Interreg CENTRAL EUROPE

Co-funded by the European Union

GRETA

Activity 1.2 Jointly developed Territorial needs and gaps

D.1.2.2 Territorial needs and gaps carried out in all the GRETA FUAs

Final version

01 2024

GRETA Website

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Deliverable revision			
Version	**Date**	**Changes**	**Author (Organization)**
0	25/01/2024	First version of deliverable	Katja Hanžič (UM)
0.1	25/01/2024	Peer Review	Philip Michalk (THWi)
0.2	26/01/2024	Peer Review	Alice Benini (ITL)
2	26/01/2024	Final version	Katja Hanžič, Nina Pavletič (UM)
3	30/01/2024	SC approval	Steering Committee

Table of contents

1. THE GRETA PROJECT 4
2. BASIC PARAMETERS OF FUAS 5
2.1. FREIGHT TRANSPORT PERFORMANCE 7
2.2. ZERO AND GREEN URBAN LOGISTICS MEASURES 9
3. URBAN MOBILITY, LOGISTICS AND FREIGHT IN GRETA FUAS 12
3.1. URBAN MOBILITY 12
3.2. URBAN FREIGHT TRANSPORT 15
3.3. MAJOR URBAN TRANSPORT INVESTMENTS 20
4. TERRITORIAL GAPS AND NEEDS 25
5. REFERENCES 29
6. ANNEX 1 - FUA MAPS 30
6.1. BUDAPEST 30
6.2. MARIBOR 31
6.3. POZNAN 33
6.4. REGGIO EMILIA 34
6.5. VERONA 35

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

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 jointed 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 SUMPs/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.

Territorial needs and gaps analysis (TNGA) is a key tool in the territorial development process to understand the challenges and opportunities that exist in different geographical areas in the context of transforming urban mobility.

Activity 1.2 has the goal of investigating the needs and challenges of each FUA concerning mobility and freight, and specifically seamless mobility solutions that enable the path to decarbonisation. The territorial needs and gaps gathers all FUA's contributions and overall conclusions for this activity.

2. Basic parameters of FUAs

Let us first determine what is considered as FUA in GRETA project. **GRETA functional urban area (FUA)** consists of a densely inhabited city (a core area) and a less densely populated commuting zone whose labour market is highly integrated with the city (1). These are also the cities in which GRETA pilot actions will be deployed. GRETA functional areas are: In particular, GRETA's FUAs are listed below in alphabetical order (and shown in Figure 1):

1. Budapest (Hungary)
2. Maribor (Slovenia)
3. Poznan (Poland)
4. Reggio Emilia
5. Verona (Italy)

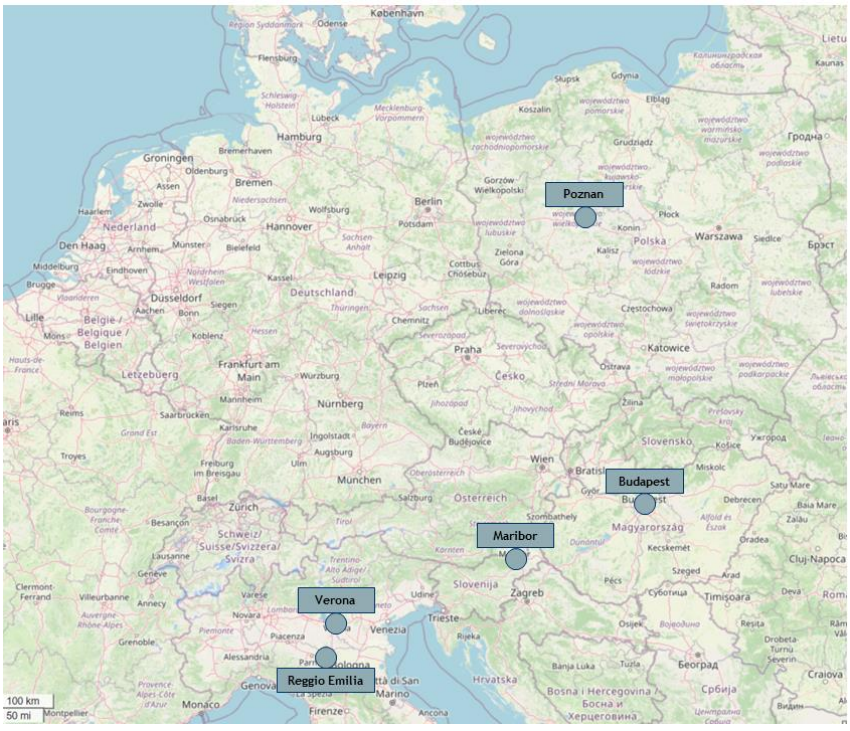

Figure 1: GRETA FUAs on map (2)

To better understand the current situation in these areas, the basic parameters of the FUAs were mapped to identify the needs and gaps in terms of freight transport. A methodology was developed to define parameters and KPIs. However, it was not possible to collect data at FUA level for all locations, so city-level data was used in the case of Maribor, Reggio Emilia and Verona. For Budapest, data was available at FUA and city level, while for Poznan only FUA level data was available. The general KPIs are shown in the table below.

Table 1: FUA Key Performance indicators (2) (3) (4) (5) (6)

KPI specification	Budapest FUA	*Budapest city*	Maribor	Poznan	Reggio Emilia	Verona
Area *[sqkm]*	6,394	*521.1*	148	3,082	230.68	199
Population *[inh]*	3,002,758	*1,671,004*	112,838	1,098,296	170,166	257,353
Population growth rate *[% for last 5 years]*	+1.26%	*-4.6%*	-6.9%	6.7%	0.4%	/
Population density *[inh/sqkm]*	469	*3,206*	765	358	738	1,293
Length of road network *[kkm]*	7.539	*4.79*	0.759	6.15	0.99	1.31
Length of railways *[kkm]*	0.794	*0.256*	0.065	1.888	0.698	/
Length of water ways [kkm]	0.05	*0.02*	0	0	0	/
Number of legal entities	661,786	*419,626*	28,195	75,487	/	/
Number of subzones	199 settlements	*23 subzones*	7	22	0	/
Average yearly public expenditure *[kEUR]*	/	*1,225,000*	185,000	1,900,000	187,255	/
Average yearly public investments *[kEUR]*	/	*222,500*	62,000	320,000	200,808	/

As can be seen from Table 1, the FUAs are quite different in terms of size, population density and transport network. Direct comparisons can be made for

Budapest FUA and Poznan (data on FUA level)

Budapest city, Maribor, Reggio Emilia and Verona.

If we look at the FUA level of Budapest and Poznan, we can see that they are reasonably similar in terms of population density, although the area of Budapest Fua is twice as large as that of Poznan, while the population is three times as large as that of Poznan. The comparison at city level shows that Budapest is by far the most densely populated, followed by Verona, while Maribor and Reggio Emilia have a rather low population density.

