart Cities Marketplace 2023

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ENERGY

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The Smart Cities Marketplace is an initiative supported by the European Commission bringing together **cities, industry, SMEs, investors, banks, research and other climate-neutral and smart city actors**. The Smart Cities Marketplace Investor Network is a growing group of investors and financial service providers who are actively looking for Climate-neutral and smart city projects.

**WHAT IS THE
SMART CITIES
MARKETPLACE?**

The Smart Cities Marketplace has thousands of followers from all over Europe and beyond, many of which have signed up as a member. Their common aims are to **improve citizens' quality of life, increase the competitiveness of European cities and industry** as well as to **reach European energy and climate targets**.

**WHAT ARE THE
AIMS OF THE
SMART CITIES
MARKETPLACE?**

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**WHAT CAN THE
SMART CITIES
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FOR YOU?**



WHAT AND WHY



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WHAT AND WHY

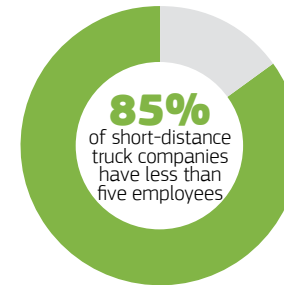
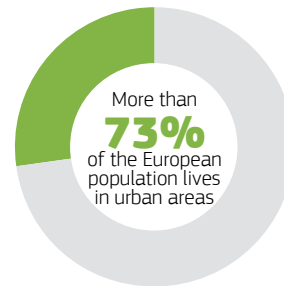
Urban freight logistics cover all movements of goods into, out of, through or within urban areas made by light or heavy vehicles, including service transport and demolition traffic, as well as waste and reverse logistics. The rapid increases in demand for the e-commerce supply chain, boosted by COVID-19, increased the pressure on city logistics and is shaping the way urban logistics policies are being drawn up. Currently, the greatest challenge is to address the growing number of urban freight vehicles and to ensure high-quality services to consumers through innovative solutions such as shared and collaborative initiatives and digital platforms.

Even though e-commerce represents only a fraction of retail sales, it is expanding quickly and putting extra pressure on urban logistics. Compared to 2019, 2020 showed a 27% increase in sales through e-commerce. Even if growth will not remain at the COVID-19 levels, it will not stop, and yearly increases are expected to remain around 8-10% through 2026.*

* Oberlo (2022): [Global ecommerce sales growth \(2021-2026\)](#)

A study by the World Economic Forum** estimates that in 2030, compared to 2019, there could be 36% more vehicles, a 30% increase in greenhouse gas (GHG) emissions, and an additional eleven minutes in daily commuting in 2030 compared to 2019 just due to more last-mile delivery activities (if no further interventions are implemented).

Some **city figures** regarding Urban Freight Logistics***:



** World Economic Forum (2020): The Future of the Last-Mile Ecosystem

*** ITF (2021), [ITF Transport Outlook 2021](#), OECD Publishing, Paris.

Urban freight logistics directly contribute to cities' wealth, competitiveness, and efficiency, whilst also negatively impacting traffic congestion, urban space occupation, accident rates, pollution, and noise.

The overall goal of urban freight logistics is to provide better and more customised last-time logistic services for citizens, fostering local economic development through local logistics businesses, while reducing the negative impact the delivery of goods has on our urban environment.



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The European Commission's shows a clear interest in sustainable solutions for urban freight logistics, as the White Paper* "Zero emission urban logistics in major urban centres by 2030" elaborates. The main actions intend to:



Produce best practice guidelines to improve monitoring and manage urban freight flows;

