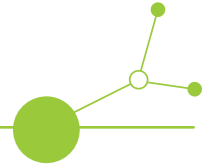


## D.3.3.6

### Boosting Urban Logistics: Improving Curb Management and Micro-Hubs for Cargo Bikes in Central Europe



Version 1

05 2025





GRETA Website

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## 1. The GRETA project

GRETA project aims to decarbonize the last mile delivery in Functional Urban Areas (FUAs) in Central Europe (CE) and create liveable and accessible cities for all by 2030. The project seeks to implement joint sustainable solutions in CE FUAs using zero-emission vehicles and cargo bikes and reorganize urban spaces with curb management. The pilot actions in the cities of Maribor, Reggio Emilia, Verona, Poznan, and Budapest (with Berlin FUA as an observer) have the potential to quickly deploy as pop-up measures in combination with existing measures. GRETA provides capacity-building activities, strategies, action plans, and tools for public authorities, enterprises, and relevant organizations to ensure financial, environmental, and social sustainability beyond the project's lifetime.

Last-mile delivery generates negative impacts, including emissions, noise, and congestion. Due to the Covid-19 crisis, global parcel distribution volume almost doubled, further adding inefficiencies in the peripheral areas. GRETA's FUAs recognize the problems that generate pollution, nuisance, noise, and congestion and jointly recognized three main problems: the lack of use of green zero-emission last-mile vehicles, conflicts between freight and public vehicles, and the lack of knowledge and strategies for a flexible and shared use of the curb and public space. Despite having SUMP/SULPs, FUAs struggle to activate fitting measures while keeping their centres attractive and alive for residents and tourists.

GRETA addresses the common challenges of all CE FUAs by creating the conditions to promote ZE logistics through the use of micro-hubs, cargo bikes, light e-vehicles, and curb management strategies. Additionally, the project also focuses on paving the way to innovative concepts such as regional collaborative logistics, physical internet, and freight curb management. GRETA facilitates the dialogue towards the acceptance of a business and governance as a service model, where cities must equip themselves with a network of innovative services to guarantee seamless experiences for their users and a mobility plan considering different functions and priorities of the services.

GRETA's objective is to support the urban mobility transition in CE FUAs by jointly developing solutions and strategies with a huge potential for decarbonization of the last mile in line with the Green Deal and the Urban Mobility Package, abating congestion, pollution, and nuisance. The project's success relies on capitalizing on previous experiences, exploiting synergies with ongoing initiatives, testing innovative pilots, improving competences and knowledge among PPs and stakeholders.



## 2. Executive summary

This deliverable examines how improved curb management and the deployment of urban micro-hubs can support the transition towards more sustainable and efficient urban logistics systems in Central European cities. Growing e-commerce demand, increasing delivery volumes, and the limited availability of curb space have intensified challenges related to congestion, emissions, and competition for public space. These trends highlight the need for innovative approaches that combine infrastructure, regulation, and digital tools to optimise last-mile and last-meter deliveries.

Building on the experiences and pilot activities of the GRETA project, the report analyses the role of micro-hubs and structured curbside management as complementary solutions to improve urban freight operations. Micro-hubs enable the consolidation of goods at neighbourhood level and facilitate the use of cargo bikes and other zero-emission vehicles for final deliveries. At the same time, effective curb management helps allocate limited street space more efficiently, reducing illegal parking, delivery conflicts, and traffic disruption.

The report reviews current policy frameworks and demonstrates how these solutions align with European strategic objectives, including the European Green Deal, the Sustainable and Smart Mobility Strategy, and the EU Urban Mobility Framework. It identifies key regulatory, spatial, and governance challenges affecting the implementation of sustainable urban logistics solutions in Central Europe.

Lessons learned from GRETA pilot cities including Budapest, Poznań, Reggio Emilia, Maribor and Verona highlight the importance of modular infrastructure, strong stakeholder cooperation, adaptive regulatory approaches, and the integration of logistics planning into broader urban mobility strategies. The report also identifies barriers such as institutional fragmentation, limited space availability, regulatory rigidity, and the need for stronger data governance and digital capacity.

Based on these insights, the deliverable proposes a strategic framework for scaling up micro-hubs and improved curb management in Central Europe. The framework outlines strategic objectives, recommended actions across different time horizons, and the roles of cities, regions, national authorities, and private logistics stakeholders. The report presents policy recommendations for the European level, focusing on regulatory coherence, targeted funding, support for digital innovation, and improved monitoring and evaluation of urban logistics measures.



### 3. Introduction & Objectives

Urban logistics plays a critical role in the economic vitality and liveability of European cities, yet it is also a growing source of congestion, greenhouse gas emissions, and competition for limited public space. In Central Europe, rising e-commerce demand, dense historic urban fabrics, and increasing pressure on curb space have intensified the challenges associated with last-mile and last-meter deliveries. Addressing these challenges is essential to achieving the objectives of the European Green Deal and the Urban Mobility Package.

Curb management and the deployment of urban micro-hubs have emerged as key levers for transforming urban freight systems. When combined with the use of cargo bikes and other zero-emission vehicles, these solutions can significantly reduce environmental impacts while improving delivery efficiency and urban safety. However, their implementation remains uneven across Central European cities, often hindered by regulatory fragmentation, limited data, and governance constraints.

This deliverable responds to these challenges by proposing a strategic framework to improve curb management and scale up the use of micro-hubs for cargo bike logistics in Central Europe. It builds on existing practices, policy developments, and pilot experiences during the GRETA project to identify transferable solutions that can be integrated into local, regional, and European policy agendas. By focusing on medium- and long-term perspectives, the report aims to support cities and policymakers in embedding sustainable urban logistics into broader mobility, climate, and spatial planning strategies.

#### 3.1 Current Trends in Urban Freight and Last-Mile Delivery

Urban freight and last-mile delivery have undergone significant transformation over the past decade, driven by the rapid growth of e-commerce, changing consumer expectations, and the digitalisation of logistics services<sup>1</sup>. Cities are experiencing an increasing number of smaller, more frequent deliveries, often operated by a wide range of logistics providers and service platforms. This evolution has intensified demand for curb space and has placed additional pressure on urban transport networks<sup>2</sup>.

At the same time, new delivery models are emerging, including the use of cargo bikes, electric light vehicles, and decentralised logistics facilities such as micro-hubs<sup>3</sup>. These models aim to improve efficiency in dense urban areas while responding to regulatory measures such as low-emission zones and access restrictions<sup>4</sup>. Digital tools for routing, booking curb space, and managing deliveries are also becoming more prevalent, enabling more dynamic and data-driven approaches to urban freight management<sup>5</sup>.

#### 3.2 Environmental, Social, and Economic Impacts

Urban freight transport is a significant contributor to greenhouse gas emissions, air pollution, noise, and road congestion in cities. Despite accounting for a relatively small share of total vehicle kilometres<sup>6</sup>, freight vehicles often have a disproportionate impact on urban environments due to their size, fuel type, and operational patterns. Addressing these impacts is essential to achieving climate neutrality and improving air quality in line with European policy objectives<sup>7</sup>.

<sup>1</sup> OECD / International Transport Forum (2019), Urban Freight and Logistics: The State of Practice, OECD Publishing, Paris.

<sup>2</sup> Eurocities (2019), Urban Freight and Logistics: Cities' Experiences and Best Practices, Eurocities, Brussels.

<sup>3</sup> CIVITAS Initiative (2020), Urban Freight Logistics: Solutions and Best Practices, European Commission, Brussels.

<sup>4</sup> European Commission (2023), Urban Mobility Package, European Commission, Brussels.

<sup>5</sup> OECD / International Transport Forum (2021), The Role of Data in Managing Urban Freight, OECD Publishing, Paris.

<sup>6</sup> European Environment Agency (2020), Transport and Environment Report, EEA, Copenhagen.

<sup>7</sup> European Commission (2019), The European Green Deal, COM(2019) 640 final, Brussels.



Beyond environmental effects, urban freight influences social and economic dimensions of city life. Inefficient delivery systems can reduce road safety, limit access to public space, and negatively affect urban liveability, particularly in dense and historic city centres<sup>8</sup>. Conversely, well-organised logistics systems support local economies, ensure reliable supply chains, and create opportunities for innovation and employment. Balancing these environmental, social, and economic considerations is therefore a central challenge for urban policymakers.

Last-mile delivery is widely recognised as the most expensive segment of the supply chain because it combines high operational complexity with limited economies of scale. Research indicates that last-mile operations can account for up to 53% of total supply chain costs and typically represent 40-50% of overall logistics costs, particularly in the context of e-commerce growth<sup>9</sup>. This cost intensity results from the high number of delivery stops, small shipment sizes, and the labour-intensive nature of door-to-door distribution. Unlike long-haul transport, which benefits from consolidation and scale efficiencies, last-mile delivery requires individual parcel handling, frequent stopping, parking, and customer interaction, all of which increase time and wage costs per unit delivered.

Urban conditions further amplify these costs. Congestion, access restrictions, low-emission zones, and limited loading space significantly reduce operational efficiency and increase fuel and labour expenses<sup>10</sup>. At the same time, the rapid growth of e-commerce has fragmented shipments and increased delivery frequency, reduced consolidation opportunities and raising vehicle-kilometres travelled in cities<sup>11</sup>. Failed deliveries and reverse logistics further contribute to cost escalation<sup>12</sup>. Together, these structural and operational factors explain why last-mile delivery represents the most costly and complex segment of urban logistics.