2.1. Freight transport performance

We also looked at the KPIs for freight transport (see Table 2)

). Road density varies considerably. The lowest density is observed in the FUA of Budapest, but on the other hand the highest road density is found in the city of Budapest. Other GRETA areas are somewhere in between. Other KPIs for freight transport were not obtained for all areas. The CO2 emissions attributed to the transport sector vary between 24% and 26.7%. We can assume that the percentage is similar in all areas analysed. The number of loading bays also varies:

- Verona 2.02 loading bays per km2,
- Budapest city 1.4 loading bays per km2,
- Poznan 0.026 Poznan loading bays per km2.

Data on freight movements (average delivery time, freight kilometres driven, number of daily cargo trips) are available for Poznan and partly for Reggio Emilia, so that no meaningful conclusions can be drawn.

Table 2: Freight transport KPIs for GRETA FUAs (2) (3) (4) (5) (6)

	Budapest	Budapest city	Maribor	Poznan	Reggio Emilia	Verona
Average Delivery Time *[h:mm]*	/	/	/	1:51	/	/
Density of roads *[km/sqkm]*	1.18	*9.19*	5.13	2.0	1.34	6.6
CO_2 emissions related to the transport sector	/	*26%*	/	24%	26.7%	/
Freight kilometres driven *[kkm]*	/	/	/	2,450	4.5	/
Number of loading bays *[pcs]*	/	*730*	/	80	43 (in city centre)	401
Number of cargo trips daily *[pcs]*	/	/	/	37,500	385	/
Volume of cargo supplies daily [*m3*]	/	/	/	460,000	/	/
Share of supplies by cargo size (by volume): - **FTL - Full Truck Load *[%]*** - **Pallets *[%]*** - **Parcels *[%]*** - **Letters [%]**	/	/	/	/	/	/
Share of low emission freight / total freight *[%]*	/	/	/	4%	43%	/

2.2. Zero and green urban logistics measures

Information on zero and green logistics measures was also obtained for GRETA FUAs (see Table 3). Investment (per capita) in sustainable transport is very low in Maribor, while the situation is much better in Budapest city and especially in Reggio Emilia. It must be mentioned that this data is somewhat unreliable, as the cities (FUAs) understand investments in sustainable transport differently.

The share of freight transport limitation zones (of any type) varies from very low in Maribor (0.276‰) and Reggio Emilia (1.224‰) to moderate in Budapest city (9.5‰) and Poznan (9.73‰). The availability of electric charging stations per km2 varies from 0.04 in Poznan to 1.47 in the city of Budapest. Nevertheless, the density of electric charging stations should only be considered in relation to demand, taking into account the number of electric vehicles in the area, especially light- and heavy-duty electric vehicles, to better understand whether the available charging infrastructure is sufficient for demand and its projected growth.

Investment (per capita) in sustainable transport is very low in Maribor, while the situation is much better in Budapest city and especially in Reggio Emilia. It must be mentioned that this data is somewhat unreliable, as the cities (FUAs) understand investments in sustainable transport differently.

Table 3: KPIs on Zero and green urban logistics measures (2) (3) (4) (5) (6)

	Budapest	Budapest city	Maribor	Poznan	Reggio Emilia	Verona	Arithmetic mean
Share of any freight transport limitation zones area (time limitation, green transport zones etc.) [‰]	/	*9.5‰*	0.276‰	9.73‰ (weight limitation only, estimated)	1.224‰	/	5.1825
Availability of electric vehicle charging stations [*pcs/sqkm*]	0.17	*1.47*	/	0.04	0.34	/	0.105* 0.905**
Investments in sustainable transport *[*kEUR *per capita]*	/	/	0.07	/	0.18	/	0.125
Investments in green initiatives *[*kEUR *per capita]*	/	*0.188*	0.004	/	0.59	/	0.261

* Calculated foe Budapest and Poznan (data for entire FUA)
** Calculated for Budapest city and Reggio Emilia (data for city, not entire FUA)

According to the methodology set in "GRETA D.1.21. Joint methodology for the territorial needs and gaps analysis (TNGA)", arithmetic mean for each of the KPI stated in Table 3 was calculated where available and then compared with KPI of each FUA. For each FUA the values of individual indicator were related to the arithmetic mean of a given indicator (FUA indicator value/value of the arithmetic mean for the indicator from all FUAs). The results are shown in Table 4 below.

Table 4: Individual levels of KPIs in relation to the arithmetic mean

	Budapest	Budapest city	Maribor	Poznan	Reggio Emilia	Verona
Share of any freight transport limitation zones area (time limitation, green transport zones etc.)	/	*1.833*	0.053	1.877	0.236	/
Availability of electric vehicle charging stations	1.619*	*1.624***	/	0.381*	0.381**	/
Investments in sustainable transport	/	/	0.560	/	1.440	/
Investments in green initiatives	/	*0.721*	0.015	/	2.263	/

* Calculated for Budapest and Poznan (data for entire FUA)
** Calculated for Budapest city and Reggio Emilia (data for city, not entire FUA)

According to the methodology, the average for all FUA indicators should be calculated and used to determine the zero and green development status of urban logistics. However, given the insufficient data from the FUAs, such a comparison is meaningless. This is because some of the data refer to the OECD definition of FUA (Budapest and Poznan), while other data refer to the FUA definition of GRETA (a densely populated city (core area) and a less densely populated commuter zone). Therefore, comparisons can only be made between Budapest and Poznan as well as Maribor, Reggio Emilia and Verona, but there is not enough information to make calculations.

3. Urban mobility, logistics and freight in GRETA FUAs

3.1. Urban mobility

Urban mobility refers to the way in which people and goods move through a city using different modes of transport. It encompasses public and private transport and vehicles, pedestrians and infrastructure and strongly impacts many aspects of urban life. Effective urban mobility management can improve the efficiency, safety and reliability of transport systems, reduce congestion, accidents and costs, improve sustainability and quality of life in urban areas and reduce greenhouse gas emissions, pollution and energy consumption. Therefore, the way GRETA FUAs manage urban mobility is of particular interest.

According to information obtained directly from GRETA FUAs (partners), all areas have Sustainable Urban Mobility Plan (SUMP) adopted (Table 5). Budapest and Maribor have adopted their SUMPs already in 2015, whereas Poznan, Reggio Emilia and Verona have adopted the plans in 2023. Update of Budapest SUMP was also made in 2023 while Maribor has not yet updated its SUMP.

Table 5: Sustainable urban mobility plans (SUMPs) in GRETA FUAs (2) (3) (4) (5) (6)

Budapest	Maribor	Poznan	Reggio Emilia	Verona
☒ SUMP is in effect from 2015, last update in 10/2023	☒ SUMP is in effect from 2015, last update in 06/2015	☒ SUMP is in effect from 2023, last update in 12/2023	☒ SUMP is in effect from 2023, last update in 05/2023	☒ SUMP is in effect from 2023, last update in 10/2023

For Budapest and Maribor details of the SUMP were available, short summaries of the two SUMPs are as follows.

