

## D2.5.3 Micro consolidation centre served by green and ZEV



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GRETA Project



## Table of Contents

1.	THE GRETA PROJECT.....	4
2.	EXECUTIVE SUMMARY .....	5
3.	SOLUTION.....	6
3.1	GENERAL INFORMATION.....	6
3.2	STRATEGY DESCRIPTION .....	8
3.3	GOVERNANCE MODEL .....	9
3.4	DIGITAL AND PHYSICAL INFRASTRUCTURE .....	12
4.	IMPACT .....	15
4.1	ENVIRONMENTAL, ECONOMICAL AND SOCIAL IMPACT ASSESSMENT OF THE SOLUTION .....	15
5.	LESSONS LEARNT .....	<b>NAPAKA! ZAZNAMEK NI DEFINIRAN.</b>
6.	TRANSNATIONAL COOPERATION.....	16
6.1	SCALING-UP.....	16
6.2	TRANSFER.....	17
7.	CONCLUSIONS.....	20
8.	REFERENCES .....	21

More information about GRETA can be found on <https://www.interreg-central.eu/greta/>



Abbreviation table	
Abbreviation	Definition
CE	Central Europe
FUA	Functional Urban Area
FQP	Freight Quality Partnership
HoReCa	Hotels Restaurants Catering
SUMP	Sustainable Urban Mobility Plan
SULP	Sustainable Urban Logistics Plan
ZEV	Zero Emission Vehicle
MOM	Municipality of Maribor
UM	University of Maribor
MUCC	Micro Urban Consolidation Centre



## 1. The GRETA project

GRETA project aims to decarbonise 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 reorganise 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 organisations 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 nearly doubled, further increasing inefficiencies in the peripheral areas. GRETA's FUAs recognise the problems that generate pollution, nuisance, noise, congestion and have jointly recognised 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 using 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 decarbonisation of the last mile in line with the EU Green Deal and the Urban Mobility Package, abating congestion, pollution, and nuisance. The project's success relies on capitalising on previous experiences, exploiting synergies with ongoing initiatives, testing innovative pilots, improving competences and knowledge among PPs and stakeholders.



## 2. Executive summary

The Maribor pilot solution focuses on the implementation of a Micro Urban Consolidation Centre (MUCC) as a key measure to support the decarbonisation and optimisation of last-mile delivery in the city centre. The solution addresses challenges related to restricted access to the pedestrian zone, fragmented delivery patterns, and the need for more flexible and sustainable logistics services.

The solution introduced a micro-hub located at the edge of the pedestrian zone, enabling the consolidation of deliveries and their distribution using zero-emission or low-emission modes such as hand trolleys and light logistics equipment. The solution complements existing regulatory measures, particularly access restrictions for motorised vehicles, by providing a practical alternative for deliveries outside defined time windows.


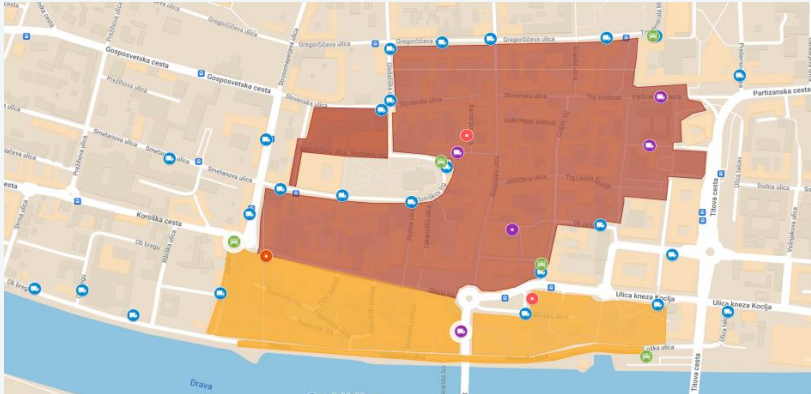
The implementation has successfully established the physical and organisational basis for the MUCC, supported by stakeholder engagement through the Freight Quality Partnership (FQP) and strengthened internal coordination within the Municipality of Maribor. The solution contributes to reducing delivery vehicle traffic, improving urban liveability and supporting long-term sustainable urban logistics strategies.