### 3.3 Challenges of Urban Freight in Central European Cities

Central European cities face specific challenges in managing urban freight and last-mile delivery. Many cities are characterised by compact urban forms, historic centres, and limited street space, which constrain the ability to accommodate growing delivery demand. Inadequate or poorly managed curb space often leads to illegal parking, traffic disruptions, and conflicts between freight vehicles, public transport, cyclists, and pedestrians<sup>13</sup>.

Institutional and governance challenges further complicate the situation. Responsibilities for urban freight are frequently fragmented across departments and levels of government, while data on freight movements and curb use remain limited<sup>14</sup>. In addition, the availability of suitable locations for micro-hubs is often constrained by land-use regulations, competing urban functions, and high real estate costs. These challenges highlight the need for integrated strategies that combine regulatory, spatial, technological, and operational solutions tailored to the Central European context.

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<sup>8</sup>World Health Organization (2018), Environmental Noise Guidelines for the European Region, WHO Regional Office for Europe, Copenhagen.

<sup>9</sup>World Economic Forum (2020), *The Future of the Last-Mile Ecosystem*.

<sup>10</sup>Organisation for Economic Co-operation and Development (2020), *Delivering the Goods: Sustainable Urban Freight*.

<sup>11</sup>International Transport Forum (2018), *Managing the Impact of Growing E-Commerce on Urban Freight*.

<sup>12</sup>Capgemini Research Institute (2019), *The Last-Mile Delivery Challenge*.

<sup>13</sup>National Association of City Transportation Officials (2018), *Global Street Design Guide - Curbside Management*, NACTO, New York.

<sup>14</sup>OECD / International Transport Forum (2019), *Urban Freight and Logistics: The State of Practice*, OECD Publishing, Paris.



## 4. Policy Framework and EU Alignment

Urban logistics is increasingly recognised as a strategic component of the European Union's efforts to achieve climate neutrality, improve air quality, and enhance urban liveability. While freight transport has traditionally received less attention than passenger mobility in urban policy, recent EU strategies and legislative initiatives have created a more supportive framework for addressing last-mile delivery, curb space management, and zero-emission logistics solutions in cities.

This deliverable outlines how the objectives of the European Green Deal and related EU mobility policies apply to urban freight transport, with a particular focus on the relevance of curb management and micro-hubs for cargo bikes. It reviews the key EU directives, strategies, and funding instruments that shape the current policy landscape and influence local and regional action. The section on policy framework also identifies gaps and opportunities where further policy alignment, guidance, and support could strengthen the contribution of urban logistics to EU climate and mobility objectives, particularly in the context of Central European cities.

### 4.1 European Green Deal Objectives and Urban Freight

The European Green Deal establishes a comprehensive framework for transforming the EU into a climate-neutral economy by 2050, with transport identified as a key sector requiring systemic change<sup>15</sup>. Urban freight transport is directly concerned by this transformation, as it contributes significantly to greenhouse gas emissions, air pollution, noise, and congestion in cities. Improving the sustainability of last-mile logistics is therefore essential to achieving the Green Deal's objectives on climate neutrality, zero pollution, and improved urban liveability.

Within this context, measures such as better curb management, the deployment of zero-emission delivery vehicles, and the development of urban micro-hubs align closely with Green Deal priorities. These approaches support a shift away from conventional diesel-powered freight vehicles towards cleaner, space-efficient solutions such as cargo bikes and electric light vehicles. By optimising the use of public space and reducing unnecessary vehicle kilometres, cities can simultaneously address climate targets, air quality standards, and quality-of-life objectives.

Urban freight also plays a role in advancing the Green Deal's emphasis on integrated planning and systemic solutions. Linking logistics policies with urban mobility planning, land-use regulation, and digital innovation enables cities to maximise the impact of local actions while contributing to EU-wide environmental goals. In this sense, urban logistics is not a standalone issue but a cross-cutting policy domain embedded within broader sustainability and mobility strategies.

### 4.2 Relevant EU Directives, Strategies, and Funding Instruments

Several EU policy instruments provide a supportive framework for advancing sustainable urban logistics. The Sustainable and Smart Mobility Strategy sets the objective of reducing transport-related greenhouse gas emissions by 90% by 2050 and explicitly highlights the need to decarbonise urban freight and last-mile delivery<sup>16</sup>. Similarly, the Urban Mobility Package and the updated EU Urban Mobility Framework encourage

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<sup>15</sup> European Commission (2019), The European Green Deal, COM(2019) 640 final, Brussels.

<sup>16</sup> European Commission (2020), Sustainable and Smart Mobility Strategy - Putting European Transport on Track for the Future, COM(2020) 789 final, Brussels.



cities to integrate freight transport into Sustainable Urban Mobility Plans (SUMP), including measures related to curb space management, consolidation, and zero-emission delivery<sup>17</sup>.

Regulatory instruments such as the Clean Vehicles Directive and the Alternative Fuels Infrastructure Regulation further support the transition to low- and zero-emission freight vehicles in urban areas<sup>18</sup>. While these instruments primarily target vehicle fleets and infrastructure, they create enabling conditions for logistics operators to adopt cargo bikes and electric vehicles as part of broader distribution systems.

In addition to regulatory frameworks, EU funding instruments play a crucial role in supporting experimentation and implementation. Programmes such as Horizon Europe, the Connecting Europe Facility (CEF), the European Regional Development Fund (ERDF), and the Cohesion Fund have financed pilot projects, digital solutions, and infrastructure related to urban logistics, micro-hubs, and innovative curb management<sup>19</sup>. Initiatives under CIVITAS and Interreg have been particularly important for testing and transferring solutions among cities, including in Central Europe.

### 4.3 Gaps and Opportunities in the Current Policy Landscape

Despite the existence of a strong overarching policy framework, gaps remain in the practical integration of urban freight into EU and local mobility policies. Urban logistics is often addressed indirectly, with greater policy attention traditionally given to passenger transport. As a result, issues such as curb management, delivery access regulation, and the spatial requirements of micro-hubs are not consistently embedded in urban planning and mobility strategies<sup>20</sup>.

At the city level, fragmented governance structures and limited institutional capacity can hinder the effective implementation of EU policy objectives. Responsibilities for urban freight transport, public space management, and land-use planning are frequently distributed across different departments, complicating coordinated action. In addition, data on freight movements and curb use is limiting the ability of cities to design evidence-based policies and to monitor impacts.

At the same time, these gaps represent opportunities for targeted policy development. Strengthening guidance on urban freight within SUMP, promoting common principles for curb management, and supporting cities in allocating space for micro-hubs can enhance policy coherence and effectiveness. Increased EU support for capacity building, data sharing, and the scaling up of successful pilot projects would further enable Central European cities to translate EU objectives into concrete local action. Aligning regulatory, financial, and governance instruments around urban logistics can therefore significantly accelerate progress towards greener and more efficient cities.

## 5. Micro-Hubs and Curbside Management in Urban Logistics

The increasing complexity of urban freight distribution requires solutions that go beyond vehicle technology alone. Micro-hubs and curbside management are now widely recognised as structural elements of sustainable urban logistics systems. When jointly implemented, they enable cities to reorganise last-mile delivery in a

<sup>17</sup> European Commission (2021), New EU Urban Mobility Framework, SWD(2021) 146 final, Brussels; European Commission (2023), Urban Mobility Package, Brussels.

<sup>18</sup> European Parliament and Council (2019), Directive (EU) 2019/1161 on the promotion of clean and energy-efficient road transport vehicles, Official Journal of the European Union.

<sup>19</sup> European Commission (2021), Horizon Europe Programme Guide, Brussels; European Commission (2022), Connecting Europe Facility - Transport, Brussels.

<sup>20</sup> OECD / International Transport Forum (2019), Urban Freight and Logistics: The State of Practice, OECD Publishing, Paris.



way that reduces environmental impacts, improves efficiency, and better balances the use of scarce public space.

This section of the deliverable provides a detailed overview of the functional models of micro-hubs and curbside management, examines how they can be integrated into urban logistics systems, and highlights the enabling role of digital tools, spatial planning, and governance frameworks. Practical examples from European cities and the GRETA pilot cities illustrate how these approaches are being implemented and adapted to local contexts, including in Central Europe.

## 5.1 Definition and Functional Models of Micro-Hubs and Curbside Management.

Urban micro-hubs are small-scale logistics facilities located close to final delivery areas, enabling the consolidation, sorting, or transshipment of goods to zero- or low-emission vehicles such as cargo bikes and electric light vehicles<sup>21</sup>. Their primary function is to reduce the need for conventional freight vehicles to enter dense urban areas while maintaining delivery reliability and service quality.

Several functional models of micro-hubs can be identified:

- **Permanent micro-hubs**, integrated into existing buildings or logistics facilities (e.g. basements, ground floors, parking garages).
- **Temporary or modular micro-hubs**, using containers or prefabricated structures that can be relocated or scaled over time.
- **Mobile micro-hubs**, operated from vans or trailers that act as moving consolidation points.

Cities such as **Paris** and **Vienna** have experimented with container-based micro-hubs placed in underused public spaces, while **Hamburg** and **Munich** have integrated micro-hubs into parking facilities or logistics real estate. These models allow cities to test solutions with limited upfront investment while maintaining flexibility.

Curbside management complements micro-hubs by regulating how curb space is allocated and used. In urban logistics, curbside management includes loading and unloading zones, time-based access rules, vehicle-type restrictions, and increasingly, dynamic allocation of curb space<sup>22</sup>. Functional approaches range from traditional fixed loading bays to flexible curb zones that change function depending on time of day or demand.