Budapest (SUMP main aims):

- Serving the mobility needs of a climate-neutral, resilient city.
- Influencing transport needs and mode choice, targeted climate-friendly developments
- Promotion of efficient cooperation and management of transport modes.
- Regional integration through urban-regional cooperation.
- Transport system to strengthen socio-economic.

Maribor (SUMP main aims)

- Establishment of integrated transport planning.
- Establishment of walking as an important mean of travel.
- Optimal use of cycling potentials.
- Creation of attractive public passenger transport.
- Enforcing the rational use of motorized traffic.

With regard to urban mobility management (and in addition to objectives specified in SUMPs) FUAs have set various objectives for urban mobility in their area. To reach these objectives, GRETA FUAs are faced with different challenges as shown in Table 6.

Table 6: Urban mobility objectives and challenges (2) (3) (4) (5) (6)

	Objectives	Challenges
Budapest	- Safe, inclusive, integrated transport. - Open, cooperative regional relations. - Improving network connections. - Attractive vehicles. - Services for better user experience. - Efficient governance.	- Modal split (high use of private cars). - Growing private car traffic from agglomerations. - Public space optimized mainly for car traffic. - Equal access problems. - Ageing infrastructure and vehicle fleet. - Gaps in the transport network connections. - Cooperation difficulties (coordination between urban and peri-urban transport institutions. - Unpredictable and insufficient funding.
Maribor	- Further improve sustainable transportation. - Public transit enhancement (efficiency and reliability). - Upgrade and development of cycling infrastructure. - Integration of smart mobility solutions. - Effective traffic management. - Parking solutions. - Accessibility for all. - Efficient governance and community engagement.	- Very high dependency on private vehicles (cars). - Traffic congestion in the city at the peak rush hours. - Environmental impact (GHG and noise emissions). - Limited parking spaces. - Infrastructure improvements. - Adoption of technological solutions (smart city). - Ensuring accessibility for all residents including those with disabilities.
Poznan	- Public transport system expansion. - Integration of public transport subsystem. - Conducting a rational spatial policy.	- Strengthening local governments' cooperation. - Mitigation of the negative effects of climate change in the cities. - Air pollution. - Road traffic safety.

	- Individual traffic and road safety. - Active mobility. - Education, knowledge and participation.	- Sustainable and integrated urban mobility system.
Reggio Emilia	- Enhancement of pedestrian zone in the city center. - LEZ in the city center. - Large 30km/k zone in the first peripheral area around the city center. - Enhancement of public transport. - Renewal of historic roads. - Increase road safety. - Enhancement of P&R system. - Completion of bike network.	- Very high car dependency (665 cars per 1,000 inh.). - Scarce role of public transport.
Verona	- Improvement of pedestrian and cyclists' safety. - Regulation of vehicles' emissions.	- Number of vehicles (congestion). - Pollution in FUA's area, especially in the historic city center (also known as LTZ).

GRETA FUAs are facing different challenges in reaching their objectives regarding urban mobility. But there are two specific challenges that all of them have in common:

- high car dependency (modal split), and
- emissions from transport (pollution and noise emissions).

The solutions to these problems can be summarized into following categories:

- improving network connections,
- modernisation of public transport systems and fleets (including better user experiences),
- P&R systems and other parking solutions,
- bicycle networks expansions,
- low emission zones, pedestrian zones, low speed zones,
- infrastructure investments,
- smart solutions and traffic management,
- efficient governance, community engagement, participation,
- education and active mobility.

Each FUA targets a different mix of interventions from the list above. In general, the aims of the FUAs are quite similar, which is not unexpected. It is also striking that urban mobility is not specifically focused on freight transport and logistics in urban centres. More attention is paid to the mobility of people.

3.2. Urban freight transport

As part of the GRETA project, we are particularly interested in freight transport and logistics and have specifically analysed the existence of Sustainable Urban Logistics Plans (SULPs) in the GRETA FUAs. There is only one officially adopted SULP (in Maribor), while two SULPs are currently being developed for Budapest and Verona, which are expected to be adopted in 2025 and 2024. A SULP was developed for Poznan in 2019 as part of the SULPiTER project funded by Interreg CE, but it has not been officially adopted and is only used as an internal document. Currently, only Reggio Emillia does not have a SULP and there are no plans to develop one (see Table 7).

Table 7: Sustainable urban logistics plan (SULP) in GRETA FUAs (2) (3) (4) (5) (6)

Budapest	Maribor	Poznan	Reggio Emilia	Verona
☒ SULP is in preparation, adoption expected in 2025.	☒ SULP is in effect from 2019, last update in 08/2019.	☒ SULP is in effect from 2019[1].	☒ SULP does not exist and is not under preparation.	☒ SULP is in preparation, adoption expected in 03/2024.

The only officially adopted SULP for Maribor specifies following objectives:

- Establishment of systematic, financial, and administrative conditions for improving organization of logistics.
- Ensure decision-making transparency by involving the public in all stages of logistics planning.
- Introduce tools for systematic monitoring of logistics.
- Reduce emissions and noise.
- Increase the share of freight delivered by environmentally friendly vehicles.
- Increase the occupancy of vehicles and reduce the share of empty trips.
- Encourage stakeholders to achieve sustainable goals.
- Increase safety and reduce conflicts between pedestrians, delivery vehicles and delivery bicycles.
- Reduce the amount of damaged and destroyed shipments.

[1] Prepared within SULPiTER project, not officially adopted, used only as internal document.

Regarding freight transport, the GRETA FUAs were asked to assess whether congestion, air pollution and noise pollution are also an issue for freight transport and logistics in their area. As shown in Table 8, all FUAS report that freight transport and logistics activities contribute to congestion, air pollution and noise pollution. However, the extent to which freight transport contributes to these problems is not measured.

Table 8: Qualitative information on main issues in the distribution of freight GRETA FUAs (2) (3) (4) (5) (6)

	Congestion	Air pollution	Noise pollution
Budapest	☒ YES ☐ NO Most deliveries are done in peak hours, increasing the congestion on the roads. Illegal parking and loading obstructing traffic contributing to congestion.	☒ YES ☐ NO Nitrogen dioxide and aerosols (pm 10; pm 2.5).	☒ YES ☐ NO
Maribor	☒ YES ☐ NO Traffic congestion at the peak rush hours can impact the efficiency of freight transportation resulting in delays.	☒ YES ☐ NO Environmental impact (freight traffic in the city contributes to air pollution and higher greenhouse gas emissions).	☒ YES ☐ NO Environmental impact (freight traffic in the city contributes to noise pollution and higher greenhouse gas emissions).
Poznan	☒ YES ☐ NO Poznan city monitors traffic on the roads. However, it does not set indicators for truck traffic congestion. The congestion level, resulting from all-vehicle traffic, is 37% for Poznan (based on external sources, not related to the city).	☒ YES ☐ NO Exceedances of the air pollution standards. However, the amount of pollution resulting from truck and van traffic is not clearly defined.	☒ YES ☐ NO No breakdown of noise emitted by transport.