### 3. Solution

#### 3.1 General information

Maribor is the second-largest city in Slovenia and the largest city of the traditional region of Lower Styria. It is the seat of the Urban Municipality of Maribor and the Drava statistical region. Maribor is also the economic, administrative, educational, and cultural centre of eastern Slovenia.

<b>Location</b>	<ul style="list-style-type: none"><li>○ 2nd largest city located in the north-eastern Slovenia</li><li>○ App. 113,000 inhabitants<sup>1</sup></li></ul>
<b>Map (general map of the municipality + detailed map of the city centre)</b>	 <p><i>Figure 1: Slovenia with neighbouring countries and Maribor location (SULP, 2019)</i></p>  <p><i>Figure 2: Maribor city pedestrian zone (GoogleMaps and UM, 2024)</i></p>

<sup>1</sup> <https://www.stat.si/obcine/sl/Municip/Index/94> (27.3.2025)

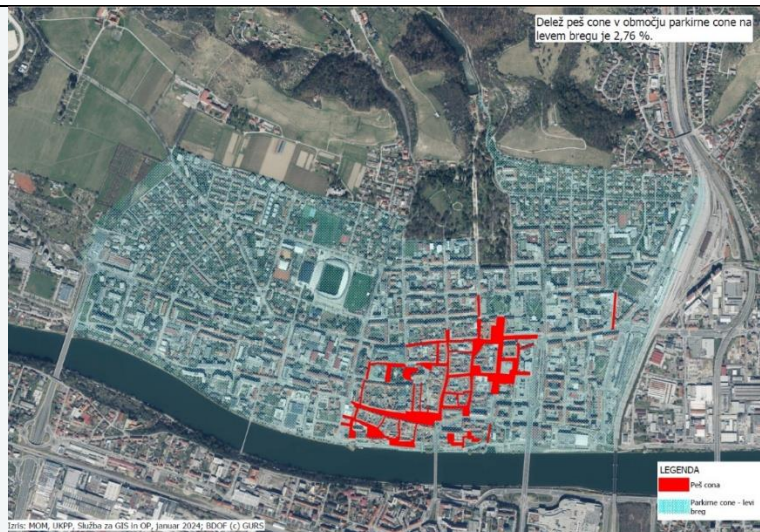


Figure 3: Maribor city pedestrian zone's share (MOM GIS, 2024)

<p><b>Area characteristics</b></p>	<ul style="list-style-type: none"> <li>○ Good geostrategic location along the Drava River and among Pohorje hills with good road connections and capacities.</li> <li>○ Centre of Eastern cohesion region of Slovenia.</li> <li>○ Located 18 km from the state border with Austria - city represents a threshold or gateway to Slovenia.</li> <li>○ Maribor has its own university represented by 17 faculties with approximately 20,000 students.</li> <li>○ 98% of local companies are SMEs.</li> <li>○ High car ownership rate (506 per 1,000 inh. with avg. car age of 11 yrs).</li> <li>○ Pilot area:             <ul style="list-style-type: none"> <li>▪ City centre (old city centre with narrow streets)</li> <li>▪ Share of cargo transport limitation zone area 0.26 km<sup>2</sup> or 260,000 m<sup>2</sup> (pedestrian zone)</li> <li>▪ Shops and HoReCa subjects in the city centre</li> </ul> </li> </ul>
<p><b>Additional information</b></p>	<ul style="list-style-type: none"> <li>○ SULP approved in 2019 as an additional pillar of SUMP, which was approved in 2015.</li> <li>○ FQP was already established during the implementation of project SULPITER (2016-2019). It was re-activated for purposes of GRETA pilot.</li> </ul>

Table 1 General information



### 3.2 Strategy description

The strategy of the Maribor solution is based on the integration of regulatory measures and physical logistics infrastructure to achieve more efficient and sustainable last-mile delivery in the city centre. The introduction of access restrictions for motorised vehicles in the pedestrian zone after 10:00 a.m. created a need for alternative delivery solutions that ensure flexibility for businesses and residents. The MUCC is designed as a complementary measure to these restrictions, enabling continued access to goods through sustainable delivery modes.

The strategy builds on existing policy frameworks, particularly the Sustainable Urban Mobility Plan (SUMP) and the Sustainable Urban Logistics Plan (SULP), which already identify micro-hubs and zero-emission delivery solutions as key measures. The solution operationalises these strategic objectives by testing a real-life implementation of a micro-hub system.