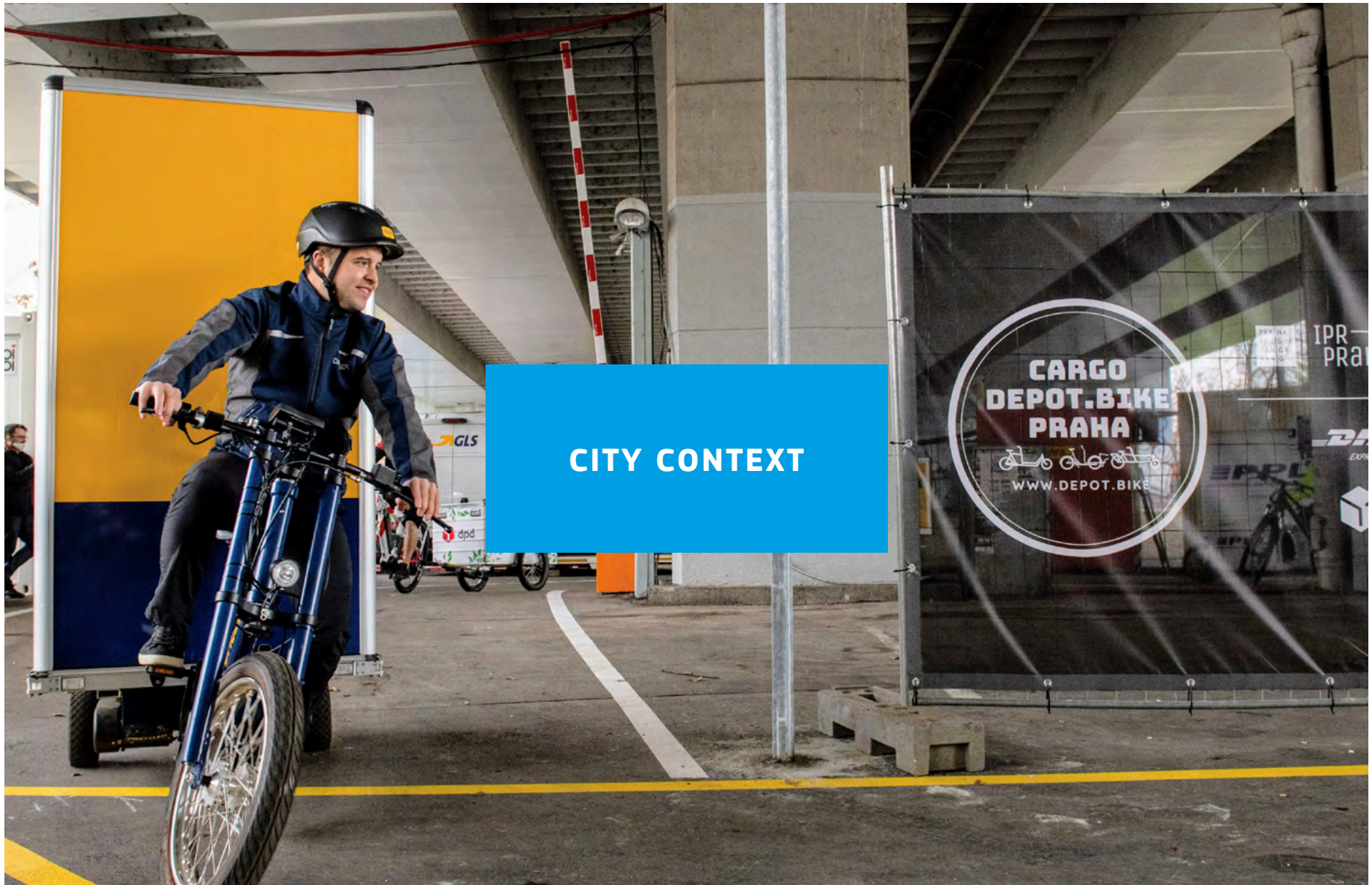


Define a strategy for moving towards 'zero emission urban logistics', bringing together aspects of land planning, rail and river access, business practices and information, and charging and vehicle technology standards.

* EU White Paper – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system (EC 2011). Initiative 33: "Zero-emission urban logistics – in major urban centres by 2030.



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Depot Bike in Prague, Czech Republic © ekolo.cz

CITY CONTEXT

The pandemic has radically changed the norms of how people live, work, travel, and also purchase products and services. Although the vast majority of restrictions have been lifted, behaviours and standards have steadily changed, which has a knock-on effect on urban freight transportation.

The following can be considered the most important impacts:

- **The gross value and the share of e-commerce in retail purchases have increased:** new platforms, challenges and solutions have been created.
- **There is a shift to working from home.** This can improve the rate of successful deliveries and widen the window when people can receive parcels at home or collect them at local delivery points.
- **People changed their way of travelling:** they have shifted to a higher share of private modes of transportation. This also means that more people choose to use cars instead of public transportation, but also active modes, such as walking and using bikes or e-scooters, have become more popular. Many cities have been reshaping their infrastructure to promote less carbon-intensive means of transportation.

It is also important to consider what has hindered and what has supported the expansion of urban freight transportation during COVID-19. The main facts are listed below.

Hindering factors:

- **Shortage of capacity and workforce to react to rapidly increasing demand.** However, higher revenues could support investments.
- **Face-to-face deliveries were not always compliant with health authorities' suggestions and rules.** This has fostered contactless transactions and other digital solutions.

Supporting factors:

- **Reduced traffic and more parking spots have resulted in quicker delivery times.** Cities should consider the potential need for support of zero- and low-carbon urban freight vehicles when reshaping public spaces.
- **Higher success rates of deliveries due to stay-at-home orders and the consequent work-from-home practices.**

Sectors and activities entailed within Urban Freight Logistics*



Waste



Retail



Express, courier
and post



Hotel, restaurant
and catering



Construction
and road services

* Source: 'CIVITAS' (2015): Webinar in ['Making urban freight logistics more sustainable: from theory to practice'](#)

Cities and innovation

Even before the pandemic, cities had a key role in bolstering innovation. This is based on the fact that local features are critical in determining urban freight logistics, and cities have the responsibility and knowledge to address these specific challenges. New solutions can be expected across four main topics:

- Electrification of urban freight logistics,
- Shift towards lighter transport vehicles,
- Digitalisation of processes – real-time and dynamic information systems,
- Collaborative and shared urban solutions.

It is also important for policymakers to consider different types of measures in urban freight logistics. Besides regulatory measures (e.g., load and parking rules, low emission zones, etc.), market-based policies are also essential; for instance, how delivery and polluting activities are taxed or whether low- or zero-carbon vehicles are subsidised.

Cities need to take into account the local opportunities and challenges and design the public areas and infrastructure accordingly.

An overview of urban freight transportation intervention measures that might be considered.* →

* Making urban freight logistics more sustainable. CIVITAS Webinar December 2015 (C. Di Bartolo & T. Stefanelli)

Stakeholders' engagement	Land-use planning & infrastructure
Freight Quality Partnerships Freight advisory boards & forums Designation of a City Logistics Manager Further engagement (e.g., through hackatons)	Adapting on-street loading zones Using building code regulations for off-street delivery areas Nearby delivery areas Upgrading central off-street loading areas (including repurposing off-street parking) Integrating logistics plans into land use planning Urban consolidations centres
Regulatory measures	Market-based measures
Time access restrictions Parking regulation Environmental restrictions (e.g., low-emission zones) Size/load access restrictions Freight-traffic flow management Ban on some types of vehicles	Pricing Taxation and tax allowances Tradable permits and mobility credits Incentives and subsidies
New technologies	Raising awareness of eco-solutions
Dynamic routing Real-time information systems (e.g., curbside management systems) Traffic control Electrification Innovation within light-vehicle systems Collaborative and shared digital solutions Fleet management systems	Anti-idling Eco-driving Modal shift Flextime Recognition & certification programmes Information campaigns

Both local, regional, and national policies can bolster innovation and push enterprises to take up new technologies (e.g., electrification, real-time systems) while they also have a central role in launching information campaigns and raising awareness.

Finally, engaging with different stakeholders is critical. The table on the previous page gives an overview of urban freight transportation intervention measures that might be considered*.