Within the GRETA pilots, different micro-hub and curb management models were tailored to the specific urban context of each city. In Reggio Emilia, the project implemented an Urban Micro-Hub with e-cargo bike distribution, designed to support zero-emission last-mile logistics in the historic urban fabric. Goods are transferred at a small urban consolidation point in the fruit market and distributed via e-cargo bikes, reducing congestion, emissions, and parking pressure in the city centre. In Maribor, the pilot focused on the installation of a mobile micro-hub in the pedestrian area of the city centre, providing a flexible and modular solution suitable for medium-sized cities. This temporary and scalable structure allows freight transshipment close to the delivery area while preserving pedestrian space and minimising heavy vehicle access.

<sup>21</sup> CIVITAS Initiative (2020), *Urban Freight Logistics: Solutions and Best Practices*, European Commission, Brussels.

<sup>22</sup> National Association of City Transportation Officials (2018), *Global Street Design Guide - Curbside Management*, NACTO, New York.



Figure 1: Micro hub installation in the market place in Reggio Emilia

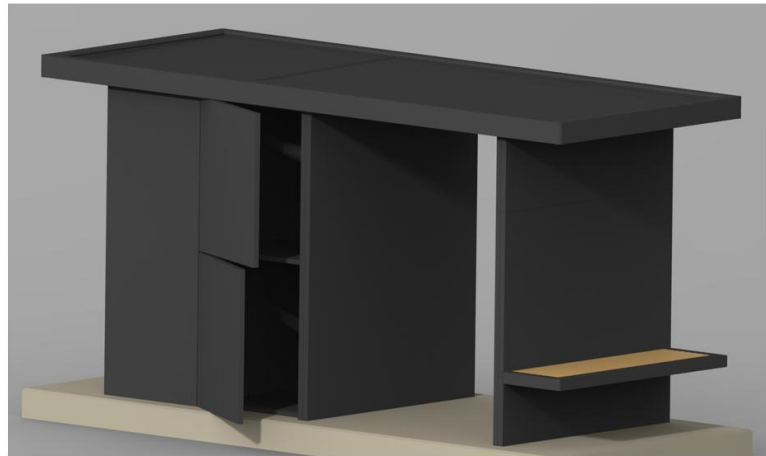
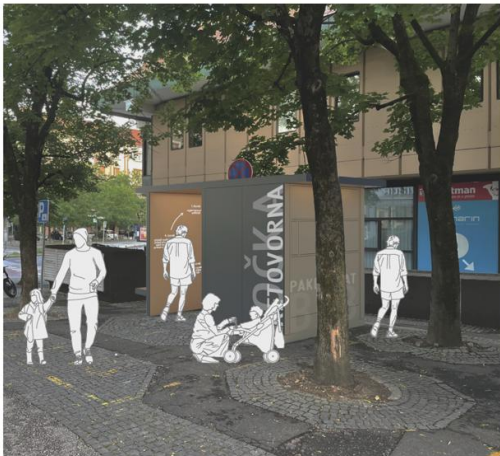


Figure 2: Microhub with ZEV in Maribor

In Poznan, the pilot centred on a Micro Consolidation Centre (MCC) served by green and Zero-Emission Vehicles (ZEVs). This model enables consolidation of freight flows before entering dense urban areas, improving load factors and reducing vehicle-kilometres travelled. The use of electric and low-emission vehicles for the final distribution leg contributes to environmental objectives while maintaining logistics efficiency. The MCC approach is particularly suitable for larger metropolitan contexts, where higher freight volumes justify structured consolidation infrastructure and coordinated multi-operator use.



Figure 3: Microhub and cargobike during pilot implementation in Poznan

The pilots in Verona and Budapest focused primarily on curbside and space management as enabling frameworks for sustainable last-mile logistics. Verona developed and tested a digitally supported curb management system within the Limited Traffic Zone (LTZ), later scalable to the wider Functional Urban Area (FUA). The system combines a digital booking platform for loading and unloading slots with sensor-based real-time occupancy monitoring, improving transparency and operational efficiency. Budapest, through BKK, developed a Comprehensive Curbside Management Framework and Function Assessment Methodology, establishing a structured, data-driven and future-oriented approach to balance competing curbside demands and create flexible, multifunctional public spaces. Together, these pilots demonstrate how physical micro-hub infrastructure and digital curb management tools can complement each other to improve urban freight efficiency and sustainability.



Figure 4: Designated pickup waiting area for food couriers in Budapest



## 5.2 Integration of Micro-Hubs into Urban Logistics Systems

Micro-hubs are most effective when integrated into wider logistics and mobility systems rather than implemented as standalone interventions. Their success depends on coordination between long-distance freight transport, urban consolidation, last-mile delivery, and curbside access arrangements<sup>23</sup>.

In practical terms, this integration often involves cooperation between municipalities and logistics operators. For example, in Graz and Utrecht, logistics companies consolidate deliveries at urban-edge facilities and use centrally located micro-hubs to serve inner-city areas by cargo bike. This reduces the number of heavy vehicles entering city centres while maintaining delivery frequency.

Integration also requires operational alignment, including:

- Coordinated delivery time windows;
- Dedicated curb access for cargo bikes and light vehicles;
- Harmonisation with low - and zero-emission zone regulations.

In Central European cities with historic centres and narrow streets, such integrated systems are particularly valuable, as they allow cities to protect sensitive urban environments while supporting economic activity.

Within the GRETA project, this cooperation has been supported through Freight Quality Partnerships (FQPs), which provide a multi-actor governance platform to align operational needs with public policy objectives and ensure shared responsibility in the design and implementation of solutions.

FQPs within GRETA have facilitated the integration of urban micro-hubs by enabling dialogue on site selection, operational rules, and regulatory adjustments. Through these partnerships, public authorities and private operators jointly defined delivery time windows, access conditions to pedestrian or restricted zones, and the allocation of loading and unloading spaces. FQPs also supported the coordination of consolidation centres served by low - and zero-emission vehicles, ensuring that different logistics providers could share infrastructure and align delivery schedules. In cases involving mobile or temporary micro-hubs, the partnerships contributed to stakeholder acceptance, spatial planning adjustments, and evaluation of pilot performance.

## 5.3 Digital Tools and Data-Driven Curb Management

Digital tools are increasingly essential for managing curb space and supporting the operation of micro-hubs. Data-driven curb management systems enable cities to monitor demand, allocate space more efficiently, and reduce conflicts between users<sup>24</sup>.

Examples include:

- **Digital booking platforms** allowing logistics operators to reserve curb space for loading and unloading;
- **Sensors and cameras** monitoring curb occupancy in real time;
- **Integrated dashboards** combining freight, traffic, and enforcement data.

Cities such as Amsterdam and Barcelona have piloted digital curb management systems that dynamically allocate loading zones based on time of day and user needs. These systems improve predictability for operators while providing cities with evidence to adjust policies.

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<sup>23</sup> OECD / International Transport Forum (2019), *Urban Freight and Logistics: The State of Practice*, OECD Publishing, Paris.

<sup>24</sup> OECD / International Transport Forum (2021), *The Role of Data in Managing Urban Freight*, OECD Publishing, Paris.



During the GRETA project, the Verona pilot action focused on the development and implementation of a digitally supported curb management system designed to improve the regulation, monitoring, and operational efficiency of loading and unloading spaces across the Functional Urban Area. Implemented in a complex urban context characterised by a historic centre, limited public space, and high competition among road users, the solution aimed to transform traditionally static curbside infrastructure into a dynamic, data-driven system. The approach combined sensor-based monitoring with a centralised digital platform that enabled real-time data collection, visualisation, and a booking system for freight operators, supporting both day-to-day operations and long-term policy planning.

The technical solution was based on the installation of IoT sensors beneath selected loading and unloading bays. These single-space devices used tri-axial magnetometric detection technology to identify vehicle presence through variations in the Earth's magnetic field, ensuring reliable occupancy monitoring even when embedded under asphalt. The sensors were fully autocalibrating, designed to achieve detection accuracy above 95%, and built to withstand mechanical stress and environmental exposure (IP68/IP69 standards), ensuring durability and data reliability in demanding urban conditions.

For micro-hubs, digital tools support route optimisation, inventory management, and coordination between hubs and delivery vehicles. However, challenges remain regarding data sharing, interoperability between systems, and the protection of commercially sensitive information. Clear data governance frameworks are therefore essential.

## 5.4 Spatial Planning and Land-Use Considerations

One of the main barriers to scaling up micro-hubs is access to suitable urban space. In dense cities, competition for land from housing, retail, and public space often limits the availability of locations for logistics functions<sup>25</sup>.

Successful cities increasingly treat micro-hubs as part of essential urban infrastructure. This includes:

- Integrating logistics needs into urban development and regeneration projects;
- Allowing mixed-use zoning that accommodates logistics functions;
- Reusing underutilised spaces such as car parks, railway land, or municipal buildings.

In Berlin, micro-hubs have been incorporated into redevelopment areas, while Prague and Budapest have explored the use of public land for temporary logistics facilities. Early integration into planning processes helps avoid conflicts and ensures long-term viability.

In pilots implementing during GRETA project, spatial planning focused on identifying underused or strategically located areas close to dense delivery zones, ensuring proximity to final customers while minimising conflicts with pedestrians and residents. In cases involving mobile micro-hubs installed in pedestrian areas (Maribor pilot), temporary or modular structures were used to test feasibility without permanent land-use change, allowing municipalities to evaluate impacts before long-term planning decisions. For micro consolidation centres in Poznan pilot, land-use considerations included peri-urban or edge-of-centre locations with adequate accessibility for larger vehicles, while ensuring compatibility with surrounding functions and minimising environmental impacts<sup>26</sup>.