Reggio Emilia	☒ YES ☐ NO The main problem about congestion concerns the city centre where the space for vehicles is limited and freight vehicles double-park.	☒ YES ☐ NO Air pollution is a problem especially in the city centre that is surrounded by the ring road, where pm10 and pm2.5 always exceed the limits defined by EU legislation.	☒ YES ☐ NO Freight vehicle fleet is a considerable source of noise pollution especially in the city centre where 10,000 inhabitants live.
Verona	☒ YES ☐ NO Currently, some vehicles stop in forbidden zones of the Verona (e.g. double-parked) so this causes congestions in the narrow streets of the city centre.	☒ YES ☐ NO The shipping vehicles currently accessing the Verona produce a relevant amount of CO2, despite the engine of these vehicles respects the law pollution parameters. However, the objective is to carry out the shipments in the city centre using zero emission vehicles (e.g. electric vehicles like cargo bikes, etc.)	☒ YES ☐ NO The vehicles that are accessing Verona are usually powered by a fossil fuel engine that produces a certain amount of noise. If these vehicles are replaced by electric vehicles or similar, there will be a significant reduction of the noise.

As already mentioned, the GRETA FUAs are aware of the importance of urban freight transport and its negative environmental impact. Irrespective of the existence of SULPs, the GRETA FUAs have identified the following objectives and challenges of freight transport and logistics for their territory (see Table 9).

Table 9: Urban freight transport objectives and challenges (2) (3) (4) (5) (6)

	Objectives	Challenges
Budapest	- Development of advanced city logistics system in metropolitan and district areas. - Develop logistics service centres (consolidation centres and micro-consolidation centres in the inner-city). - Promote environment friendly last mile transport (e.g., cargo bikes, electric vehicles, etc.). - Develop digital tools to support urban freight transport (identification of optimal density of loading areas, to measure and optimize the use of public space) and to manage access to loading bays. - Creating flexible use of public space for mobility functions (adaptive curb management). - Open and collaboration-based metropolitan public parcel point network (integration of service providers).	- Unpredictable access to loading bays. - Pollution from vehicles. - Lack of digitalization. - Fragmented institutional system. - Gaps in regulatory environment. - Insufficient data about actual freight transport volume and frequency.
Maribor	- Establishment of systematic, financial, and administrative conditions for logistics management and organisation. - Ensure decision-making transparency. - Tools for systematic monitoring of logistics. - Reduce emissions and noise. - Increase the share of freight delivered by environmentally friendly vehicles. - Increase the occupancy of vehicles and reduce the share of empty trips. - Increase safety and reduce conflicts.	- Loading bays use and placement, illegal parking for deliveries. - Environmental impact. - Last-Mile Delivery in pedestrian zone. - Infrastructure limitations for freight. - Effective coordination of various stakeholders.

	- Reduce the amount of damaged and destroyed shipments. - Ensure physical and time availability to end user.	
Poznan	- Reduction of transport congestion (emissions and air pollutants). - Ensure effective and efficient deliveries with emission-free vehicles. - Deliveries to be made using alternative fuelled vehicles to reduce noise and pollution. - Implementation of so-called last-mile deliveries using mini-hubs.	- Getting delivery vehicle traffic out of the city centre. - Reduction in the number of combustion vehicles circulating in the centre of the city. - Solutions that reduce freight vehicle traffic in city centre, but to maintain the ability to deliver parcels and goods to the final recipient.
Reggio Emilia	- Reduce the impact of urban logistic especially in the city centre. - Introduce cargo bike as one mode of freight transport.	- Air and noise pollution. - High density of small businesses in the city centre. - High number of businesses in pedestrian zones. - Management of freight permits to access to the city centre. - E-vehicles can freely access to the city centre due to national legislation.
Verona	- To optimize the use of the loading and unloading slots in the FUA. - To limit the access of large vehicles, such as vans. - To increase the use of agile vehicles for deliveries in the city centre, reducing the pollution and queues in narrow streets.	- To decrease the transit time for deliveries.

It is clear that the GRETA FUAs face several challenges in realising their urban freight transport objectives. But there are several challenges that are common:

- Loading bays issues (access, illegal parking).
- Pollution from freight vehicles.
- Freight permits, freight vehicles in city centres, number of freight vehicles.
- Achieving a balance between access restrictions for delivery vehicles to city centres and an acceptable level of supply for businesses.

The objectives for freight transport are also quite similar. GRETA FUAs aim to:

- Reduce congestion and pollution from freight transport.
- Utilization/promotion of environmentally friendly or zero-emission vehicles for the last mile (especially in city centres or restricted access zones).

In addition, there are some other freight transport specific objectives:

- Development of an advanced urban logistics system, digital tools for urban freight transport.
- Transparency in decision-making.

In general, all GRETA FUAs strive to achieve efficient, environmentally friendly, appropriate and acceptable freight transport, but there is no common approach as to how this goal can be achieved.

3.3. Major urban transport investments

To better understand the interventions of the GRETA FUAs in relation to urban mobility and freight transport, the transport investments were reviewed. Indeed, the objectives of urban mobility and freight transport should be reflected in the investments made or planned by the FUAs. An overview of the most important investments in urban transport (services, policies and infrastructure) was drawn up. The investments were categorised by time period (last three years), current and planned investments (see Table 10).

Table 10:Major transport investments (2) (3) (4) (5) (6)

	Finished in the last 3 years	Currently in progress	Planned
Budapest	- Renovation of the Chain Bridge and introducing a new traffic order to improve the liveability of the city. - Rebuilding public spaces, such as Blaha Lujza square. - Renovation of Hungary's busiest metro line, the M3 metro. - BudapestGO - an integrated app that can be used to handle all traffic-related matters (route planning, digital tickets, traffic changes, etc.).	- Micro mobility point network extension. - Micro consolidation centres and booking system of loading/unloading areas. - Sustainable Urban Logistics Plan of Budapest.	- improvement of parking regulations. - greening the public transport vehicle fleet. - Micro mobility network (installation of (micro) mobility points, mobility stations).
Maribor	- Reconstruction of promenade in City parm. - Pedestrian bridge over Drava river. - Expansion of pedestrian area and traffic calming zone 30 km/h in the city centre. - Cycling infrastructure between city districts and local communities. - Overpass across the Titova cesta for cyclists and pedestrians. - Bike sharing service MBajk. - Reconstruction of main square in old city centre.	- Reconstruction of river Drava embankment. - Drava cycling route. - Bike sharing service MBajk network extension.	- Implementation of micro urban consolidation centre with ZEV to serve the pedestrian zone. - Universal parcel locker network.