A key element of the strategy is the use of a collaborative governance model through the Freight Quality Partnership (FQP), ensuring that the solution is co-developed with relevant stakeholders, including logistics operators, businesses, and public authorities. The strategy also foresees the development of a viable business model and long-term operational framework, including the potential use of concession-based management.



### 3.3 Governance model

The governance model of the Maribor Micro Urban Consolidation Centre (MUCC) is based on a coordinated approach involving public authorities, operational stakeholders, and supporting institutions. The model combines regulatory control, strategic coordination, and operational management to ensure effective implementation and long-term sustainability of the solution.

#### Governance structure and key actors

The governance of the MUCC involves the following main actors:

- **Municipality of Maribor** - responsible for overall coordination, regulatory framework, and strategic planning,
- **Municipal departments** (traffic, spatial planning, public utilities) - responsible for implementation support, permitting procedures, and enforcement of access regulations,
- **Mobility Centre of Maribor as MUCC operator** - responsible for day-to-day operation and service provision,
- **University of Maribor** - providing technical support, digital solutions, and analytical input,
- **Freight Quality Partnership (FQP)** - acting as a stakeholder platform for consultation, co-creation, and feedback,
- **Logistics operators and local businesses** - end-users and key stakeholders involved in the use and validation of the solution.

#### Roles and responsibilities

Municipality of Maribor plays a central role in establishing the regulatory and organisational framework. It is responsible for defining access restrictions in the pedestrian zone, providing the physical space for the MUCC, and coordinating the overall implementation process. The Municipality also ensures alignment with strategic documents such as the SUMP and SULP.

Municipal departments are responsible for operational aspects within their competences, including traffic regulation, spatial planning approvals, and coordination with external institutions such as cultural heritage authorities.

Mobility Centre of Maribor as the operator is responsible for the daily management of the micro-hub, including handling of goods, organisation of last-mile delivery, customer interaction, and maintenance of the facility. The operator is expected to function within a concession-based model, ensuring service continuity and efficiency.

University of Maribor contributes to the development of digital tools, monitoring frameworks, and evaluation methodologies, supporting evidence-based decision-making and future optimisation of the solution.

The Freight Quality Partnership plays a key role in stakeholder engagement. It serves as a platform for dialogue between public authorities, logistics operators, businesses, and other relevant actors. Through this platform, stakeholders can provide feedback, identify challenges, and contribute to the co-development of the solution.

Logistics operators and local businesses are essential users of the system. Their participation is crucial for the practical validation of the MUCC concept and for ensuring that the solution meets real operational needs.



## Governance approach

The governance model can be described as a hybrid model combining public authority leadership with stakeholder-driven input and future operator-based service provision. The Municipality ensures strategic direction and regulatory support, while the operational model is designed to be flexible and market-oriented. This approach allows for gradual transition from a publicly initiated pilot phase towards a more sustainable and potentially self-sufficient operational model. It also supports scalability and transferability, as roles and responsibilities can be adapted to different urban contexts. Overall, the governance model ensures transparency, clear distribution of responsibilities, and effective coordination among all actors involved in the MUCC implementation and operation.

## Local policies and regulations

- The pilot area is managed by local government Municipality of Maribor. Entrances and exits into the pedestrian zone are supervised by Municipal department of utility and traffic and monitored by city wardens.
- The access to the city centre is restricted after 10.00 am according to the new Act on traffic which entered into force in April 2024. According to the new Act only hand trolleys, carts, hand trucks, e-cargo bikes, bikes or other ZEV vehicles are allowed for delivery after 10.00 am.
- In 2019 adopted Sulp has action plan with proposed measures. Main measures from the Sulp are for improving freight transport and stating tendencies towards closing the city centre. Deliveries friendly zones are proposed and defined (the priority for entering the pedestrian zone and friendly zone is to be given to environmentally friendly vehicles, additional benefits to be granted (e.g., longer time for unloading/loading/parking processes); micro consolidation centres are foreseen in action plan and to be equipped with light transshipment equipment (carts, hand trucks, e-cargo bikes); supply in the city centre to be done by cargo bikes; a network of loading bays outside the city centre is planned to be established according to the action plan). Decision by the mayor was that action plan serves as a framework, guidelines or recommendations for the implementation of measures in the field of regulating logistics and traffic of the Municipality of Maribor.