Mechelen in Belgium © Ayman Elkandoussi on Unsplash

* European Parliament's Committee on Transport and Tourism (2022): COVID-19 | [COVID-19 and urban mobility: impacts and perspectives – Rapid-response brief](#)

Case study: Mechelen, Belgium

Mechelen is a middle-sized city with a population of ca. 88,000 inhabitants, located in Flanders, Belgium. The city council is committed to combatting climate change and reaching net zero emissions of urban freight transportation by 2030 (in line with EU guidelines). As such, they take an active role in local initiatives to decarbonise urban logistics. Three main goals have been identified in local urban freight transportation: (1) to reduce the number of vehicles, (2) to decrease the number of driven kilometres, and (3) to mitigate GHG emissions.

Several low- and zero-carbon solutions have been introduced to address increasing delivery demand. These include:

- ↳ Extensive use of cargo bikes by local companies
- ↳ Subsidies to local entrepreneurs to support purchasing (electric) cargo bikes
- ↳ Expanding electric vehicle fleets, e.g., bpost (Belgium's leading postal operator) relies exclusively on electric trailers, e-vans, and other electric vehicles in the city
- ↳ Two cargo bike companies operate as bicycle couriers

In order to improve the quality of life of inhabitants, Mechelen has adopted several additional measures. The downtown has car-free shopping streets to moderate inner traffic, and a shuttle is provided between a parking area on the outskirts of the city and the centre. The city has the 'City Changer Cargo Bike' project to promote cargo bikes to public, private and commercial stakeholders in the inner urban areas. In 2019, the first three smart lockers were installed to enhance shipment acceptance and delivery 24/7. The potential role of micro-mobility hubs has also been investigated. Moreover, the city is participating in the trial version of the ULaaDS project, namely in setting up a city-wide platform to integrate and manage urban logistics and starting to operate a transport vehicle-sharing scheme.

It is also important to consider the local factors which contribute to the success of local projects. First, the geography of the city helps: the town is flat and compact with high population density, which supports bike usage. Furthermore, a large warehouse is located at a good logistical point to facilitate the distribution of parcels. Also, the city council has been ambitious and launched new projects often. Conversely, the regional and national policy environment is less supportive, and there is a lack of clear targets. There is also a need to find a good balance between moderated traffic in the inner areas and ensuring accessibility, as well as supporting delivery companies to reach inner, densely populated districts easily and quickly to address the increasing challenge of on-demand services. Further reading: ULaaDS cities [Mechelen](#)

Urban Freight Logistics electrification and GHG emissions

In 2019, freight transport was responsible for more than 40% of all transport CO₂ emissions*, and demand is projected to more than double in the next three decades.

Urban freight transport covers short distances, involving many trips and small loads. Even though the volume of activity is low, representing only 3% of the total freight activity, these movements are very carbon-intensive, accounting for around 20% of all freight emissions.**

Light commercial vehicles (LCVs) account for approximately 70% of all road freight vehicles. LCV fleets servicing last-mile urban delivery have characteristics that make them highly suitable for electrification, with the prediction of daily mileage of vehicles enabling battery size and charger installations to be optimised.

* ITF (2021), [ITF Transport Outlook 2021](#), OECD Publishing, Paris,

** ITF (2020). How Urban Delivery Vehicles can Boost Electric Mobility, International Transport Forum Policy Papers, No. 81, OECD Publishing, Paris

The electrification of freight fleets, alongside the switch to renewable technologies for electricity production, presents an important step in achieving 2050's 90% transport carbon reduction goals. Key examples are cities that have joined the C40 Green and Healthy Streets Declaration pledge to set up zero-emission zones by 2030 in their metropolitan areas *** in order to improve air quality and decrease GHG emissions.

C40 is a network of mayors of nearly 100 world-leading cities collaborating to halve the emissions of its member cities within a decade. C40 operates on performance-based requirements instead of membership fees, member cities earn their membership through action. In 2017, C40 Cities launched the Green and Healthy Streets Accelerator, where signatories pledged to procure only zero-emission buses from 2025 and ensure a major area of their city is zero emission by 2030 .

To achieve this, cities will commit to:

- ↳ Transform cities through people-friendly planning policies.
- ↳ Increase the rates of walking, cycling and the use of public and shared transport that is accessible to all residents.
- ↳ Reduce the number of polluting vehicles on our streets and transition away from vehicles powered by fossil fuels.
- ↳ Lead by example by procuring zero-emission vehicles for city fleets as quickly as possible.
- ↳ Collaborate with suppliers, fleet operators and businesses to accelerate the shift to zero emissions vehicles and reduce vehicle miles in our cities.
- ↳ Publicly report every two years on the progress the cities are making towards these goals.

To date, 36 cities have pledged to Green and Healthy Streets, including Paris, Los Angeles, Cape Town, Mexico City, Tokyo, Auckland, and many others.

*** [C40 \(2020\)](#)



SOCIETAL AND USER ASPECTS

Depot Bike in Prague, Czech Republic © ekolo.cz

SOCIETAL AND USER ASPECTS

Urban freight logistics activities, by definition take place within cities, and hence distribution networks depend upon and impact various city stakeholders^{*}:

- Public authorities;
- Supply chain stakeholders (shippers, transport operators, receivers);
- Other traffic participants (including residents and visitors);
- Providers of vehicles and IT equipment.

COVID-19 has steadily changed some of urban freight logistics's societal and user aspects. The demand for doorstep deliveries has skyrocketed, but new challenges and, as a response, new services have emerged. These include, for instance, quick grocery shopping (q-commerce) and 'on-demand' delivery services, delivered by new or internationally expanding.^{**}

* Updated version of the 'CIVITAS' (2015): Webinar in '[Making urban freight logistics more sustainable: from theory to practice](#)'

** CNBC (2021): [Deliveroo takes on start-up rivals with 10-minute grocery delivery service](#)

Cities also have to consider the current and expected changes to urban freight logistics in order to adopt the right regulation at the right time. The right policy environment can nudge providers to use low – or zero-carbon solutions and can give clear guidance to businesses on the path to a greener transport system. Defined medium – and long-term strategies are essential in re-designing urban infrastructure, such as streets and mobility hubs, public transport services, etc. Stakeholder engagement is also crucial to foster real change in social behaviour and avoid social resistance against new distribution models.