	- Reconstruction of two streets (shared spaces). - 3x mini e-buses providing free, on-demand transport in pedestrian zone called MAISTER.		
Poznan	- Construction of three Park and Ride car parks. - Extension of the Paid Parking Zone area. - Purchase of electric buses. - Expansion of the Poznan Metropolitan Railway system including passenger transport. - Infrastructure reconstruction under intercommunal agreements.	- Metropolitan Plan for Sustainable Urban Mobility by all municipalities in the association Metropolia Poznan. - Construction and redevelopment of tram routes. - Purchase of hydrogen buses.	- The Poznan Freight Bypass as an accessible route for passengers of the Poznan Metropolitan Railway - Investment in rolling stock in the Poznan FUA area (zero-emission buses and trams). - Extension of the tram network.
Reggio Emilia	- SUMP. - Inner city accessibility plan. - Enlargement of limited traffic zone. - Bike2work incentives. - School mobility management. - Urban renewal of historical roads. - New pedestrian areas in the city centre. - Paid parking zone in the parking area of high-speed train station. - Bus lane at the high-speed train station.	- Video surveillance of vehicles accessing the city centre. - New bike lab. - New pedestrian bridge and cycle bride to improve connections between neighbourhoods. - New pedestrian and cycle underpass under the ring road and railway. - New cycle highways. - Re-design of a square in front of a school centre to reduce car traffic.	- New parking plan. - New tram line. - Implementation of bicycle plan. - Promotion of cargo-bikes. - New radars to reduce car speed and accidents. - New e-minibus to connect p&r area to the city centre. - New bike station in the high-speed train station. - Low emission zone.

	- New bus hub in the south of the city near a school centre. - New P&R area with bus connection to the city centre. - New bus line connecting the high speed train station to the inner city train station. - New electric charging stations. - New cycle and 30 km/h streets. - New bike lanes. - New bike racks in the city centre. - E-scooter sharing service.	- New pedestrian areas in the city centre - Traffic calming intervention in one of the main road crossing 3 peripheral areas. - Bus fleet renewal (new natural gas and electric buses) - 3 new bypass to reduce traffic in residential areas. - 15 minutes city. - New bike racks. - New bicycle plan. - New circulation plan. - Bike2work incentives. - Neighbourhood car sharing. - FUA public transport plan.	
Verona	- /	- Upgrade of the Verona Sud tollbooth. - Construction of a new road to connect southern and northern Verona bypass. - Extension of the existing road “Strada Statale 12” to reduce the congestions.	- Instalment of trolleybus service.

In the past three years, GRETA FUAs have done investments that fall into the following categories:

- Transport infrastructure renovation/construction.
- Public transport investments (infrastructure, rolling stock).
- Restricted zones.
- Mobility applications
- Bike sharing service.
- E-vehicles in public transport.
- Park&Ride, parking.
- SUMP.
- Public awareness.

It should be noted that none of the investments are directly related to freight transport or logistics. Certainly, the measures listed above have an impact on freight transport, but they are not aimed at solving the problems mentioned in the previous sections. However, the situation is improving as the current investments also include freight transport and logistics:

- Transport infrastructure renovation/construction.
- Public transport investments (infrastructure, rolling stock).
- Micro mobility network.
- (micro) Consolidation centres.
- SULP, metropolitan SUMP, FUA public transport plan, bicycle plan.
- Investment into cycling (bicycle lanes/highways, stations, racks, incentives, bike sharing).

While some FUAs are already investing in freight and logistics-related measures, other FUAs have planned very similar measures. The planned investments can be summarised in the following categories:

- Parking regulations, parking plan.
- Public transport investments (infrastructure, rolling stock).
- Universal parcel locker network.
- Micro consolidation centre.
- Micro mobility network.
- Restricted zones (emissions).
- Safety (speed monitoring).

4. Territorial gaps and needs

Territorial Needs and Gaps Analysis is important in planning the development of territorial areas. However, there are limitations related to such a study for it is based on access to data. It has to be noted that data from GRETA FUAs was not obtained in foreseen scope and quality. This made it difficult to assess needs and gaps for each particular area and a general SWOT analysis was made based on the information and obtained for GRETA FUAs.

Table 11: General SWOT analysis for GRETA FUAs

Advantages	- Existing and planned policies/strategies for low-carbon and zero-emission transport. - SUMPs (adopted). - SULPs (adopted or in preparation). - Political commitment to management of freight transport.
Disadvantages	- Absence of SULP (no plan for preparation). - Unavailability of freight related data. - Uncoordinated decision making (low level of collaboration and engagement of stakeholders). - Lack of coordination of transport policies across different levels and sectors. - Constant and sufficient funding of freight transport related issues. - Strategy for freight transport management. - Inflexible public space regulations and management.
Opportunities	- Stakeholders' engagement in co-creation of policy measures. - EU and national legislation on green and zero emission vehicles. - Increasing environmental awareness. - Increasing public awareness and demand for more sustainable and accessible transport options. - Availability of funding and incentives from various sources,
Threats	- Unwillingness of transport/logistics operators to share data. - Uncertainty of the external factors (COVID-19 pandemic, global market conditions). - Increasing demand for deliveries (e-commerce). - Increasing traffic in urban centres. - Increased competition for space in urban areas. - High costs and risks associated with the transition to zero-emission freight vehicles.

All GRETA FUAs are aware that there is a lack of information on freight transport. Without data it is very difficult to understand the situation in each FUA and therefore access to data should be one of the priorities of the FUAs. A list of data that could/should be constantly monitored by the FUAs:

1. Information on freight flows

   GRETA FUAs are primarily aimed at managing freight traffic in old city centres or pedestrian zones with a high concentration of shops, restaurants and businesses, where competition for space is fierce. Much of the above data is collected by logistics companies and is not shared with the authorities that manage these areas. Where data is available, authorities could work with stakeholders to obtain this information in anonymised form. Alternatively, authorities could extract some of the information from existing systems where and when possible. In addition, access to data should also be considered when planning smart solutions or introducing new technologies in urban centres. Data to be obtained and monitored:

   - share of freight transport / total transport,
   - information on vehicle occupancy,
   - number of vehicles and delivery per day,
   - average delivery time,
   - average number of trips per day per vehicle,
   - freight kilometres,
   - number of reloading bays,
   - volume of cargo supplies daily,
   - number of generated cargo trips per location,
   - share of supplies by cargo size (by volume),
   - share of low emission freight / total freight.

2. Electric transport related data

   Many of the FUAs aim to promote electromobility in general and even more so for freight transport, especially over the last mile. But GRETA FUAs currently do not have up-to-date data on:

   - number of electric vehicles (light duty vehicles, heavy duty vehicles),
   - availability of electric vehicle charging stations (location, type – slow/fast),
   - potential locations for new charging stations,
   - number and location of charging points (slow and fast).

   The FUAs should consider obtaining the above data to better understand the electric mobility situation. More importantly, this data will shed light on whether the goals set out in the strategic documents can be achieved.