## National policies and regulations

- **National act on integrated transport planning (since 2022)**

Act regulates the goals and principles of integrated transport planning, types of integrated transport strategies, their content and preparation process, quality assessment and integration of transport and spatial planning. The law also determines the rules on the co-financing of comprehensive transport planning measures and financial incentives for the implementation of measures based on this act, as well as the competences in the field of comprehensive transport planning. Integrated transport planning as described in that act, ensures optimal coordination of the transport system with needs for mobility, supply and transport logistics. Act also determines the framework for sustainable urban logistics plan.

## EU policies and regulations

**European Commission Transport White Paper** setting the goal of a 'carbon-free urban freight distribution', i.e., zero direct carbon dioxide (CO<sub>2</sub>) emissions by 2030; the proposed revision of TEN-T Regulation is followed with great attention from the cities, especially the part related to the definition of the Urban Nodes, which will influence also city logistics planning, as well as the ambitious target of phasing out ICE vehicle sales by 2035.



It supports EU goals for sustainability, decarbonisation of transport, and improved urban mobility while contributing to environmental and public health objectives. By aligning with the EU's Green Deal, urban mobility frameworks, clean Vehicle directive<sup>2</sup>, and vision zero for road safety<sup>3</sup>, the project can help meet broader EU targets for a greener, safer, and more efficient transportation system.

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<sup>2</sup> DIRECTIVE (EU) 2019/1161 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles

<sup>3</sup> European Commission: Directorate-General for Mobility and Transport, *Next steps towards 'Vision Zero' - EU road safety policy framework 2021-2030*, Publications Office, 2020, <https://data.europa.eu/doi/10.2832/391271>



### 3.4 Digital and physical infrastructure

The Maribor solution is based on the implementation of a Micro Urban Consolidation Centre (MUCC) as an alternative solution for the delivery of small, medium, and larger shipments within the pedestrian zone of the city centre. The micro-hub is designed as a flexible transshipment point that enables the consolidation of goods and their distribution using zero-emission or low-emission delivery modes. The overall concept of the MUCC combines both organisational and technological elements. It is based on the identification of demand through stakeholder engagement within the Freight Quality Partnership (FQP), the definition of potential user groups (including shop owners, residents, and delivery operators), and the development of a suitable operational and business model. The solution is designed to function as a semi-autonomous system supported by digital tools, while maintaining strong coordination by the public authority.

#### Physical infrastructure

The physical component of the micro-hub consists of a small-scale logistics facility located at the edge of the pedestrian zone. The final location was selected based on several criteria, including demand, accessibility, and connectivity to surrounding areas. Due to spatial constraints in the historic city centre, the solution was designed as a compact and adaptable structure.

The implementation included:

- preparation and arrangement of the selected location,
- installation of the micro-hub structure,
- procurement and installation of logistics equipment.

The micro-hub is equipped with basic infrastructure that supports core logistics functions, including:

- transshipment of goods,
- short-term storage,
- handling of different shipment sizes,
- use of zero-emission delivery equipment (e.g. trolleys and other light logistics devices).

The design of the physical infrastructure allows flexibility in use and potential adaptation depending on needs expected to function. The compact size of the facility (approximately 7.65 m<sup>2</sup>) reflects the constraints of the urban environment while ensuring sufficient functionality for the operation of the facility.

#### Digital infrastructure

The digital component of the solution supports the operation, monitoring, and future scalability of the micro-hub.

The digital infrastructure included:

- digital support for managing the use of the micro-hub,
- support for tracking deliveries and usage of the facility,
- data collection (limited) for monitoring KPIs and evaluating performance.

In addition, the micro-hub is designed to be compatible with existing digital logistics solutions, such as parcel locker systems (e.g. Direct4Me), which are already integrated into the broader urban logistics ecosystem.



### Integration of physical and digital components

A key feature of the Maribor solution is the integration of physical infrastructure with digital support systems. While the physical micro-hub enables the operational aspect of last-mile delivery, the digital tools provide the basis for monitoring, optimisation, and future scaling of the solution.

This integrated approach ensures that the MUCC is not only a static logistics facility, but part of a broader, evolving urban logistics system. It also supports the transition towards more data-driven and service-oriented urban freight management.