Depot Bike in Prague, Czech Republic © [ekolo.cz](#)

The below table summarises the new phenomena which have been accelerated by the increase in e-commerce. It also emphasises the differences between short- and medium-term effects (which have been the result of the strong and sudden change in people’s lifestyle) and long-term effects (which refer to those changes which continue to affect everyday life after restrictions have been lifted).

Changes in urban freight transportation for different stakeholder groups due to COVID-19:



Depot Bike in Prague, Czech Republic © ekolo.cz

	Short – and medium-term; <i>During restrictions.</i>	Long-term; <i>After restrictions are lifted.</i>
Consumers	Opportunity to buy essential (e.g., food) or unavailable (e.g., clothing) goods.	Changed preferences, higher e-commerce rate and better availability of services (e.g., ordering food from more restaurants at the same time).
Producers	Delivery is often the only way of selling goods.	Potential to increase revenue in new markets (e.g., those who do not want to go out); Increase in reverse logistics operations due to multiple-size ordering of goods (e.g., clothes).
Public authorities	Ensure essential (public) services.	Regulating urban freight logistics (with a focus on mitigating GHG emissions, reducing congestion and bolstering innovative solutions).
Providers of urban freight logistics	React to demand and supply shocks, comply with health measures, peak labour demand.	Follow demand-side changes, improve efficiency and follow public measures.

Stakeholder engagement

Stakeholders in urban freight logistics have different characteristics, depending on whether they are public authorities, private business participants or citizens.

In the case of **private actors and businesses**, their main interest is in the practicalities connected to their own business, such as how to improve profitability and what can endanger it. That is why it is important to include a strong preference for short and mid-term solutions; otherwise, these private actors and businesses will soon lose interest in city initiatives. Moreover, it is essential to show cooperation opportunities between complementary businesses and niches within the urban freight logistics environment as a path to boost their potential.

Regarding **politicians**, it is key to understand the views of the relevant political bodies to adjust the initiatives to the windows of opportunity which may arise in the local context. The point is to engage key stakeholders, having a clear idea of what role they are playing in the process, both individually and as institutional representatives.

When considering **citizens**, the best way of engaging people is to explicitly present the city initiatives and the achievable results, realistically addressing any potential misunderstanding of the process as well as any co-creation opportunity which may arise during the design and/or implementation stages.

Furthermore, **educational and research institutions**, as well as **experts and consultants** can contribute significantly to the upgrade of solutions to be implemented.



To learn more about **collaborative approaches** regarding Urban Freight Logistics, please check CITYLAB project materials*.

Key questions when engaging in Urban Freight Logistics environment:

Which members?

People, institutions, stakeholders' analysis

Existing working relations?

Network analysis

What's their mission and interest?

Depending on the stakeholders

What can they deliver to the project and its environment?

Foster proactivity

What level of engagement?

Inform/consult/collaborate/empower;
Depending on the purpose of the project.

* [CIVITAS CITYLAB](#), City Logistics in Living Laboratories.



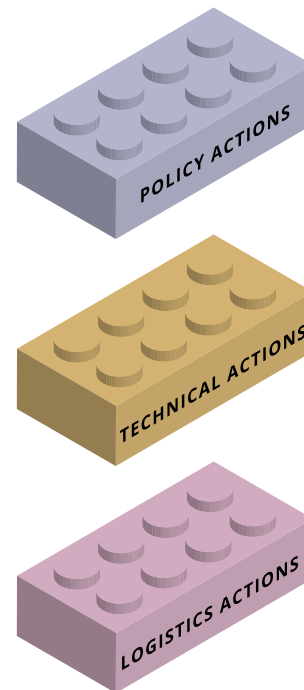
Depot Bike in Prague, Czech Republic © ekolo.cz

TECHNICAL SPECIFICATIONS

Most urban freight solutions are based on the principle of an open interoperable component-based design. This delivers flexibility and choice for cities in selecting solutions to suit their various community needs. They are akin to “Lego” building blocks, used to build something standard with given instructions, but also can adjust and adapt the pieces to suit specific needs.

Urban Freight Logistics system components at the city level

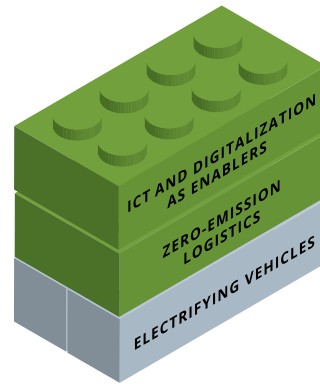
The Urban Freight Logistics system can be broken down into three main components (ways of action) as a basic common taxonomy for any city. The mix among those three components determines logistics operations within the city:



1. **Policy actions.** These determine the urban conditions in which Urban Freight Logistics operations can take place, specifying times, locations, vehicle constraints, etc. In most EU cities, this policy level depends on municipal regulations and competencies.
2. **Technical actions.** These determine the means to plan trips and communication (e.g., Information and Communication Technologies, known as ICTs) within Urban Freight Logistics activities, as well as the means to move the freight across the city (e.g., vehicles).
3. **Logistics actions.** These determine the operational conditions for urban freight transport (e.g., delivery hours and frequency, means used, exact delivery locations, etc.).

Within Urban Freight Logistics systems, regarding Smart Cities' projects, innovative solutions are focused on technical and logistical actions, as most of them are either:

- **targeting new ways of planning trips/routes** through ICT and digitalisation as enablers (real-time/dynamic information and geo-referenced systems), intending to better monitor, manage and plan urban freight flows;
- **targeting vehicles and infrastructures, promoting zero-emission logistics** in major urban areas by:
 - ↳ fostering lighter vehicles for last-mile delivery services (e.g., cargo bikes)
 - ↳ electrifying those vehicles (and inherent infrastructures) which currently are run on fossil fuels.