In addition to data on freight flows and electromobility, FUAs need to improve stakeholder participation and coordinated decision-making. Many of the GRETA FUAs have indicated that they have difficulties with stakeholder coordination and involvement, which is particularly important considering that data on freight flows must be obtained from transport operators. But not only that – policies and interventions in the field of freight transport will be more successful if they are developed together with stakeholders. The GRETA Freight Quality Partnerships have been developed specifically for this purpose and are a step in the right direction to build long-term co-operation with stakeholders.

Next steps

Following the methodology set in "GRETA D.1.21. *Joint methodology for the territorial needs and gaps analysis (TNGA)*", the SWOT analysis was prepared identifying (some) of the factors determining the current state of zero and green urban logistics. For further steps defined in the joint methodology, these factors need to be firstly discussed with FUAs to determine if the core set is appropriate. Once agreement is reached on the core set, the next step is to determine importance and strength of each factor for each individual FUA. Based on this, calculations are made for each GRETA FUA and their strategic position is determined.

Further steps to determine the individual positions of GRETA FUAS:

1. Final selection of the factors defined in the SWOT analysis:
    - to be done at the joint transnational GRETA review workshops on TNGAs with all FUAs).
2. Determination of importance for each factor selected in the previous step:
    - Each of the FUAs assigns the importance of each factor (in the form of decimal fractions, where the sum within a category is 1).
    - Each of the FUAs rates the strength of each factor on a 5-point scale:
        i. positive for advantages and opportunities
        ii. negative for disadvantages and threats.
3. On this basis, a strategic position of each FUA in relation to other GRETA FUAs can be determined according to the methodology.

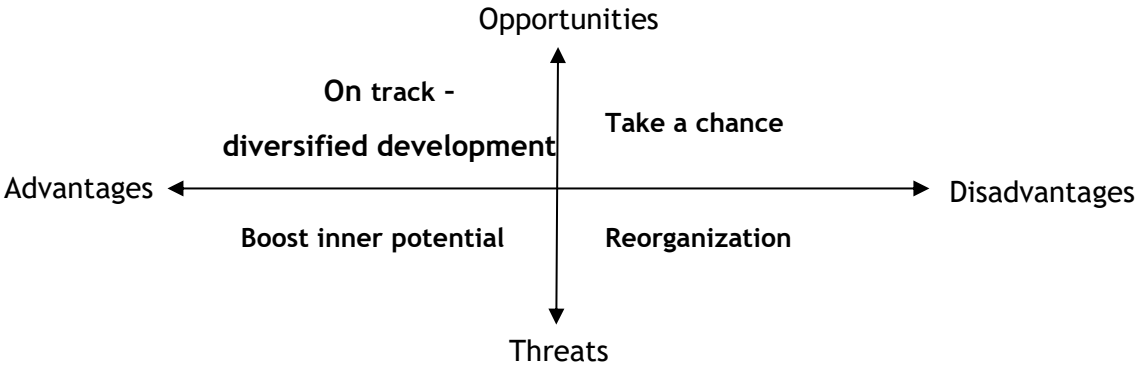

Figure 2: Framework for roadmap for achieve seamless solutions to enable alternative zero and green urban logistics development (1)

This analysis is then sent back to the GRETA FUAs to formulate an action plan and roadmap to address the gaps identified.

This document "Territorial needs and gaps in all GRETA FUAs" should be further completed by finalising the steps mentioned above. However, even without these steps, the analysis in its current state has identified benefits and gaps in the management of freight transport in the GRETA FUAs.

5. References

1. **GRETA.** *D.1.2.1 Joint methodology for the territorial need and gaps analysis (TNGA).* s.l. : GRETA project, 2023.
2. **OpenStreetMap Foundation.** *OpenStreetMap.* [Online] 2024. https://www.openstreetmap.org.
3. **GRETA.** *D.1.2..2 Territorial Gaps and needs - FUA Budapest contribution report.* BKK Centre for Budapest Transport (Mobility development). s.l. : GRETA project, 2023.
4. **GRETA**. *D.1.2..2 Territorial Gaps and needs - FUA Maribor contribution report.* Municipality of Maribor, University of Maribor. s.l. : GRETA project, 2024.
5. **GRETA**. *D.1.2..2 Territorial Gaps and needs - FUA Poznan contribution report.* City of Poznan - Office of Project Coordination and Urban Revitalization . s.l. : GRETA project, 2023.
6. **GRETA**. *D.1.2..2 Territorial Gaps and needs - FUA Reggio Emilia contribution report.* City of Reggio Emilia - Sustainable Mobility Department . s.l. : GRETA project, 2023.
7. **GRETA**. *D.1.2..2 Territorial Gaps and needs - FUA Verona contribution report.* ZAILOG SCARL. s.l. : GRETA project, 2024.
8. **OECD.** Regional development. [Online] 2022. https://www.oecd.org/cfe/regionaldevelopment/Appendix_all_fuas.pdf.

6. Annex 1 - FUA maps

6.1. Budapest

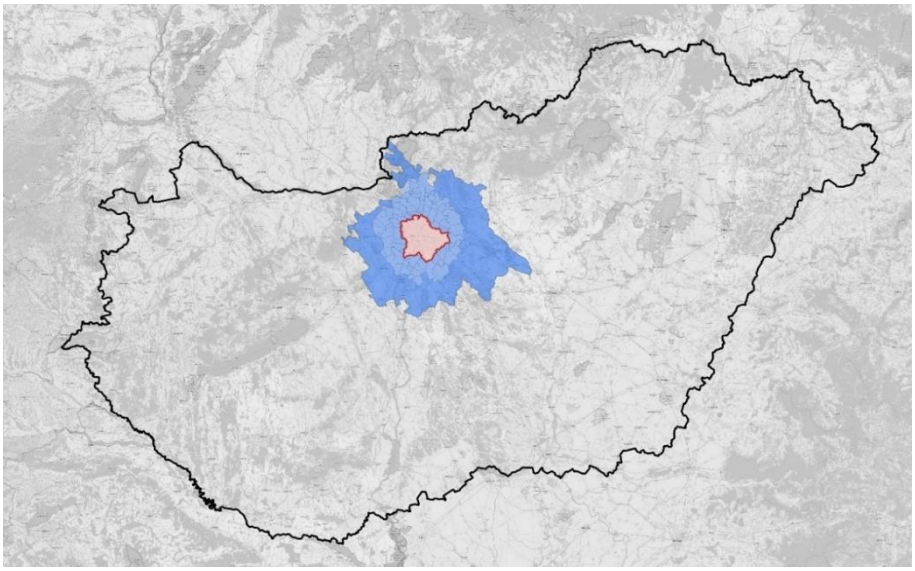

Figure 3: Map of Budapest FUA – location in Hungary (2)