<sup>25</sup> Eurocities (2019), *Urban Freight and Logistics: Cities' Experiences and Best Practices*, Eurocities, Brussels.

<sup>26</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>

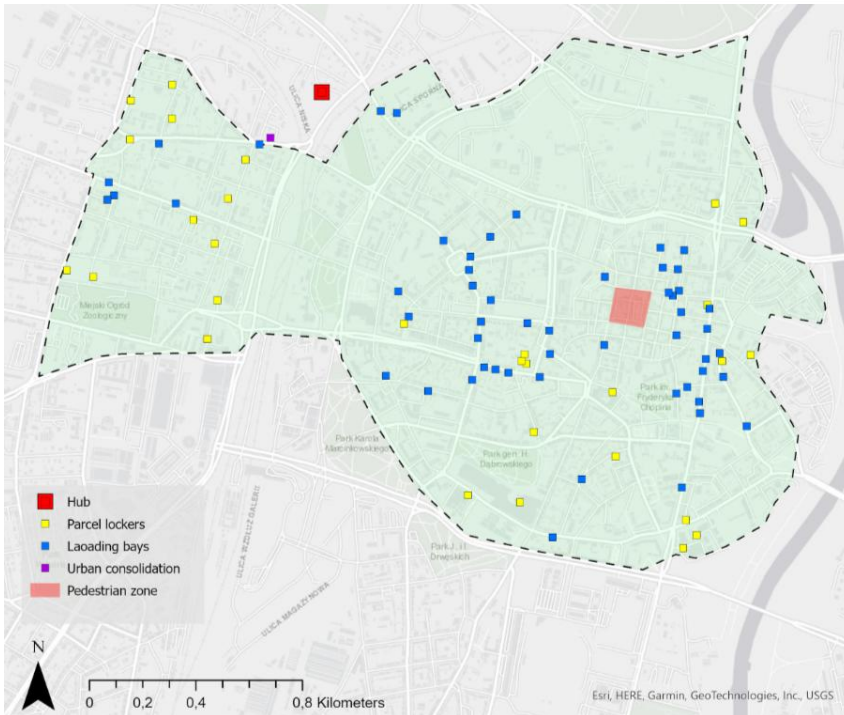


Figure 5: Location of Microhub in Poznan

Pilots addressing curbside management and digital regulation of loading zones highlighted the importance of rethinking the allocation of limited public space. By introducing booking systems and real-time occupancy monitoring, cities were able to transform static loading bays into dynamically managed infrastructure, improving turnover rates and reducing illegal parking



Figure 6: Use of sensors below the surface in Verona



## 5.5 Regulatory and Governance Models

Regulatory and governance frameworks strongly influence the effectiveness of micro-hubs and curbside management. Clear and consistent rules on access, vehicle types, operating hours, and curb use are essential to provide certainty for logistics operators and other street users<sup>27</sup>.

Governance models vary across Europe:

- **Public-led models**, where municipalities operate or directly manage micro-hubs;
- **Public-private partnerships**, combining public space or funding with private operational expertise;
- **Private initiatives**, operating under municipal regulation and agreements.

Cities such as London and Vienna have adopted partnership-based approaches, while others rely on regulatory incentives, such as preferential access for zero-emission deliveries. Effective governance also requires coordination across municipal departments and engagement with stakeholders, including residents and businesses.

The governance model adopted in the GRETA project is based on public-private partnerships (PPPs), which foster structured collaboration between municipalities, logistics operators, service providers, and other relevant stakeholders. This model ensures that urban freight solutions such as micro-hubs, consolidation centres, and digital curb management systems are co-designed and co-implemented, combining regulatory authority with operational expertise<sup>28</sup>.

The main benefits of this approach include improved feasibility and acceptance of pilot actions, as private operators contribute practical knowledge and market insights, while public authorities ensure alignment with policy objectives and spatial planning frameworks.

## 5.6 Environmental and Economic Benefits (Efficiency, Safety, and Emissions)

Evidence from European pilot projects shows that micro-hubs combined with managed curbside solutions can deliver measurable benefits. These include reductions in vehicle kilometres travelled, lower greenhouse gas emissions, and improved air quality<sup>29</sup>. Cargo bike deliveries can replace a significant share of van trips in dense urban areas, particularly for parcels and light goods.

Economic benefits are also significant. Consolidation through micro-hubs reduces failed deliveries, improves route efficiency, and lowers operating costs. Predictable curb access reduces delays and illegal parking, improving road safety and reducing conflicts with pedestrians and cyclists<sup>30</sup>.

For cities, these benefits translate into improved urban liveability, more efficient use of public space, and progress towards climate and mobility goals. In Central European cities, where space constraints and environmental pressures are acute, these gains are particularly relevant.

Across the analysed pilot cities, the GRETA project demonstrated that both infrastructure-based and governance-based interventions can contribute to improved environmental performance in urban logistics systems. The pilots generated measurable or observable environmental benefits through<sup>31</sup>:

- Direct reduction of CO<sub>2</sub> emissions (e.g. cargobike substitution in Reggio Emilia and Poznań);

<sup>27</sup> POLIS Network (2021), *Managing Urban Freight: Policy Recommendations for Cities*, POLIS, Brussels.

<sup>28</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>

<sup>29</sup> European Environment Agency (2020), *Transport and Environment Report*, EEA, Copenhagen.

<sup>30</sup> World Health Organization (2018), *Environmental Noise Guidelines for the European Region*, WHO Regional Office for Europe, Copenhagen.

<sup>31</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>



- Reduction of empty trips and unnecessary circulation (Verona);
- Reduction of idling and illegal stopping in pedestrian areas (Budapest);
- Optimised use of existing urban space without additional land consumption (Verona and Budapest);
- Promotion of zero-emission delivery modes (Reggio Emilia and Poznań).

The pilots confirm the potential of integrated urban logistics measures ranging from micro-hubs and cargobikes to smart curbside management and spatial regulation to contribute to emission reduction in Functional Urban Areas.



## 6. Synergies between Curb Management and Micro-Hubs

Curb management and urban micro-hubs are most effective when implemented as part of a coordinated urban logistics system rather than as isolated measures. Micro-hubs restructure freight flows by consolidating goods close to delivery destinations, while curb management governs how these flows interact with public space at street level. When jointly designed, these instruments reinforce each other, enabling cities to reduce environmental impacts, improve operational efficiency, and enhance urban liveability.

This chapter explores how operational integration, public space allocation, and scalability considerations can maximise the combined benefits of curb management and micro-hubs. Drawing on examples from European cities, it highlights practical approaches that can be adapted and replicated across Central Europe.

### 6.1 Operational Integration and System Design

Operational integration between micro-hubs and curb management is crucial to ensure that logistics' flows function efficiently and predictably. Micro-hubs generate new delivery patterns, typically involving high-frequency, low-volume trips by cargo bikes or light electric vehicles. These patterns require dedicated, well-managed curb access to enable loading, unloading, and short stops without disrupting other street users.

In integrated systems, curbside regulations are designed in parallel with micro-hub operations. For example, in **Paris**, micro-hubs serving dense neighbourhoods are supported by designated cargo bike loading zones and time-based curb access rules that prioritise zero-emission deliveries. This alignment reduces delivery times and minimises conflicts with private vehicles and public transport.

System design also includes the coordination of operating hours, routing strategies, and enforcement mechanisms. In **Amsterdam**, cargo bike delivery routes from micro-hubs are aligned with dynamic curbside regulations and digital booking systems, allowing operators to reserve curb space in advance. Such integration improves reliability for logistics providers while giving cities greater control over street-level activity.

For Central European cities, operational integration offers a way to manage freight activity in historic centres with limited street capacity. By linking micro-hubs at the urban edge or in strategic inner-city locations with managed curb access, cities can reduce the presence of large freight vehicles while maintaining service levels for businesses and residents.

### 6.2 Public Space Allocation and Urban Liveability

The combined implementation of micro-hubs and curb management enables cities to rethink how public space is allocated and used. By reducing the need for large delivery vehicles and illegal parking, these measures free up curb and street space that can be reallocated to more socially beneficial uses, such as wider sidewalks, cycling infrastructure, greenery, or outdoor activities<sup>32</sup>.

Cities such as **Barcelona** and **Vienna** have used managed curbside zones to balance freight needs with pedestrian priority areas<sup>33,34</sup>. In these contexts, cargo bike deliveries from nearby micro-hubs are allowed

<sup>32</sup> European Commission (2019). Sustainable Urban Mobility Planning (SUMP) Guidelines, 2nd Edition. Publications Office of the European Union.

<sup>33</sup> Ajuntament de Barcelona (2021). Urban Mobility Plan of Barcelona 2024 (PMU 2024).

<sup>34</sup> City of Vienna (2019). Urban Development Plan Vienna (STEP 2025).



during extended time windows, while access for conventional freight vehicles is more restricted. This approach supports commercial activity while improving safety, noise levels, and overall urban quality<sup>35</sup>.

Improved public space allocation also enhances social acceptance of urban logistics interventions. When residents see tangible benefits such as reduced congestion, quieter streets, and safer environments support for micro-hubs and curbside regulation tends to increase<sup>36</sup>. In **Copenhagen**, for instance, cargo bike-based deliveries integrated with pedestrian-friendly street design have become a visible part of the city's sustainable mobility culture<sup>37</sup>.