Public administration will be in charge of promoting ambitious policy actions with the aim of facilitating the operation of both technical and logistical actions.



© Manchester Bike Hire (Triangulum project)

Urban Freight Logistics solution components: Logistics depot for e-cargo bikes in Prague

The logistics depot project in the city of Prague is presented below, following the component-based approach. The implementation area prioritises lighter last-mile delivery vehicles:

- ↳ **The City government runs the scheme:** the depot in Florenc, Prague was agreed upon and built within five months after City Council support was acquired. No EU funds or subsidies were used to ensure the depot would continue its operation after the end of any support scheme.
- ↳ **Big logistics companies (DHL Express, Dachser, PPL, DPD, GLS, CCCB partner Messen-gerCZ, and Rohlík.cz):** signed an agreement to bring their freight to the last-mile micro-distribution centre.

Warehouse: The city of Florenc, Prague supported the initiative by acquiring a municipal warehouse for the pilot project. The depot also offers heated facilities for couriers, including a kitchenette and showers, a universal charging station for e-bikes and a service station.

Vehicles: Depots for e-cargo bikes were installed to showcase a new method of last-mile logistics in the city as a sustainable alternative to polluting delivery vans and e-cargo. Bikes were trialled in the city to raise awareness of this mode.

Data: Local provider of [electric mobility Ekolo](#) hold confidential data and statistics linked to the operation of the site.

Impacts:

- ↳ Turned a car-dominated space (parking lot) into a bike hub depot in four weeks.
- ↳ 50,000 parcels were delivered through the scheme between November 2020 and July 2021.
- ↳ 23,000 cargo e-bike kilometres were driven within the initial eight months of operation (November 2020 – July 2021).
- ↳ The temporary bike depot in Florenc is now permanent and a second depot was opened in 2021, in Prague-Smíchov, with eight logistics providers signing up.
- ↳ The project was identified as one of the three best projects in the 'Zero Pollution' category of Eurocities' Awards 2021, and is considered one of Europe's most environmentally-friendly projects.



Warehouse



Vehicles



Sensors and data management

BUSINESS MODELS AND FINANCE

This section aims to give a brief overview of the different business models that European cities have experimented with during the implementation of urban freight logistics solutions.

In recent years, shared and collaborative economies have emerged and rapidly increased both in number and scale. Digital solutions are also spreading quickly in the area of urban logistics. Innovative approaches are available to cut costs, increase efficiency and contribute to cutting emissions.

From a business point of view, it is risky to take successful practices and try to implement them directly in other cities, as the potential success of those solutions depends very much on the local context they have been piloted. It is important to carefully characterise the initial and targeted implementation setups and context so that potential businesses can explore the viability related to expansion opportunities.



© Manchester Bike Hire (Triangulum project)

Collaborative platforms

'Urban Logistics as an on-Demand Service' (ULaaDS) is an initiative that aims to enhance urban logistics ecosystems, working across different European cities. They focus on shared and collaborative solutions and launched some projects recently to test innovative ideas such as*:

Containerised urban last-mile delivery:

Containerisation means that instead of vans picking up parcels at a sorting terminal outside the city, driving to the city centre and delivering parcels, containerisation introduces standardised and modular load units, such as specific trolley containers for the last mile. These parcels are then grouped based on common delivery areas. Delivery from the city hubs to the last mile is done by cargo bikes. This creates the possibility to ship different goods from different carriers.



Depot Bike in Prague, Czech Republic © ekolo.cz

Sharing economy platforms for on-demand city logistics:

Crowdsourcing (or 'crowd shipping') logistics is the main pillar of this idea. It involves citizens taking part in delivery: by using their everyday routes and usual types of vehicles, they can ship parcels instead of dedicated logistics operators. Crowdsourcing can be fostered further by innovative ideas, for instance, by ensuring shared cargo bikes and offering individual contracts for different 'on-demand delivery' platforms. As a result, costs can be reduced due to resource pooling; local enterprises can be more competitive as they do not have to develop their platforms, and they are often located closer to consumers than warehouses of larger retailers."

* ULaaDS: [Solutions](#)

** Further reading: International Transport Forum: [Combined passenger and freight flows](#)



Depot Bike in Prague, Czech Republic © ekolo.cz

City-wide platforms for integrated management of urban logistics:

City-wide platforms have the potential to pool the goods of providers and the orders of consumers on one neutral platform and optimise the delivery and reverse logistics operations from different warehouses located across the city. Parcels can be shipped by any of the delivery companies, but local authorities have the opportunity to set regulations.

CargoHitching:

Idea built on using the capacities of vehicles that would be kept empty otherwise. For example, vehicles such as taxis have the potential to flexibly deliver products by filling their slots. This can lower GHG emissions and mitigate congestion, connect peri-urban areas with centres and improve the efficiency and load of vehicles.



Dual MobiHub:

Mobility hubs ('Mobihubs') have been developed to enable switching between different transportation modes through the integration of shared mobility parking slots (cars, bikes, cargo bikes, e-scooters, etc.), public transportation stations, and even EV-chargers for private use.

As many people pass these meeting points every day, there is a good option to add urban freight points: pick-up points, delivery lockers and shipping pick-up stations can be placed here. As a result, fewer last-mile deliveries are needed since people can pick up their parcels without additional distribution being required.

Digital solutions

However, while collaborative and shared initiatives have been developed considerably over recent years, digital solutions are also key for improving the quality of urban freight logistics or mitigating its negative impacts. Digital solutions can be categorised into two main groups depending on whether they target public or private users.*

The first category creates a **tool mainly for local authorities to efficiently monitor, manage and restrain and design urban spaces**, particularly (un)loading and parking areas. There are platforms which have been developed to help local authorities reconsider the usage of public spaces and regulate it through different planning, visualisation and mapping functions, as well as provide real-time data to cities. As such, these apps contribute to reshaping urban areas according to local priorities. Additionally, there have been initiatives which help cities to digitally control loading spaces in crowded inner areas by varying maximum parking time depending on the type of vehicle, based on the time of day or even on individual profiles. As such, they provide a digital solution for the shortage of parking spots, congestion, and air and noise pollution.