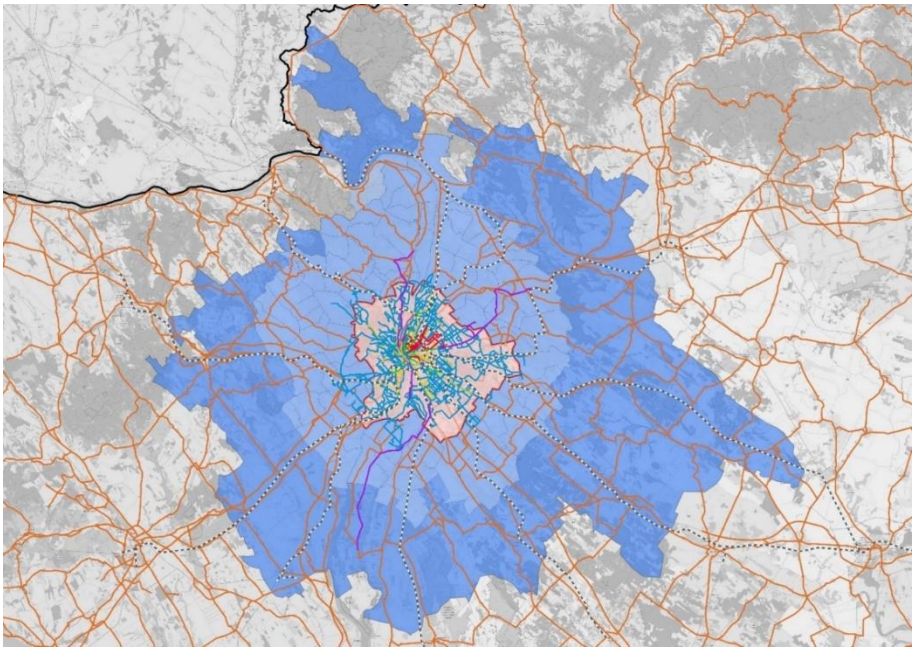

Figure 4: Map of Budapest (showing transport network) (2)

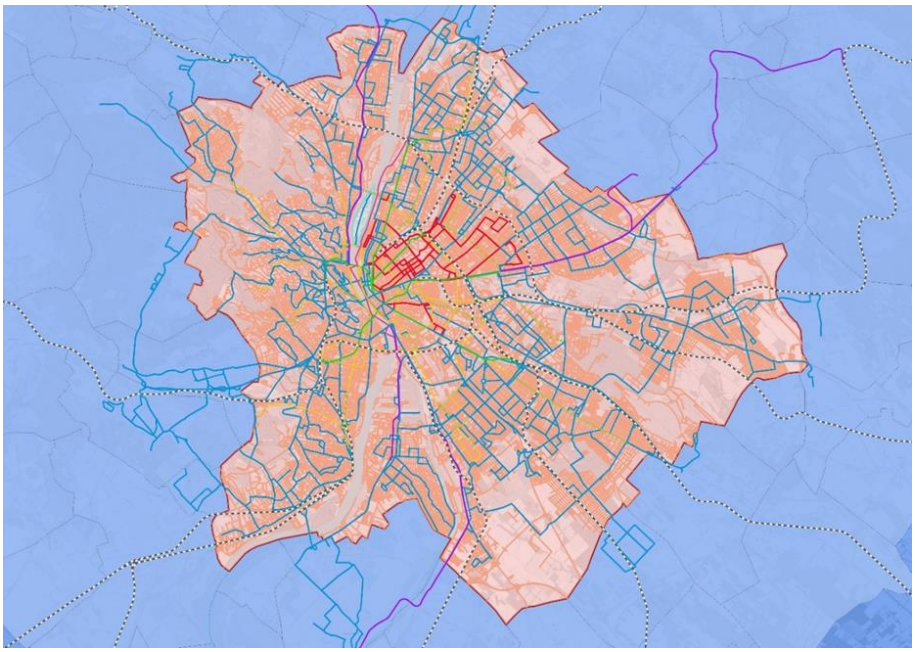

Figure 5: Map of Budapest (showing transport network including subzones) (2)

6.2. Maribor

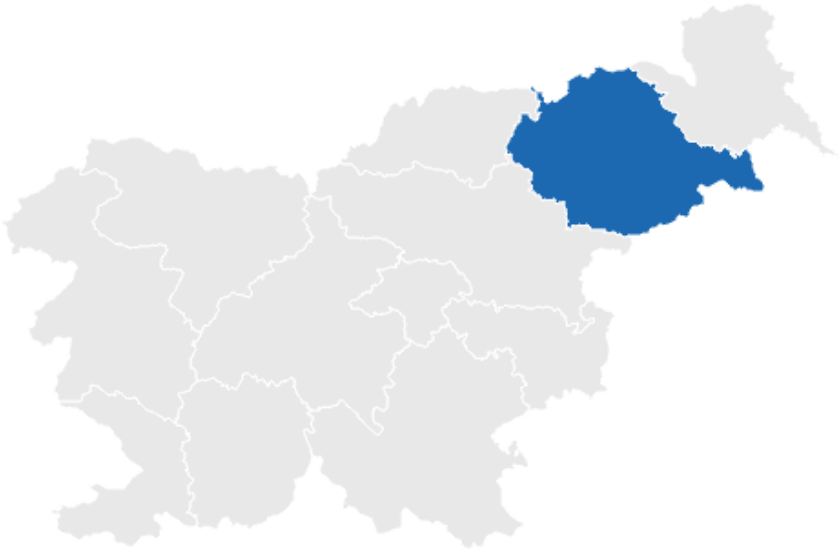

Figure 6: Map of Maribor FUA – location in Slovenia (3)

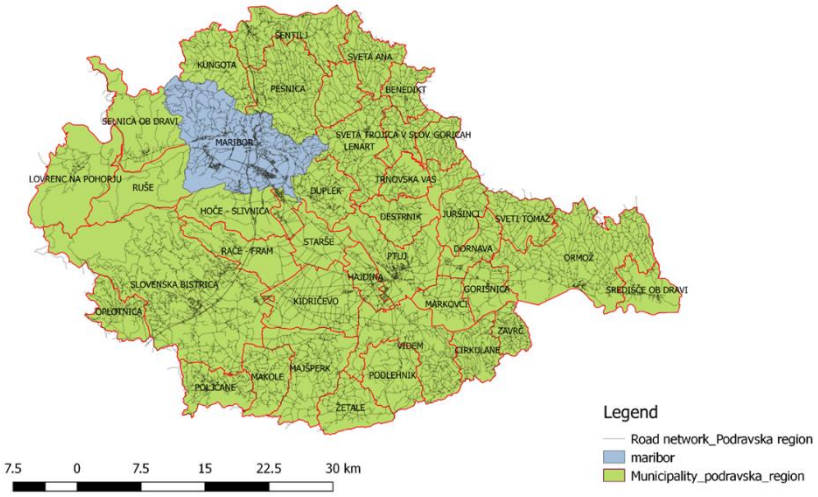

Figure 7: Map of Maribor FUA and subzones (3)