For Central European cities, where public space is often scarce and highly contested, these synergies offer a pathway to reconcile freight needs with broader urban liveability objectives<sup>38</sup>.

### 6.3 Scalability and Replicability Across Central Europe

Scalability and replicability are key considerations for the widespread adoption of integrated curb management and micro-hub solutions. While many European cities have successfully implemented pilot projects, scaling up requires consistent regulatory frameworks, long-term spatial planning, and stable business models.

Experience from cities such as **Hamburg** and **Munich** shows that modular micro-hubs combined with adaptable curbside regulations can be scaled incrementally, allowing cities to learn and adjust over time. Standardised design principles, such as common signage, digital interfaces, and operational rules, facilitate replication across neighbourhoods and cities.

In Central Europe, replicability is influenced by diverse urban forms, governance structures, and market conditions. However, common challenges—such as historic city centres, limited curb space, and growing delivery demand—create a strong case for shared approaches. EU-funded programmes, including CIVITAS and Interreg, have demonstrated the value of cross-city cooperation in transferring knowledge and adapting solutions to local contexts.

To support scalability, cities need clear guidance on integrating micro-hubs into SUMPs, harmonised curb management principles, and access to funding for both pilot projects and long-term implementation. By focusing on system-level integration rather than isolated interventions, Central European cities can accelerate the transition towards greener, more efficient, and more liveable urban logistics.

The GRETA pilots demonstrate strong potential for transferability and scaling up across diverse urban contexts.

In Budapest, the modular curbside management methodology can be extended beyond pilot streets and integrated into large-scale projects such as the Nagykörút renewal. Its incorporation into the Sustainable Urban Logistics Plan ensures institutional anchoring and long-term continuity. However, successful scaling requires clear, benefit-oriented stakeholder communication and sufficient time for consultation. A key challenge lies in strengthening cooperation between city and district authorities to ensure coherent implementation. Systematic documentation and knowledge sharing are essential to replicate the approach in other districts and Central European cities.

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<sup>35</sup> Browne, M., Allen, J., & Leonardi, J. (2011). Evaluating the use of urban consolidation centres and micro-hubs in city logistics. *Procedia - Social and Behavioral Sciences*, 39, 611-625.

<sup>36</sup> CIVITAS Initiative (2020). *Urban Freight in CIVITAS Cities: Best Practice Guide*.

<sup>37</sup> Rudolph, C., Gruber, J., & Lenz, B. (2018). Cargo cycles in commercial transport: Potentials and constraints. *Transportation Research Procedia*, 30, 219-228.

<sup>38</sup> Organisation for Economic Co-operation and Development (2021). *Reversing Car Dependency: Summary and Conclusions*. OECD Publishing.



In Poznań, the cargo-bike-oriented hub concept offers a transferable model for limiting car traffic and reducing emissions. The design solution can be adapted to local spatial and regulatory conditions in other cities. Yet scaling up in historic districts is constrained by strict heritage and land-use regulations. Flexibility in internal municipal rules is necessary to accommodate innovative, low-impact logistics infrastructure.

The Reggio Emilia pilot stands out for its simplicity, modularity, and limited reliance on complex technologies. Its low investment requirements enhance scalability, particularly for medium-sized cities with limited resources. The governance model—where the public sector acts as regulator while operators retain autonomy—reduces implementation barriers. Transferability is high, provided suitable urban spaces are available and strong partnerships with logistics stakeholders are built. Nonetheless, ensuring long-term operator commitment may be challenging without stable policy support.

In Verona, the digital platform and sensor-based system proved adaptable to different regulatory and spatial contexts. Its modular architecture facilitates replication in other Functional Urban Areas. Embedding digital tools within existing mobility and climate strategies strengthens policy coherence. However, scaling up requires technical capacity, data governance clarity, and financial resources for maintenance.

Overall, the GRETA pilots confirm that modular design, institutional integration, and stakeholder cooperation are critical enablers—while regulatory rigidity, spatial constraints, and governance fragmentation remain key challenges for broader transfer and upscaling.



## 7. Best Practices and Lessons Learned from the GRETA Project

Pilot projects and real-world applications play a crucial role in advancing sustainable urban logistics. They allow cities to test innovative solutions, assess impacts, and refine governance and operational models before scaling up. Across Europe, a growing number of cities have implemented micro-hubs, cargo bike logistics, and improved curb management, providing valuable insights into what works in different urban contexts.

This section presents experiences from Central Europe and GRETA pilot cities and identifies common success factors and lessons learned, and discusses barriers and risks encountered during implementation. The analysis is intended to support cities and policymakers in designing robust, transferable solutions tailored to their local conditions.

Central European cities have increasingly engaged in pilot projects aimed at improving urban logistics through micro-hubs, cargo bikes, and curbside management. These initiatives often respond to shared challenges, such as dense historic centres, limited street space, and growing delivery demand linked to e-commerce.

Typical pilot approaches in the region include:

- The establishment of **temporary or modular micro-hubs** in central locations or at the edge of low emission zones;
- The use of **cargo bikes for last-mile deliveries**, particularly for parcels and light goods;
- The introduction of **dedicated or time-regulated loading zones** to reduce illegal parking and delivery-related congestion.

Cities such as Vienna, Prague, Budapest, and Ljubljana have tested variations of these approaches through EU-funded projects, often in cooperation with logistics operators and research institutions.

### 7.1 Success Factors and Lessons Learned

Analysis of European and Central European case studies reveals several recurring success factors. A key element is **early and continuous stakeholder engagement**, involving logistics operators, retailers, residents, and municipal departments. Projects that actively involve stakeholders from the design phase tend to achieve higher acceptance and smoother implementation.

Another critical factor is **integration into broader urban mobility and planning frameworks**. Successful pilots are often linked to Sustainable Urban Mobility Plans (SUMP), low- or zero-emission zone strategies, or public space redesign initiatives. This integration helps ensuring policy coherence and long-term viability beyond the pilot phase<sup>39</sup>.

Operational flexibility also emerges as an important lesson. Cities that allow **adaptive regulations**, modular infrastructure, and phased implementation are more capable of responding to unexpected challenges and changing demand. For example, pilots in Hamburg and Utrecht show that temporary micro-hubs and adjustable curbside rules enable cities to test solutions with limited risk while building evidence for scaling up<sup>40</sup>.

<sup>39</sup>POLIS Network (2021). Regulating Urban Freight for Sustainability: Case Studies from European Cities.

<sup>40</sup>CIVITAS Initiative (2020). Urban Freight in CIVITAS Cities: Best Practice Guide.



The GRETA pilots highlight several critical success factors that enabled effective implementation and scalability of sustainable urban logistics solutions.

A success factor was the **modular and flexible design** of interventions. In Budapest and Verona, both physical curbside measures and digital platforms were designed to be scalable and adaptable to different urban contexts. This modularity allows gradual expansion to additional districts and Functional Urban Areas without requiring complete system redesign.

Another key factor was **institutional integration**. Embedding pilot measures within existing policy frameworks such as Sustainable Urban Logistics Plans and broader mobility strategies ensuring continuity beyond the project lifetime. Formalizing curbside management frameworks within planning and street renewal processes strengthened long-term impact.

**Strong stakeholder engagement** proved essential across all pilot cities. Early dialogue with logistics operators, local businesses, district authorities, and residents helped aligning expectations and reducing resistance. The Budapest experience particularly demonstrated that benefit-oriented communication and sufficient consultation time are crucial for acceptance.

The **governance model adopted in Reggio Emilia** stands out as a best practice. By positioning the public sector as regulator while preserving operator autonomy, the city reduced implementation barriers and fostered public-private cooperation. This balanced approach enhanced both operational feasibility and long-term sustainability.

**Simplicity and cost-effectiveness** were additional success factors. The Reggio Emilia pilot showed that meaningful environmental and social benefits can be achieved without complex technologies or high investment costs, increasing transferability to medium-sized cities.

At the same time, important lessons were learned. Regulatory rigidity especially in historic districts can constrain hub location and scaling potential. Greater flexibility in internal municipal regulations is often necessary to accommodate innovative logistics solutions.

The pilots also revealed the importance of **cross-level cooperation**, particularly between city and district authorities. Fragmented competencies can delay implementation unless institutional coordination mechanisms are strengthened.

For digital solutions, as demonstrated in Verona, **technical capacity, data governance clarity, and long-term maintenance planning** are essential to ensure reliability and scalability.

Systematic monitoring, documentation, and knowledge sharing are crucial for transferability. Capturing evidence of environmental, social, and operational benefits supports replication in other Central European cities.

## 7.2 Barriers, Risks, and Mitigation Strategies

Despite their potential, urban logistics pilots often face significant barriers and risks. One common challenge is the **limited availability of suitable urban space** for micro-hubs, particularly in dense city centres. Competing land-use priorities and high real estate costs can restrict options and delay implementation.

Regulatory and institutional barriers are also frequent. In some cases, pilots struggle with transition into permanent solutions due to the absence of stable funding or long-term policy commitments.

Mitigation strategies identified across European experiences include:

- Using **temporary or modular micro-hubs** to reduce spatial and financial risks;
- Establishing **clear governance structures and interdepartmental coordination** within municipalities;



- Leveraging **EU funding programmes** to support both experimentation and capacity building;
- Collecting and communicating **evidence on impacts**, such as emission reductions or safety improvements, to build political and public support.

For Central European cities, addressing these barriers requires a combination of regulatory flexibility, stakeholder cooperation, and alignment with EU policy and funding frameworks.