The other type of **digital innovation focuses on private consumers and businesses**. Automation and optimisation of last-mile deliveries can improve the efficiency of deliveries and finetune the end-user experience. For consumers, visualising deliveries in real-time and sending notifications ensures a higher level of transparency and also improves delivery rates. Moreover, via digitalisation, higher automation of processes can be reached, which reduce operational cost and optimise shipments and warehouse operations.



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* See some digital solutions listed in the annex.

Ways to reduce delivery costs and emissions

The [World Economic Forum](#) released a study just before the COVID-19 pandemic started, which forecasted a drastic increase in deliveries, and, therefore, higher congestion and GHG emissions if the industry is not regulated properly.

Their baseline scenario (which assumes no interventions) compared the year 2019 to 2030 and expected a 36% increase in the number of delivery vehicles, an increase in GHG emissions from 19 to 25 million tonnes of CO₂, and an additional eleven minutes in average daily commuting time due to heavier traffic – these predictions have likely been accelerated by the increased use of private transportation modes and the higher e-commerce share due to COVID-19.

The same study also suggests that many different types of interventions could limit the negative consequences of increasing delivery services. These cover steps like changing vehicle powertrains (from the current fleet to battery electric or fuel cell electric vehicles), customer movements using more parcel lockers, incentivising office delivery and multi-brand parcel shops, load pooling and technological advances such as drones and earth-bound delivery robots.

According to the research, the largest GHG mitigation effects can be achieved by investing in EVs and FCEV (if changes are mandated, these suggest a 60% and 40% decrease, respectively, compared to the baseline). Several cities have introduced a ban on fossil fuel vehicles earlier than national policies mandate (see for example Amsterdam, where a [full ban by 2030 will be implemented in steps](#)). Delivery costs can be significantly reduced thanks to increased night-time deliveries, robots (both drones and earthbound), more multi-brand parcel shops and parcel lockers (by 28%, 20%, 17% and 12%, respectively, compared to the baseline with no specific intervention). Parcel lockers are widely used in many cities, whilst robots are still in the design and testing phase.

[Night-time deliveries](#) have been tested in several larger cities and have been found efficient in lowering traffic in peak times, mitigating emissions due to less congestion, and creating more punctual arrival of services.

Besides the revenue obtained from deliveries, there are complementary sources to be exploited in some urban freight logistics solutions. For example, in some cases, the last-mile logistics company can sell advertising rights to larger delivery companies, implementing their branding in last-mile logistics company vehicles and workwear. This could be of special interest to cargo-bike delivery companies, often struggling with profitability issues. However, in some cases, local regulation does not allow the advertisement of any company other than logistics companies, significantly limiting the business potential.



**GOVERNANCE
AND REGULATION**

Depot Bike in Prague, Czech Republic © ekolo.cz

GOVERNANCE AND REGULATION

Governance models and regulatory measures

In a post-pandemic world where COVID-19 has induced or accelerated changes in people's behaviour and norms, urban freight transportation faces new challenges. However, to increase consumers' and service providers' well-being, it is necessary to change the policy environment accordingly. Besides national governments, local authorities have a crucial role as they understand the challenges of urban infrastructure best.

First of all, cities are essential in addressing the negative environmental impacts of elevated delivery activities, but regional and national policy frameworks also have an important role to play. The following environmental regulations could be considered:

Local and national measures

Subsidising low – and zero-carbon solutions, such as switching to e-vans or financing cargo-bike systems. This can have a significant role in accelerating the electrification of urban freight movements and the change to lighter vehicles.



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Local measures

- Moderation of congestion and emissions in inner areas, while ensuring the robustness of local supply chains. Congestion charges, dynamic curb-side management of loading times and parking conditions can be efficient digitalisation tools.
- Restriction of the use of polluting vehicles locally (e.g., via low-emission zones), and the outright ban of internal combustion engine vehicles from the busiest parts of cities can give rise to a more financially sustainable freight model based on cargo-bike or e-van deliveries. Time-based, volume or weight restriction of freight vehicles is also an important policy tool. Note that regulatory measures usually have a higher degree of acceptability to the general public as compared to market-based measures.
- Local regulations need to address the situation on the ground and therefore, need to be tailored accordingly. This means, for example, that local governments need to regulate emerging micro-mobility activities, which raises a challenge for last-mile delivery services. If in crowded inner areas low – or zero-carbon methods are incentivised, such as opening new bike lanes, regulating scooters or ensuring additional parking spots for cargo bikes or EVs, changes in delivery approaches can occur.

Note that cycle-friendly cities have been proven to be more effective for urban freight logistics thanks to lower levels of congestion.^{*} Furthermore, local authorities are also responsible for creating a supportive regulatory framework for new local initiatives.

- Specific measures can enhance governance models, such as the creation of “freight quality partnerships”, city logistics advisory boards and forums, or the designation of a city logistics manager (facilitator role). These are important as all stakeholders feel they have the ability to equally influence and contribute to this model and the overall decision-making process.

Furthermore, cities can foster innovative ideas, such as by running hackathons to assess local challenges, or by mandating or operating business-neutral platforms to pool supply and demand. If unused or empty buildings can be allocated to delivery companies to function as inner-city hubs (open for all market participants or to those who comply with stricter local regulations), costs, congestion and delivery time can be lowered. Digital solutions have the potential to help to smooth congestion and to accelerate loading and unloading.

At the national and international level, it is crucial to organise platforms where cities of different sizes can share their experience, solutions and best practices – for instance, the Covenant of Mayors, or C40 Cities initiative can fulfil this role for their member cities. Furthermore, by harmonising local and national policies, delivery companies can offer the same, high-standard services in more locations and reduce costs for consumers.