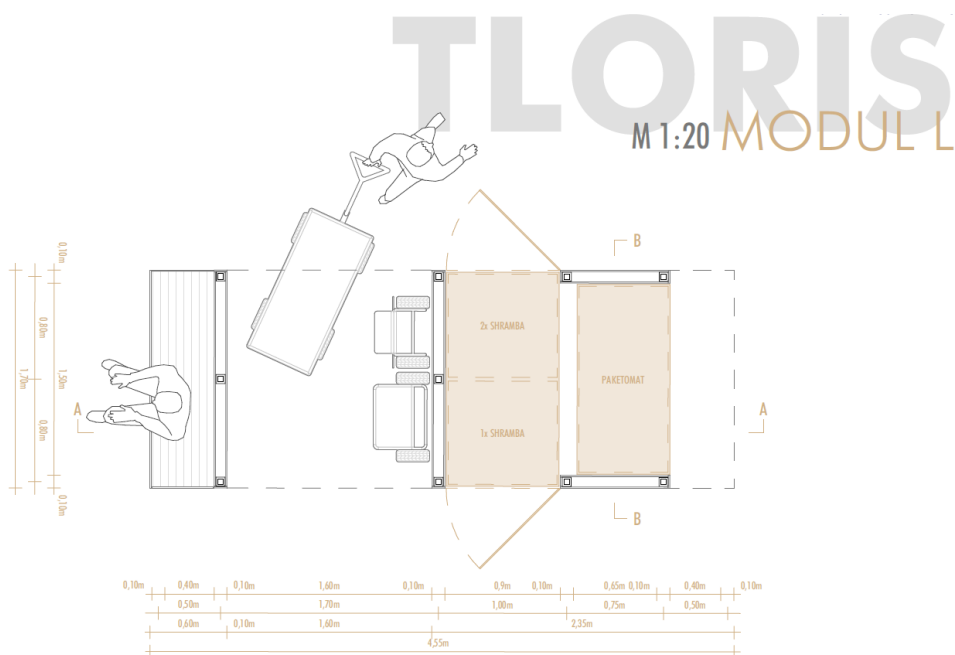


Figure 5 Maribor micro hub floor plan (UM, 2025)



Figure 6 Maribor micro hub 3D render I. (UM, 2025)