The implementation and scaling of GRETA pilot solutions reveal several barriers that cities must carefully address. A primary barrier is institutional fragmentation, particularly where responsibilities for curbside management are divided between municipal and district authorities, as observed in Budapest. Without strong interdepartmental coordination, coherent implementation across larger urban areas becomes difficult. Another risk concerns insufficient stakeholder engagement, which can generate resistance from businesses, residents, or logistics operators. Early, transparent, and benefit-oriented communication is therefore essential to build trust and acceptance.

Regulatory rigidity represents an additional obstacle, especially in historic city centres such as Poznań, where internal rules may limit the location of micro-hubs. Strict heritage or land-use regulations can slow down or prevent scaling unless adaptive regulatory frameworks are introduced. Spatial constraints and scarcity of public space further complicate the identification of suitable hub locations. To mitigate this, cities must integrate logistics planning into broader urban renewal and street redesign processes.

Financial and technical capacity gaps pose risks, particularly for digital solutions like those tested in Verona. Sensor infrastructure and data platforms require long-term maintenance, cybersecurity safeguards, and clear data governance rules. Ensuring stable funding streams and institutional responsibility for system management is therefore critical.

The Reggio Emilia experience shows that preserving operator autonomy while maintaining public regulatory oversight can reduce such barriers. However, long-term viability depends on sustained demand and supportive policy frameworks. Without systematic monitoring and evaluation, successful elements may remain isolated experiments. Establishing standardized methodologies and sharing best practices can enhance replication potential.

By proactively addressing governance, regulatory, financial, and social risks, cities can strengthen the resilience and scalability of innovative urban logistics solutions.



## 8. Strategy for Central Europe

The transition towards sustainable urban logistics in Central Europe requires a coordinated and long-term strategic approach that reflects the specific spatial, economic, and institutional characteristics of the region. While cities face diverse local conditions, they share common challenges related to historic urban fabrics, limited public space, and growing demand for urban freight services. Building on the analysis of policy frameworks, operational solutions, and pilot experiences, this chapter sets out a strategic framework to guide the deployment of micro-hubs and improved curb management across Central Europe.

The strategy aims to support the alignment of local and regional actions with European climate and mobility objectives, while providing practical guidance for cities and stakeholders to move from experimentation to large-scale implementation.

### 8.1 Vision and Strategic Objectives

The vision for Central Europe is to establish **efficient, low-emission, and people-centred urban logistics systems** that support economic activity while enhancing urban liveability and environmental performance. Micro-hubs and well-managed curb space are central components of this vision, enabling cities to reorganise last-mile delivery in a way that reduces congestion, emissions, and conflicts in public space.

The strategic objectives of this vision include:

- Reducing the environmental footprint of urban freight transport, in line with EU climate and air quality targets;
- Improving the efficiency and reliability of last-mile delivery through consolidation and digitalisation;
- Optimising the use of public space by balancing freight needs with those of pedestrians, cyclists, and public transport;
- Supporting innovation and economic competitiveness in the urban logistics sector;
- Ensuring that solutions are scalable, inclusive, and adaptable to different urban contexts within Central Europe.

The GRETA pilots share a common vision of creating **climate-neutral, efficient, and liveable urban freight systems** that balance economic activity with environmental and social objectives. By promoting cargo bikes, micro-hubs, curbside management frameworks, and digital tools, the pilots aim to decarbonise last-mile logistics while improving the quality of public space.

A core strategic objective is the **reduction of greenhouse gas emissions, air pollution, and congestion** through zero-emission delivery solutions and better regulation of urban freight flows. Another objective is a **more efficient use of scarce urban space**, reallocating curb areas from unmanaged parking and large delivery vehicles to sustainable mobility and public realm improvements.

The pilots also strengthen **institutional capacity and governance**, embedding urban logistics into long-term planning instruments such as Sustainable Urban Mobility Plans and logistics strategies. Their modular and scalable design supports replication in other Functional Urban Areas.

These objectives directly align with key European strategic frameworks, including the European Green Deal, which calls for a 90% reduction in transport-related greenhouse gas emissions by 2050, and the Sustainable and Smart Mobility Strategy, which promotes zero-emission urban logistics and digitalisation. By integrating decarbonisation, digital innovation, and public space reallocation, the GRETA pilots operationalise European climate and mobility goals at the local level.



## 8.2 Short-, Medium-, and Long-Term Actions

Achieving this vision requires a phased approach combining regulatory, operational, and infrastructural measures.

**Short-term actions** focus on experimentation and capacity building. These include pilot projects for micro-hubs and cargo bike delivery, the introduction of dedicated or time-regulated loading zones, and the use of temporary or modular infrastructure. Cities should also begin collecting data on freight movements and curb use to inform decision-making.

**Medium-term actions** aim to integrate successful pilots into mainstream urban mobility and planning frameworks. This includes embedding urban freight measures into Sustainable Urban Mobility Plans (SUMP), expanding digital curb management systems, and establishing stable governance and funding models. At this stage, cities can scale up micro-hub networks and harmonise regulations across districts or metropolitan areas.

**Long-term actions** focus on systemic transformation. These include permanent allocation of space for urban logistics infrastructure, widespread adoption of zero-emission delivery vehicles, and the integration of urban freight considerations into land-use planning, urban regeneration, and climate strategies. Long-term actions should also support interoperability and standardisation to facilitate cross-city and cross-border logistics operations.

## 8.3 Roles of Cities, Regions, and National Authorities

Clear allocation of roles and responsibilities is essential for effective implementation. **Cities** play a central role in managing curb space, regulating access, allocating urban space for micro-hubs, and engaging local stakeholders. They are also responsible for integrating urban logistics into mobility and planning strategies.

**Regions and metropolitan authorities** can support coordination across municipal boundaries, particularly where logistics flows extend beyond city limits. They can facilitate harmonisation of regulations, support shared infrastructure, and align urban logistics measures with regional transport and economic development strategies.

**National authorities** provide the legal and policy framework within which cities operate. Their role includes enabling regulatory flexibility, supporting data sharing, and aligning national transport, climate, and spatial planning policies with EU objectives. National governments also play a key role in channelling EU funding and supporting capacity building at local level.

## 8.4 Engagement of Private Sector and Logistics Operators

The successful implementation of micro-hubs and curb management depends on active engagement with the private sector, particularly logistics operators, retailers, and service providers. These actors bring operational expertise, innovation capacity, and investment potential that are essential for scalable solutions.

Public-private cooperation can take various forms, including partnerships for operating micro-hubs, co-design of curb management rules, and joint pilots of digital solutions. Cities that involve logistics operators early in the planning process are better able to align regulatory measures with operational realities and to ensure economic viability.



Engagement should also extend to small and medium-sized enterprises, local retailers, and new market entrants, such as cargo bike operators. Transparent dialogue and clear communication of objectives and benefits help build trust and encourage long-term commitment.

## 8.5 Capacity Building and Knowledge Transfer

Capacity building and knowledge transfer are critical enablers of the strategy. Many Central European cities face limited institutional capacity and experience in managing urban freight, particularly in relation to digital tools, data analysis, and stakeholder coordination.

Targeted capacity-building actions include training for municipal staff, peer-learning networks among cities, and the development of practical guidance and toolkits. EU-funded programmes, such as Interreg and CIVITAS, play a key role in facilitating knowledge exchange and supporting the transfer of successful solutions across borders.

The capacity building strategy represents a critical step toward embedding sustainable urban logistics within broader mobility and planning frameworks. By equipping local authorities, logistics companies, and stakeholders with the skills, tools, and institutional support necessary to adopt innovative solutions, the strategy ensures that sustainable last-mile delivery systems are not treated as stand-alone pilots, but rather as integral components of long-term urban development. This integration strengthens governance structures, enhances cross-sector collaboration, and supports the alignment of urban logistics with climate, mobility, and accessibility goals.

### Institutional Strengthening:

Institutional strengthening is a key pillar for achieving sustainable and efficient urban freight systems. Within the GRETA project, several strategic measures have been designed to build the capacity of public authorities, foster effective collaboration with stakeholders, and support the integration of green logistics into urban mobility frameworks.

This section outlines three key measures implemented to enhance institutional capacity:

1. **Establishment of local task forces within FQPs developed by GRETA FUAs** composed of municipal authorities, logistics operators, and stakeholders to co-design sustainable urban logistics action plans.

The GRETA project developed a methodology on how to create and establish a Freight Quality Partnership (FQP) capitalizing the methodology developed in SULPiTER project<sup>41</sup> and adding GRETA Step-by-step instructions on FQP establishment and operations (*D2.2.1 Methodology for the creation of a FQP and FQP establishment*)<sup>42</sup>.

The FQP is a partnership between local authorities, local communities, the freight industry, the private sector, environmental groups, and other stakeholders. The goal is to develop an agreement related to freight transport issues, as well as try to find solutions to many problems that concern this field. In fact, a FQP is effective if it allows to achieve concrete results.

The FQP allows stakeholders to work together to fulfil a common strategy, minimising oppositions and arguments and maximising collaborations to obtain benefits as much as possible. There are a lot of advantages, for example FQPs permit authorities to become aware of problems about freight transport and distribution. They also promote dialogue between all the groups involved to understand all the different points of view. In this way there is an exchange of knowledge, information and ideas.

<sup>41</sup> SULPiTER Interreg Central project: <https://programme2014-20.interreg-central.eu/Content.Node/SULPiTER.html>

<sup>42</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>



Benefits related to the desired outcomes are environmental (fewer vehicle emissions and noise), economic (cost reduction and economic growth) and societal (more safety, improved access to goods).