* ULaaDS: [Collaborative and shared urban logistics models](#)

** Long-term partnership between urban freight stakeholders that, on formal or informal basis, meet regularly to discuss problems, issues and potential solutions that occur in the urban area.

Steps to create an action plan

From a city perspective, the CIVITAS initiative describes a step-by-step process to frame new innovative urban freight logistics solutions, connected to the formulation of city goals and a set of indicators that ensure an effective implementation and (re)assessment of those innovative solutions*.

The following steps are included:



* 'CIVITAS' (2015): Webinar in ['Making urban freight logistics more sustainable: from theory to practice'](#)

What steps can cities take to incentivise (electric) cargo bikes? Examples from C40 Cities

C40 Cities is a global initiative which aims to make cities more liveable and lower the negative effects of climate change through local mitigation and adaptation measures. As cargo bikes can have a double dividend through moderating congestion level, boosting to local living standards and operating as zero-emissions vehicles, their role has been explored during and since the pandemic, and recommendations have been to local authorities have been formulated based on applied examples.

Reshaping and reusing urban areas

- ↳ Berlin was **one of the first cities which created pop-up bike lanes after COVID-19 hit in March 2020**, a decision which has supported cargo-bike deliveries. The district of Neukölln has been redesigning public spaces to improve accessibility. This has included opening new areas for cargo bike parking, and modifying e-scooter parking regulations.
- ↳ **Cities can also contribute to identify unused areas in the downtown**, such as in a basement of a shopping centre in Gothenburg which has opened exclusively for e-cargo bikes, or to reuse a former bus station as local hub for e-cargo bikes, as happened in Montréal. These help to create local hubs closer to crowded urban areas and contribute to logistical challenges.
- ↳ In Oslo a carpentry company has decided to **switch from diesel vans to cargo bikes in the city centre**. This has been incentivised by the city's Car-Free Liveability programme, as downtown shipment has become more challenging and more costly.

Engage stakeholders and ensure financial subsidies

- ↳ It is also crucial to **engage different stakeholders to switch to low – or zero-carbon urban freight solutions**. This can be incentivised by clear city goals. For instance, London has set a target that 15% of businesses should switch to cargo bikes in the central areas.
- ↳ Another important step to nudge companies towards cargo bikes is **providing financial incentives, primarily subsidies**. Oslo offers NOK 10,000 grants to companies for purchasing new cargo bikes. In a few neighbourhoods of London, GBP 2000 subsidies are available for enterprises, and free opportunities are offered for businesses and households to test cargo bikes. This is further fostered by the national eCargo Bike Grant Fund, providing GBP 2 million of funding.

Support initiatives to raise awareness

- ↳ Berlin is also a leader in **supporting local initiatives**. In the project 'fLotte Berlin' the city and its districts have created a platform for entrepreneurs and non-profit organisations to use shared car-go bikes for free in order to incentivise a modal shift. Berlin has also participated in a research project investigating the efficiency of cargo bikes and local logistical hubs.
- ↳ It is also important to emphasise the potential **positive health impacts of using bikes** – a delivery company in Oslo has reported lower sick leave after changing diesel vehicles to cargo bikes. More generally, cycling has been proven to increase average life expectancy by 3-14 months, while reducing air pollution.

Further reading: Incentives of cargo bikes in C40 Cities, C40 Knowledge Hub (2020): Cargo bikes: [Safely delivering goods during the COVID-19 crisis and paving the way for a zero-emission freight future](#) as well as International Transport Forum: [Cargo bikes for urban freight](#).



**GENERAL LESSONS
LEARNT**



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GENERAL LESSONS LEARNT

Recommendations and actions

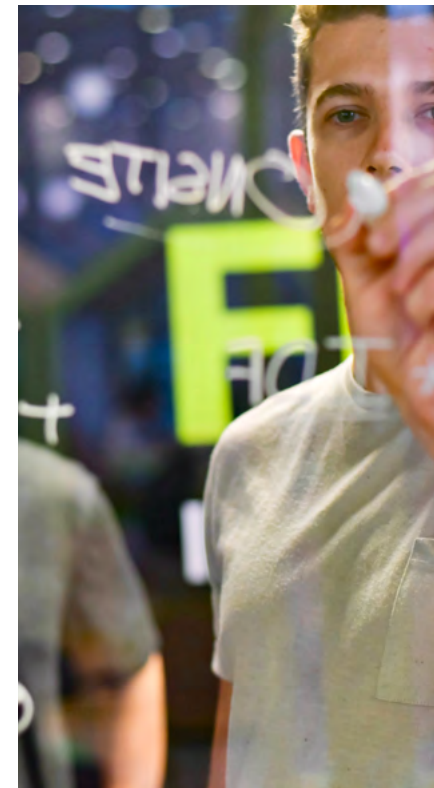
Based on materials presented in this Solution Booklet, several recommendations related to the improvement of urban freight logistics can be made:

Consider global trends and local context

1. The COVID-19 pandemic has accelerated the deep transformation of urban freight logistics, as people's behaviour and norms have changed. This has induced increasing e-commerce demand, and, therefore, has boosted last-mile delivery needs. The main mode of transportation for people has shifted from public to private vehicles, and working from home has become more common.
2. City context matters. Different sizes, geography, density, average income, urban structure and local priorities are all important contextual factors in urban freight transportation. As a result, cities have a crucial role in addressing new challenges emerging due to new trends as they know the local problems best.

Technical solutions

1. The shift to lighter vehicles, for instance, cargo bikes, is a good way to combat climate change, reduce congestion and transform cities to make them more liveable.
2. The electrification of freight vehicles is an efficient tool to reduce local air and noise pollution while mitigating emissions.
3. Several shared and collaborative ideas and platforms have been created which can deeply transform urban freight logistics and help to address the increasing number of vehicles. Local authorities have a crucial role in fostering these innovations and harmonising local regulations to help such initiatives thrive.
4. Digital platforms can raise the quality of deliveries and reduce costs, while some can contribute to re-design urban areas by collecting, sharing and analysing data and adjusting public spaces dynamically.