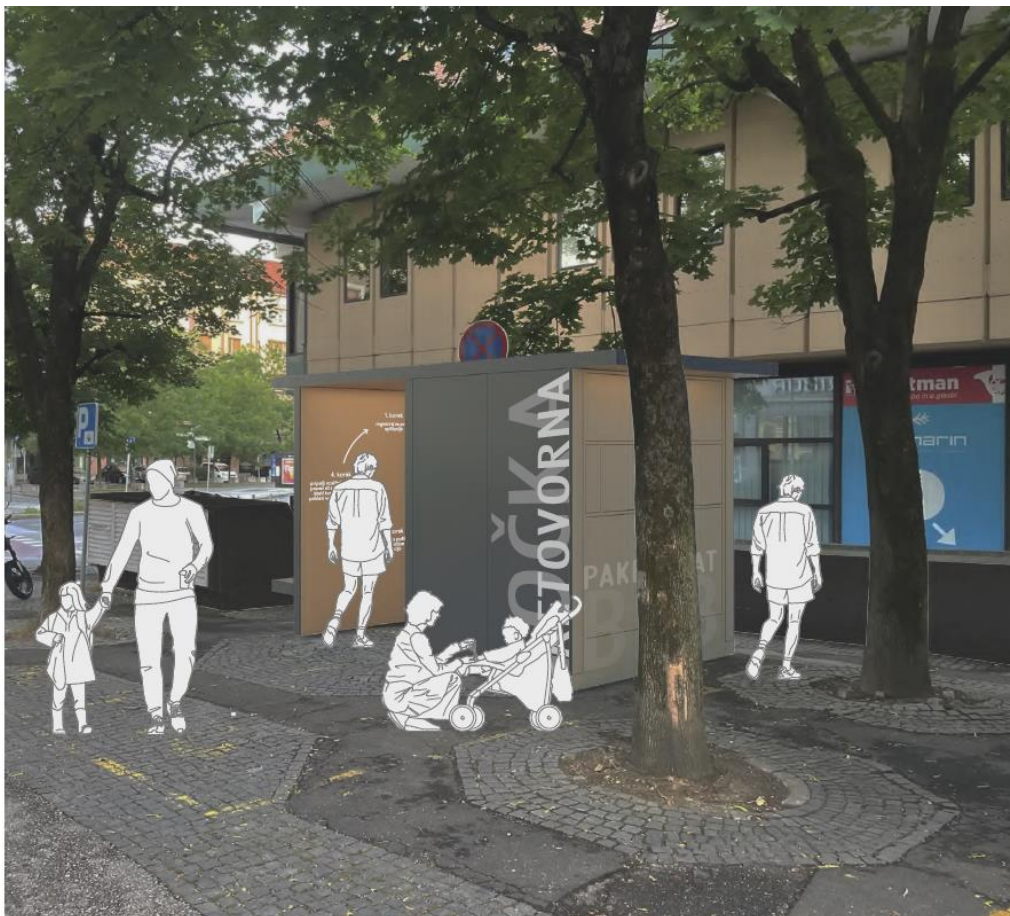


Figure 7 Maribor micro hub 3D render II. (UM, 2025)



## 4. Impact

### 4.1 Environmental, economical and social impact assessment of the solution

The Maribor solution demonstrates strong potential to generate positive environmental, economic and social impacts, although full quantitative assessment will continue through post-project monitoring activities. This solution has also a significant institutional impact, it strengthens cooperation between stakeholders and building capacity within the municipality for the implementation of sustainable urban logistics measures. The material provided and implemented by partners during the GRETA project also represents very solid guiding points contributing to renewing strategic frameworks of Maribor's urban logistics and green policies.

#### **Environmental impact:**

The introduction of the micro-hub enables a shift from motorised delivery vehicles to zero-emission and low-emission delivery modes within the pedestrian zone. This contributes to the reduction of greenhouse gas emissions, noise, and air pollution. The consolidation of deliveries reduces the number of vehicle trips, thereby decreasing congestion and improving the efficiency of urban logistics.

#### **Economic impact:**

The solution introduces a new logistics model that may initially involve additional operational costs, particularly related to micro-hub operation and last-mile delivery organisation. However, it also creates opportunities for more efficient delivery processes, potential cost optimisation through consolidation, and the development of new logistics services and business models.

#### **Social impact:**

The solution improves the quality of life in the city centre by reducing conflicts between delivery vehicles and pedestrians, increasing safety, and enhancing the attractiveness of public space. It also provides greater flexibility for businesses and residents by enabling deliveries outside restricted time windows.



## 5. Transnational Cooperation

Maribor solution was developed in close cooperation with project partners, particularly the cities of Poznań and Reggio Emilia, which provided valuable insights into micro-hub implementation and business models. Through regular project meetings, workshops, and bilateral exchanges, partners shared experiences related to stakeholder engagement, regulatory frameworks and operational aspects of urban logistics solutions. This collaboration helped to refine the Maribor approach and avoid additional potential risks. The exchange of knowledge also contributed to a better understanding of different implementation models, including operator-driven and municipality-led solutions. The transnational cooperation strengthened the overall quality of the solution and increased its transferability.

### 6.1 Scaling-up

The Maribor solution has strong potential for scaling-up within the city and the wider Functional Urban Area.

The municipality plans to expand the micro-hub network by establishing 2-3 additional MUCCs in strategic locations to cover the entire city and its surroundings. Scaling-up will depend on factors such as availability of suitable locations, funding, and the development of a sustainable business model.

The modular nature of the solution allows gradual expansion, while maintaining flexibility and adaptability to local conditions. Integration with existing infrastructure, such as parcel lockers and bike-sharing systems, further enhances scalability.

<b>Plans for scaling up the solution in the pilot area.</b>	After series of internal meetings with municipal department for traffic and facility, Maribor has planned to scale up the solution also in other areas in and beyond the city centre, implementing ca. 2-3 MUCCs (later stages after project conclusion). Additional concepts were identified, including the potential integration of cargo-trailer rental options within the existing MBajk bike-sharing system to deliver goods within the city centre.
<b>Suitability for scaling-up</b>	The solution can be implemented in other areas beyond the city centre (Municipality long term goal is to implement 2 or 3 such micro urban consolidation centres in order to cover all city and its nearest surroundings). In the city centre, the MUCC is realized in the framework of GRETA project, in a way which to use the ZEV which will be provided for last mile delivery in the city centre in order to reduce the number of freight motor vehicles in areas with lots of pedestrians and cyclists.
<b>Identified risks for scaling up and solutions to overcome them (risk mitigation).</b>	The possible identified risk for scaling up the solution in other FUA is the number of inhabitants, lack of suitable locations or regulatory measures. Solution could be transferred in medium large cities. In FUA Podravje, this is only suitable for Municipality of Ptuj.