The establishment of local task forces within FQPs are one of the most impactful measures that can be implemented in GRETA FUAs and in other similar contexts aiming to empower public authorities in identifying effective solutions for a greener and more sustainable urban freight. This is essential for keeping city centres and the broader FUA attractive and vibrant for both residents and tourists. These local task forces may be coordinated by a public institution or by neutral third-party entity and should involve all relevant stakeholders according to the identified objectives.

Starting from issues and problems related to Urban Freight Transport, all the potential partners can identify the objectives of their FQP. To get an overview of the situation, each FUA can organize exploratory meetings where it is possible to gather ideas and obtain a first commitment from the stakeholders.

The objectives should be as S.M.A.R.T. as possible: Specific, Measurable, Achievable, Realistic and Timed. They have to be defined at the beginning of the process, but they often need to be reviewed as the Partnership develops.

- 2. Governance support:** specific training for public decision-makers on integrating green logistics solutions into SUMP (Sustainable Urban Mobility Plans) and urban planning tools.

As illustrated in *D1.4.2 Jointly developed capacity building for CE FUAs policy makers* (within chapter 4.1 of this document)<sup>43</sup>, it is important to set up ad hoc training sessions for policy makers focused on the integration of green logistics solutions into SUMP and urban planning tools. These training courses will be performed through OPEN ENLoCC Learning Management tool to increase the competences and stimulate the discussion on possible solutions that can advance the debate on sustainable and efficient urban freight transport and exploring how urban logistics can be integrated into broader urban planning alongside passenger mobility.

- 3. Drafting of a strategy to harmonize urban logistics regulations** at the transnational level across Central Europe.

The strategy aims to influence the urban agenda of the European Commission on urban logistics, in the medium and long term in line with the Green Deal and Urban mobility package objectives. The strategy will also make a step forward to define how a better curb and public space management (parking, bus stops, loading and unloading spots) and the use of micro-hubs in logistics, can make Central Europe greener. The strategy will be developed as an output and a deliverable of GRETA project by March 2026: *O3.1/D3.3.6 Boosting Urban Logistics: Improving Curb Management and Micro-Hubs for Cargo Bikes in Central Europe*<sup>44</sup>.

Knowledge transfer should also be embedded in project design, ensuring that lessons learned from pilot initiatives—such as those under the GRETA project—are systematically documented and shared. Strengthening institutional learning will enable Central European cities to move more quickly from pilots to long-term, sustainable urban logistics solutions.

#### **Digital Tools & Capacity Empowerment:**

Important aspect of capacity empowerment within the strategy is the use of digital tools that enhance accessibility, knowledge retention, and self-assessment capabilities. The Learning Management Tool, hosted on the OPEN ENLoCC website<sup>45</sup>, will provide a structured platform for continuous training, offering modular courses, resources, and interactive materials tailored to sustainable last-mile logistics.

The GRETA Transferability Platform will also serve as a practical decision-support tool for public authorities. By enabling self-assessment of their current logistics frameworks and readiness levels, it will guide cities

<sup>43</sup><https://www.interreg-central.eu/projects/greta/?tab=media>

<sup>44</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>

<sup>45</sup> <https://www.openenlocc.net/greta-learning-platform/>



and Functional Urban Areas in identifying opportunities, challenges, and tailored pathways for adopting and transferring innovative last-mile delivery solutions.

### Building Long Partnerships:

Building strong and lasting partnerships is a key element of the GRETA project's capacity building strategy. In the context of innovative and sustainable urban logistics, long-term collaboration among diverse stakeholders—public authorities, private sector actors, research institutions, and civil society—is essential for ensuring continuity, maximizing impact, and enabling the replication of successful practices across Central Europe.

This chapter explores the different forms of strategic cooperation fostered by GRETA to support innovation in green urban logistics. These include the establishment of a transnational network among Functional Urban Areas (FUAs), the activation of a Permanent Working Group with external projects to promote ongoing synergy and shared learning, and the reinforcement of both Public-Private Partnerships (PPPs) and Freight Quality Partnerships (FQPs). Each of these initiatives serves a specific role in strengthening collaborative frameworks, aligning goals, and ensuring that the knowledge and solutions developed within the project remain impactful well beyond its conclusion.

- **Establishment of the GRETA transnational network** among relevant stakeholders from the GRETA FUAs for future exchanges and cooperation beyond the project's lifetime, including the selection of new funding opportunities. In order to further capitalize this cooperation, this transnational network can profit and, in case, further spread also thanks to the networking activities carried out by OPEN ENLoCC. Among the possible beneficial usages of this network, the share of the knowledge materials developed within GRETA project is worth mentioning here. The transnational network will be developed through the signature of an agreement that will represent the *Deliverable 3.3.7 GRETA Transnational Network*<sup>46</sup>.
- **Permanent Working Group (PWG) with external projects:** The Permanent Working Group with external projects is a core activity of the GRETA project that fosters productive collaboration with other ongoing initiatives, enabling the joint utilization of results and best practices. To this end, a series of workshops has been realised and planned within the project to facilitate continuous synergy exchange with similar projects and to leverage existing knowledge. Synergies have been activated with EU-funded projects and beyond (e.g. H2020, Horizon Europe and other INTERREG projects). This activity has the main objective to generate collaborative opportunities, including joint workshops, events, and publications also after project closure<sup>47</sup>.
- **Public-Private Partnerships (PPPs):** Public-Private Partnerships are contractual agreements in which private companies support the delivery and financing of public services, to finance, design, build, operate, and/or maintain infrastructure or services that are traditionally provided by the public sector. The establishment of Public-Private Partnerships is fundamental for the development and implementation of sustainable urban logistics solutions. It allows to generate innovative ideas and testing pilot solutions aimed at decarbonising the logistics sector. Such collaborative approaches enable the alignment of public policies and private investments, helping create urban freight systems that are more environmentally friendly and better able to cope with future challenges. In GRETA project, Łukasiewicz - Poznań Institute of Technology (L-PIT) established a Public-Private Partnership with GLS, the logistics operator. L-PIT is part of the Łukasiewicz Research Network, a public, state-owned R&D organization in Poland. This because GLS is the major operator one of the operators in Poznan city centre so its cooperation could be very useful and effective for the pilot successful implementation and its transferability and replication to other cities and other minor Logistics Service Providers operating in the Poznan area. As a result of the cooperation with GLS, it

<sup>46</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>

<sup>47</sup> Ibid



was agreed that the project would utilize GLS infrastructure, specifically their cargo bikes, and follow GLS established processes. This approach significantly reduced the cost of external services that L-PIT might otherwise need for the development of the pilot. In addition, since the pilot was based on an actual, complex and high-volume process, a huge amount of data characterising the logistics processes (including, among others, the last mile delivery routes) was collected during the pilot.

- **Freight Quality Partnerships (FQPs):** An FQP is truly effective when it leads to tangible, real-world outcomes. It concentrates on enhancing the efficiency and effectiveness of freight transport, usually through collaborative efforts on targeted projects or initiatives, not with long-term contractual agreements<sup>48</sup>.

Table 1: Capacity Building Strategy – Elements & Goals Matrix

Strategic Element	Specific Goal
Knowledge transfer and Training	Develop standardised training modules on zero-emission logistics, cargo bike deployment, curbside management, and digital planning tools
Peer-to-Peer Learning	<ul style="list-style-type: none"> <li>• Facilitate transnational peer reviews and workshops to share solutions, reduce risks, and generalize conclusions on topics like micro-hubs and curb management.</li> <li>• Organise targeted study visits to pilot cities, enabling stakeholders to directly observe solutions, discuss challenges, and assess replicability.</li> <li>• Strengthen collaborative networks among FUAs to foster mutual learning, continuous knowledge exchange, and wider adoption of low-emission logistics practices.</li> </ul>
Pilot actions	Build technical, institutional, and governance capacity among municipalities, logistics operators, and planners. Generate transferable knowledge, operational data, and best practices to support replication and policy integration.
Institutional strengthening	<ul style="list-style-type: none"> <li>• Establish local task forces within FQPs to co-design sustainable urban logistics action plans and empower public authorities in decision-making.</li> <li>• Provide targeted training for policymakers to integrate green logistics solutions into SUMP and urban planning frameworks.</li> <li>• Develop a transnational strategy to harmonize urban logistics regulations, advancing curb management, micro-hubs, and alignment with EU Green Deal objectives.</li> </ul>
Digital tools and Capacity empowerment	Produce a toolkit with guidelines, business models, and regulatory recommendations.
Long term partnerships	<ul style="list-style-type: none"> <li>• Establish and sustain a transnational network and Permanent Working Group to ensure continuous knowledge exchange, synergies, and cooperation beyond the GRETA project's lifetime.</li> </ul>

<sup>48</sup> <https://www.interreg-central.eu/projects/greta/?tab=media>



- Strengthen Public-Private Partnerships (PPPs) and Freight Quality Partnerships (FQPs) to co-design, test, and implement innovative, sustainable urban logistics solutions.
- Align diverse stakeholders' efforts to maximize impact, foster replication of successful practices, and secure future funding opportunities for green logistics initiatives.

## 9. Policy Recommendations

The European Commission plays a pivotal role in shaping the framework conditions for sustainable urban logistics across Europe. While cities are responsible for implementation on the ground, EU-level policies, legislation, funding instruments, and guidance strongly influence local capacity to act. To accelerate the transition towards efficient, low-emission urban logistics in Central Europe, targeted and coordinated action at EU level is required.