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Policy measures

1. Cities are often the leader in regulating new services, and nudging consumers and businesses to more efficient and more sustainable solutions, while regional and national policy frameworks typically follow behind.
2. Defined medium – and long-term strategies are essential in re-designing urban infrastructure, creating clearer streets and mobility hubs, repurposing empty buildings, operating public services, etc. They can also help businesses to focus on the most relevant problems and bolster innovation.
3. Agreements based on wider consensus have delivered a deeper impact in the long term. Therefore, stakeholder engagement is crucial, and this can be boosted through a city logistics manager or freight quality partnership.
4. A balanced mix of policy, technical and logistics actions will provide a favourable ecosystem for innovative actions within urban freight logistics.
5. Multiple types of measures can be efficiently deployed (e.g., market-based and regulatory measures), and they can support each other. However, their acceptance by the population and businesses needs to be considered, and they also need to take into account the interests and problems of different groups (e.g., service providers, inhabitants of inner areas, and users of public infrastructure).





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USEFUL DOCUMENTS

USEFUL DOCUMENTS, RELEVANT EXAMPLES AND CONTACTS

Projects, initiatives and contacts

Project initiatives and contacts

GrowSmarter (SCC1)

[Communal service boxes for sustainable deliveries in Stockholm](#)

Contact: olle.kronby@stockholmskem.se – rasmus.linge@arcona.se

Micro distribution of Freight in Barcelona

Contacts: francesc.gasparin@upc.edu – irene.de.cubas@upc.edu

Triangulum (SCC1)

🚩 [Electric-Assist Cargo Bike Hire in Manchester](#)

Contact: Manchester Bike Hire – info@manchesterbikehire.co.uk

MySmartLife (SCC1)

🚩 [Public authority vehicle electric fleet in Hamburg](#)

Contact: jutta.wolff@bergedorf.hamburg.de



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SULPiTER project

↗ [Sustainable Urban Logistics Planning to Enhance Regional Freight Transport](#)

Contact: giuseppe.luppino@regione.emilia-romagna.it

CityLab project

[City Logistics in Living Laboratories](#)

STRAIGHTSOL project

↗ [Strategies and Measures for Smarter Urban Freight Solutions](#)

SMILE project

↗ [Smart Green innovative urban logistics for energy-efficient Mediterranean cities](#)

Contact: irene.de.cubas@upc.edu

C-LIEGE project

[Clean Last Mile Transport and Logistics Management](#)

European Cycle Logistics Federation

↗ [Resources, events & training](#)

Contact: richard@c4st.u

SULPiTER initiative

↗ [SULPiTER project – Interreg \(interreg-central.eu\)](#)

City Changer Cargo Bike

↗ [Bike depot in Prague](#)

Micro depots in Meisengasse, Frankfurt am Main

↗ <https://www.eltis.org/discover/case-studies/micro-depots-meisengasse-frankfurt-am-main>



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Relevant documents

C40 Knowledge Hub (2020): [Cargo bikes: Safely delivering goods during the COVID-19 crisis and paving the way for a zero-emission freight future](#)

'CIVITAS' (2015): Webinar in ['Making urban freight logistics more sustainable: from theory to practice'](#)

CNBC (2021): [Deliveroo takes on start-up rivals with 10-minute grocery delivery service](#)

European Parliament's Committee on Transport and Tourism (2022): [Relaunching transport and tourism in the EU after COVID-19 – Part V: Freight transport](#)

European Parliament's Committee on Transport and Tourism (2022): [COVID-19 and urban mobility: impacts and perspectives – Rapid-response brief](#)

International Transport Forum:

↗ [Change in delivery schedules/night deliveries](#)

↗ [Change in delivery schedules/night deliveries](#)

↗ [Combined passenger and freight flows](#)

World Economic Forum (2020): [The Future of the Last-Mile Ecosystem](#)

Urban Logistics as an On-Demand Service (ULaaS) – used links:

↗ [Low and zero-carbon vehicles for urban last-mile deliveries](#)

↗ [Solutions](#)

↗ [Case study of Mechelen](#)

ITF Transport Outlook (2021): [Freight transport: Bold action can decarbonise the movement of goods](#)

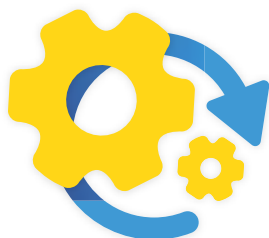
ITF Report (2022): [The Freight Space Race: Curbing the Impact of Freight Deliveries in Cities](#)

ETP Alice (2020): [Urban Freight: Research and Innovation Roadmap](#)

Smart Cities Marketplace

The Smart Cities Marketplace is a major market-changing enterprise supported by the European Commission bringing together cities, industries, SMEs, investors, researchers and other smart city actors. The Marketplace offers insight into European smart city good practice, allowing you to explore which approach might fit your smart city project.

[Discover our digital brochure here.](#)



Matchmaking

The Smart Cities Marketplace offers services and events for both cities and investors on creating and finding bankable smart city proposals by using our Investor Network and publishing calls for projects.

[Investor network](#)

[Call for projects](#)

[Project finance masterclass](#)



Focus and Discussion groups

Focus groups are collaborations actively working on a commonly identified challenge related to the transition to smart cities. Discussion groups are fora where the participants can exchange experience, cooperate, support, and discuss a specific theme.

[Focus and Discussion groups](#)

[Community](#)



EU initiatives

Apart from the smart cities marketplace, there are a number of adjacent EU initiatives focusing on making European cities better places to live and work.

[Other EU initiatives](#)



URBAN FREIGHT LOGISTICS SOLUTION BOOKLET

Smart Cities Marketplace 2023

The Smart Cities Marketplace is managed by the European Commission Directorate-General for Energy