Table 2 Scaling up – plans and recommendations



## 6.2 Transfer

Maribor solution is transferable to other medium-sized and larger cities facing similar challenges related to urban logistics and pedestrianisation.

Key conditions for successful transfer include:

- existence of access restrictions or regulatory measures,
- availability of suitable locations for micro-hubs,
- stakeholder engagement and cooperation,
- institutional capacity for implementation.

The experience from Maribor highlights that transferability is not only dependent on technical solutions, but also on governance structures and administrative processes. Cities with similar urban characteristics and policy frameworks are particularly suitable for replication.

Problems and solutions	
Problems faced	<p>During the preparation and implementation of the Maribor pilot, several challenges were encountered that significantly influenced the timeline and operational readiness of the solution:</p> <ul style="list-style-type: none"><li>• One of the main challenges was the complexity of internal decision-making processes within the Municipality. The implementation required coordination across multiple departments and decision-making levels (including technical departments, heads of offices, and political leadership), which extended the preparation phase and required additional alignment efforts.</li><li>• Another critical issue was related to permitting procedures, particularly due to the location of the micro-hub in a historic urban area. The need to obtain approval from the National Institute for Cultural Heritage Protection introduced delays that were beyond the control of the Municipality and implementation partners.</li><li>• The pilot also faced challenges related to limited availability of suitable locations within the city centre. The selection process required balancing accessibility, demand, spatial constraints, and regulatory requirements, which further complicated implementation.</li><li>• Additionally, stakeholder engagement posed initial challenges, particularly in terms of motivating logistics operators and other stakeholders to actively participate and commit to the pilot process. The lack of available logistics data from operators further limited the ability to plan and assess the solution in a data-driven manner.</li><li>• Also administrative and public procurement procedures had a significant impact on the implementation timeline, requiring careful planning and coordination, and contributing to the delays in the operational readiness of the solution during the pilot implementation.</li></ul>
Corrective actions taken	<p>To address the identified challenges, several corrective actions were implemented during the pilot preparation and implementation phases:</p>



	<ul style="list-style-type: none"> <li>• To overcome internal coordination challenges, the Municipality needed to strengthen its cross-departmental collaboration through regular meetings and active involvement of key decision-makers. The inclusion of higher-level stakeholders (e.g. city urbanist, head of spatial planning and political representatives) ensured alignment and facilitated decision-making.</li> <li>• In response to permitting challenges, close cooperation was established with the National Institute for Cultural Heritage Protection to ensure compliance with all regulatory requirements. Although this process extended the timeline, it ensured that the solution is fully aligned with heritage protection standards with no issues after the solution was implemented.</li> <li>• To address stakeholder engagement issues, the Freight Quality Partnership (FQP) was reactivated and used as a structured platform for dialogue and co-creation. This approach helped to build trust, improve communication, and align the solution with the needs of businesses and logistics operators.</li> <li>• Regarding the lack of logistics data, the project relied on qualitative inputs from stakeholders, expert knowledge, and transnational exchange within the GRETA project to support decision-making and solution design.</li> <li>• In terms of administrative and procurement challenges, Municipality adapted planning approach by introducing a phased implementation model, allowing for gradual development of the solution.</li> </ul>
<p>What to watch out for</p>	<p>Regarding the experience from the Maribor pilot, several recommendations can be provided for future implementation of similar solutions.</p> <p>It is essential to ensure early involvement of all relevant stakeholders, including decision-makers, technical departments, and external actors in order to avoid delays and ensure alignment throughout the process.</p> <p>Particular attention should be given to permitting procedures, especially in historic urban areas, where additional regulatory requirements can significantly impact timelines. Early identification of these constraints is crucial.</p> <p>Strong cross-departmental coordination within public administration is a key success factor and should be established from the outset of the project.</p> <p>Stakeholder engagement should not be treated as a one-time activity but as a continuous process, supported by structured platforms such as Freight Quality Partnerships or similar governance mechanisms.</p> <p>Cities should also anticipate limited availability of logistics data and consider alternative approaches, such as stakeholder consultations and pilot-based learning, to support decision-making.</p> <p>It is also recommended to adopt a phased and flexible implementation approach, allowing sufficient time for preparation, testing, and adjustment of the solution before scaling up.</p>