This section of the deliverable sets out policy recommendations aimed at strengthening regulatory coherence, directing investment, supporting innovation and digitalisation, and improving monitoring and evaluation of urban logistics measures. The recommendations focus on enabling better curb management and the deployment of micro-hubs for cargo bike logistics.

### 9.1 Regulatory and Legislative Recommendations

The European Commission should reinforce the visibility and integration of urban freight and logistics within EU mobility and transport legislation. While urban logistics is addressed in several EU initiatives such as the *Sustainable and Smart Mobility Strategy*, the *EU Urban Mobility Framework*<sup>49</sup>, and policies related to the *Trans-European Transport Network (TEN-T)* it remains not very visible in binding regulatory frameworks.

Key recommendations include:

- **Strengthen the integration of urban freight in SUMP**s by updating SUMP guidelines to include mandatory consideration of curb management, urban consolidation, and micro-hubs, particularly in cities receiving EU funding.
- **Promote common EU principles for curb management**, providing guidance on curbside allocation, prioritisation of zero-emission deliveries, and time-based access rules, while allowing flexibility for local adaptation.
- **Support regulatory flexibility for cities**, including the use of temporary regulations, pilot zones, and experimental approaches to urban logistics and curbside use.
- **Ensure coherence between freight, climate, and spatial planning policies**, including alignment with the Clean Vehicles Directive, the Alternative Fuels Infrastructure Regulation, and EU air quality legislation.

By providing a stronger regulatory basis, the Commission can reduce uncertainty for cities and logistics operators and facilitate consistent implementation across Member States.

<sup>49</sup> European Commission, Sustainable Urban Mobility Plans (SUMP)s policy framework.



## 9.2 Funding and Investment Priorities

EU funding instruments, including programmes such as **Interreg**, are critical for enabling cities to move from pilot projects to large-scale implementation. To maximise their impact, funding priorities should explicitly recognise urban logistics infrastructure and digital tools as essential components of sustainable urban mobility.

Key funding recommendations include:

- **More space urban logistics in EU funding programmes**, including Horizon Europe, the European Regional Development Fund (ERDF), the Cohesion Fund, and the Connecting Europe Facility (CEF).
- **Support both infrastructure and soft measures**, such as micro-hub facilities, digital curb management systems, capacity building, and governance development.
- **Encourage long-term investment models**, including support for public-private partnerships and blended finance approaches to ensure financial sustainability beyond pilot phases.
- **Facilitate access for smaller and medium-sized cities**, particularly in Central Europe, by simplifying application procedures and supporting project development.

Targeted investment can help overcome financial barriers, reduce risk, and support the scaling up of proven solutions.

## 9.3 Support for Innovation, Digitalization, and Data Sharing

Digitalisation and data-driven approaches are key enablers of efficient curb management and integrated urban logistics systems. The European Commission can play a central role in fostering innovation while ensuring interoperability and data protection.

Recommended actions include:

- **Support the development and deployment of digital curb management platforms**, including real-time monitoring, booking systems, and integration with traffic and enforcement systems.
- **Promote common data standards and interoperability**, enabling cities and operators to share freight and curbside data across platforms and borders.
- **Facilitate secure data sharing frameworks**, balancing the need for evidence-based policymaking with the protection of commercially sensitive information.
- **Encourage innovation through research and demonstration projects**, particularly those combining digital tools with new logistics models such as micro-hubs and cargo bikes.

## 9.4 Monitoring, Indicators, and Impact Assessment

Robust monitoring and evaluation are essential to demonstrate the effectiveness of urban logistics measures and to inform future policy development. The lack of harmonised indicators and comparable data can limit the ability to assess impacts at EU level.

The European Commission should:

- **Develop a common set of indicators for urban logistics**, covering environmental impacts (emissions, air quality, noise), operational efficiency (delivery times, vehicle kilometres), and social outcomes (safety, public space quality).



- **Integrate urban logistics indicators into existing EU monitoring frameworks**, including those related to SUMP and climate reporting.
- **Support cities in data collection and impact assessment**, through guidance, tools, and capacity-building activities.
- **Encourage systematic evaluation of EU-funded projects**, ensuring that lessons learned are captured and disseminated across cities and regions.

## 10. Conclusions

Urban freight transport is an essential component of urban economies, but it puts pressure on limited street space, contributes to congestion, and generates environmental impacts. Central European cities face challenges due to dense urban structures, growing delivery demand, and complex governance arrangements. Addressing these challenges requires integrated and forward-looking approaches to urban logistics planning.

This deliverable demonstrates that micro-hubs combined with effective curb management represent promising tools for improving last-mile logistics while supporting broader urban sustainability goals. By enabling the consolidation of goods and the use of cargo bikes and other zero-emission delivery vehicles, these solutions can reduce emissions, improve operational efficiency, and enhance the quality of urban public space.

The experiences of the GRETA pilot cities provide valuable insights into how such measures can be implemented and scaled. To fully realise the potential of these solutions, coordinated action is required across governance levels. Cities play a central role in implementation, but support from regional, national, and European institutions is essential to provide clear regulatory frameworks, funding opportunities, and technical guidance. EU policies and programmes can facilitate the transition from pilot initiatives to large-scale deployment of sustainable urban logistics solutions.

Improving curb management and scaling up micro-hubs for cargo bike logistics can contribute significantly to achieving the objectives of the European Green Deal and the broader transition towards climate-neutral, efficient, and liveable cities. The strategic framework and policy recommendations presented in this deliverable aim to support Central European cities in advancing this transition and embedding sustainable urban logistics within long-term urban development strategies.



## 11. References

1. Browne M, Allen J, Leonardi J. Evaluating the use of urban consolidation centres and micro-hubs in city logistics. *Procedia Soc Behav Sci.* 2011;39:611-625.
2. National Association of City Transportation Officials (NACTO). *Global Street Design Guide - Curbside Management.* New York: NACTO; 2018.
3. International Transport Forum. *Managing the Impact of Growing E-Commerce on Urban Freight.* Paris: OECD Publishing; 2018.
4. World Health Organization. *Environmental Noise Guidelines for the European Region.* Copenhagen: WHO Regional Office for Europe; 2018.
5. Rudolph C, Gruber J, Lenz B. Cargo cycles in commercial transport: Potentials and constraints. *Transportation Research Procedia.* 2018;30:219-228.
6. European Commission. *The European Green Deal. COM(2019) 640 final.* Brussels: European Commission; 2019.
7. European Parliament and Council. *Directive (EU) 2019/1161 on the promotion of clean and energy-efficient road transport vehicles.* Official Journal of the European Union. 2019.
8. OECD / International Transport Forum. *Urban Freight and Logistics: The State of Practice.* Paris: OECD Publishing; 2019.
9. Eurocities. *Urban Freight and Logistics: Cities' Experiences and Best Practices.* Brussels: Eurocities; 2019.
10. Capgemini Research Institute. *The Last-Mile Delivery Challenge.* Paris: Capgemini; 2019.
11. City of Vienna. *Urban Development Plan Vienna (STEP 2025).* Vienna: City of Vienna; 2019.
12. CIVITAS Initiative. *Urban Freight Logistics: Solutions and Best Practices.* Brussels: European Commission; 2020.
13. CIVITAS Initiative. *Urban Freight in CIVITAS Cities: Best Practice Guide.* Brussels: European Commission; 2020.
14. European Commission. *Sustainable and Smart Mobility Strategy - Putting European Transport on Track for the Future. COM(2020) 789 final.* Brussels: European Commission; 2020.
15. European Environment Agency. *Transport and Environment Report.* Copenhagen: EEA; 2020.
16. Organisation for Economic Co-operation and Development. *Delivering the Goods: Sustainable Urban Freight.* Paris: OECD Publishing; 2020.
17. World Economic Forum. *The Future of the Last-Mile Ecosystem.* Geneva: WEF; 2020.
18. European Commission. *Sustainable Urban Mobility Planning (SUMP) Guidelines. 2nd ed.* Luxembourg: Publications Office of the European Union; 2019.
19. European Commission. *Horizon Europe Programme Guide.* Brussels: European Commission; 2021.



20. European Commission. New EU Urban Mobility Framework. SWD(2021) 146 final. Brussels: European Commission; 2021.
21. OECD / International Transport Forum. The Role of Data in Managing Urban Freight. Paris: OECD Publishing; 2021.
22. Organisation for Economic Co-operation and Development. Reversing Car Dependency: Summary and Conclusions. Paris: OECD Publishing; 2021.
23. POLIS Network. Managing Urban Freight: Policy Recommendations for Cities. Brussels: POLIS; 2021.
24. POLIS Network. Regulating Urban Freight for Sustainability: Case Studies from European Cities. Brussels: POLIS; 2021.
25. Ajuntament de Barcelona. Urban Mobility Plan of Barcelona 2024 (PMU 2024). Barcelona: City of Barcelona; 2021.
26. European Commission. Connecting Europe Facility - Transport. Brussels: European Commission; 2022.
27. European Commission. Urban Mobility Package. Brussels: European Commission; 2023.
28. Interreg Central Europe Programme. GRETA Project - Green and Resilient Transport for Urban Accessibility. Available from: <https://www.interreg-central.eu/projects/greta/>
29. Open ENLoCC. GRETA Learning Platform. Available from: <https://www.openenlocc.net/greta-learning-platform/>
30. Interreg Central Europe Programme. SULPiTER - Sustainable Urban Logistics Planning to Enhance Regional Freight Transport. Available from: <https://programme2014-20.interreg-central.eu/Content.Node/SULPiTER.html>
31. European Commission. Sustainable Urban Mobility Plans (SUMP) Policy Framework. Brussels: European Commission.