Table 3 What to expect - problems and solutions



## 6. Lessons Learnt

The implementation of the Maribor MUCC solution has provided several important lessons, particularly relevant for the future scaling-up and transfer of similar solutions to other urban contexts.

One of the key lessons is the importance of establishing a strong governance framework at an early stage. Effective coordination between municipal departments, political decision-makers, and external stakeholders is essential to ensure timely implementation and to create the conditions for future expansion of the solution.

Another important lesson relates to stakeholder involvement. Continuous engagement through structured platforms such as the Freight Quality Partnership (FQP) proved to be a critical factor for building trust, increasing acceptance, and ensuring that the solution responds to real operational needs. This approach is particularly important when considering scaling-up, as stakeholder support directly influences the viability of the solution.

The pilot also highlighted the importance of regulatory alignment. The existence of access restrictions for motorised vehicles in the pedestrian zone created a strong enabling framework for the introduction of the MUCC. This demonstrates that successful transfer of the solution to other cities depends on the presence of supportive regulatory conditions or the willingness to introduce them.

From an implementation perspective, the experience underlined the need for a phased and flexible approach. Given the complexity of administrative procedures, permitting processes, and stakeholder coordination, it is essential to allow sufficient time for preparation, testing, and gradual development. This is particularly relevant for scaling-up, where solutions need to be adapted to different locations and conditions.

Another key lesson concerns the availability of data. Limited access to logistics data required reliance on qualitative inputs and stakeholder feedback. For future replication and scaling, it is recommended to establish clearer data-sharing mechanisms or monitoring systems to support evidence-based decision-making.

Finally, the pilot confirmed that the physical implementation of a micro-hub is only one part of the solution. Long-term success depends on the development of a sustainable operational and business model, including the definition of roles between public authorities and operators. This aspect is crucial for both scaling-up within the city and transfer to other urban areas.

Overall, the Maribor experience demonstrates that micro-hub solutions are transferable and scalable, but their success depends on a combination of regulatory support, stakeholder engagement, governance capacity, and operational planning.



## 7. Conclusions

The Maribor MUCC pilot solution demonstrates that micro-hub-based logistics solutions can effectively support the transition towards more sustainable, efficient, and flexible last-mile delivery in urban areas. Despite challenges related to administrative procedures, permitting constraints, and coordination among multiple stakeholders, solution successfully established the essential physical, organisational, and governance foundations required for the operation of a micro-hub. The experience confirms that the implementation of urban logistics solutions requires an integrated approach, combining regulatory measures, infrastructure, stakeholder engagement, and operational planning.

The pilot highlights the importance of aligning logistics solutions with existing policy frameworks, such as SUMP and SULP, and demonstrates how these strategies can be translated into concrete, on-the-ground measures. It also confirms that regulatory instruments, such as access restrictions, play a key role in enabling the adoption of sustainable delivery solutions. The solution shows strong potential to reduce delivery vehicle traffic in the city centre, improve the quality of public space, and support the decarbonisation of urban freight.

Importantly, the Maribor solution provides a solid basis for future development, scaling-up, and transfer to other areas within the Functional Urban Area and to other cities facing similar challenges. The experience demonstrates that successful replication depends not only on physical infrastructure, but also on governance capacity, stakeholder involvement, and the development of a sustainable operational model.

Certain monitoring activities related to long-term operational performance and KPI evaluation will continue after the official project period as part of the Municipality's ongoing urban logistics development activities. The pilot implementation itself has been completed within the GRETA project framework and provides a solid basis for future scaling-up and policy integration.

In this context, the pilot should be understood not as a final solution, but as a foundational step towards a more comprehensive and integrated urban logistics system. The knowledge, experience, and partnerships developed within the GRETA project represent a valuable asset for the continued evolution of sustainable last-mile delivery in Maribor and beyond.



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