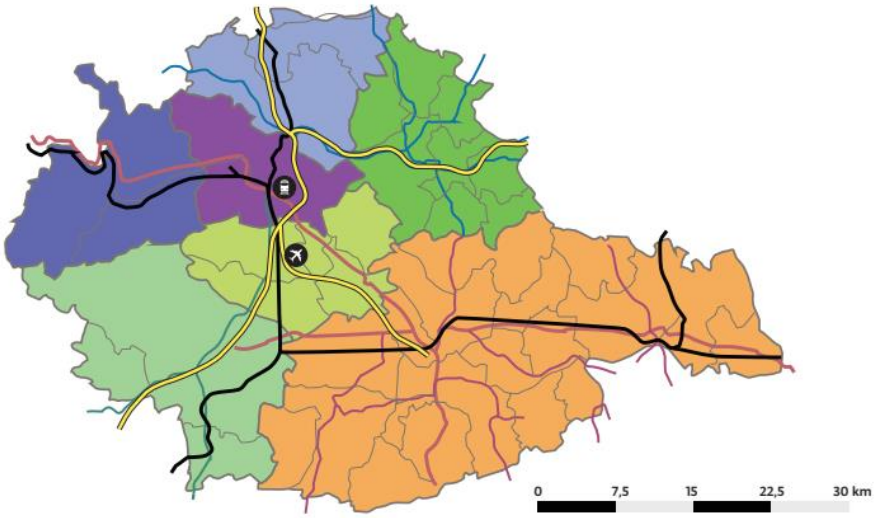

Figure 8: Map of Maribor FUA transport network and subzones (3)

6.3. Poznan

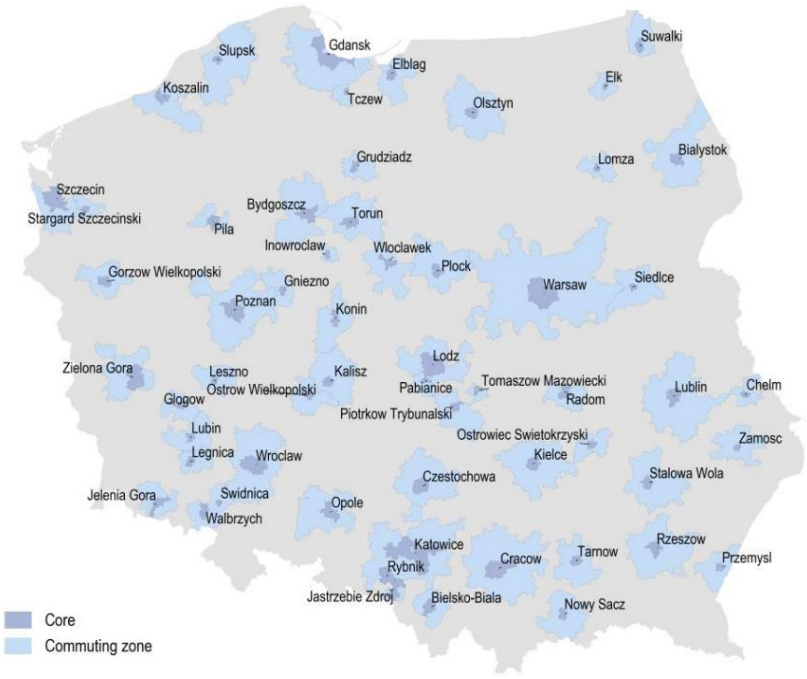

Figure 9: Map of Poznan FUA (7)

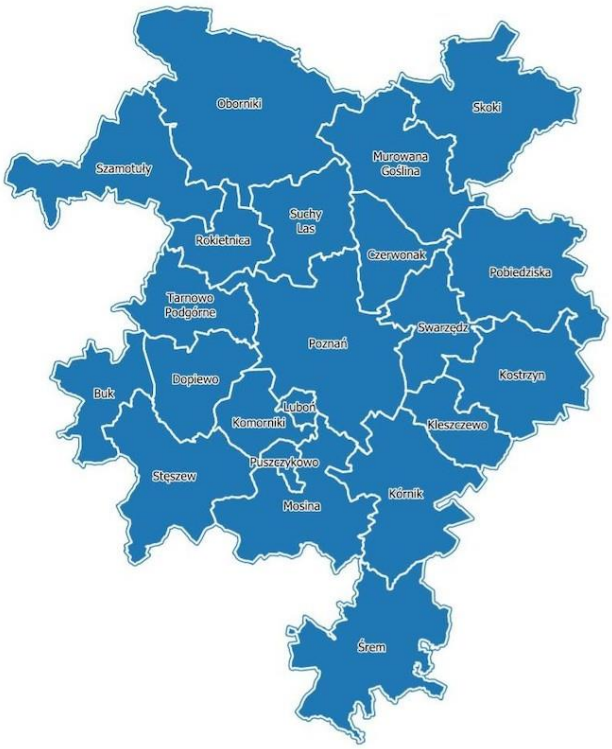

Figure 10: Map of Poznan FUA and its subzones [Michał Babicki, Plan Zrównoważonej Mobilności Miejskiej]

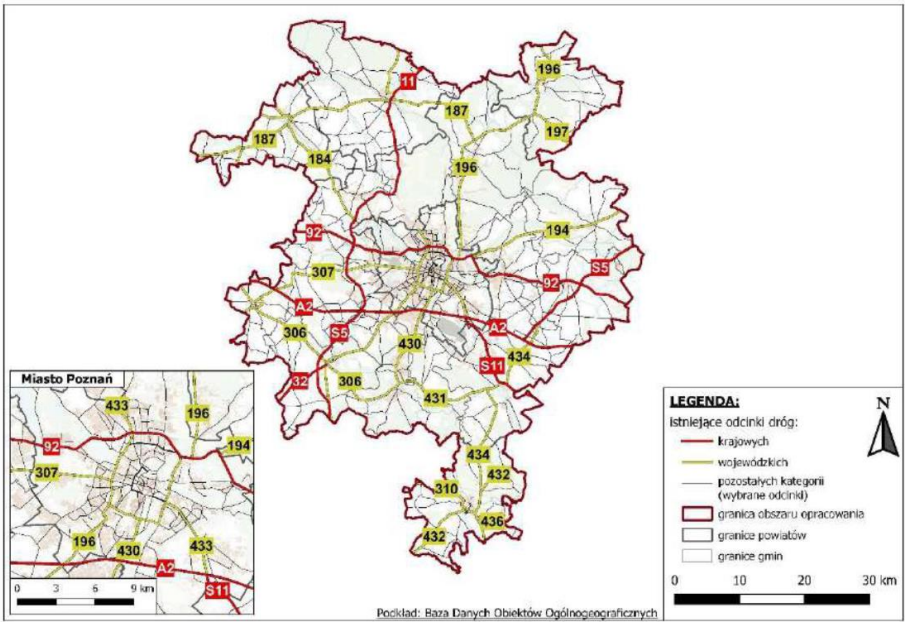

Figure 11: Map of Poznan FUA transport network
[Sustainable Mobility Plan for Poznań Metropolis up to 2040draft resolution (PU 1925/23)]

6.4. Reggio Emilia

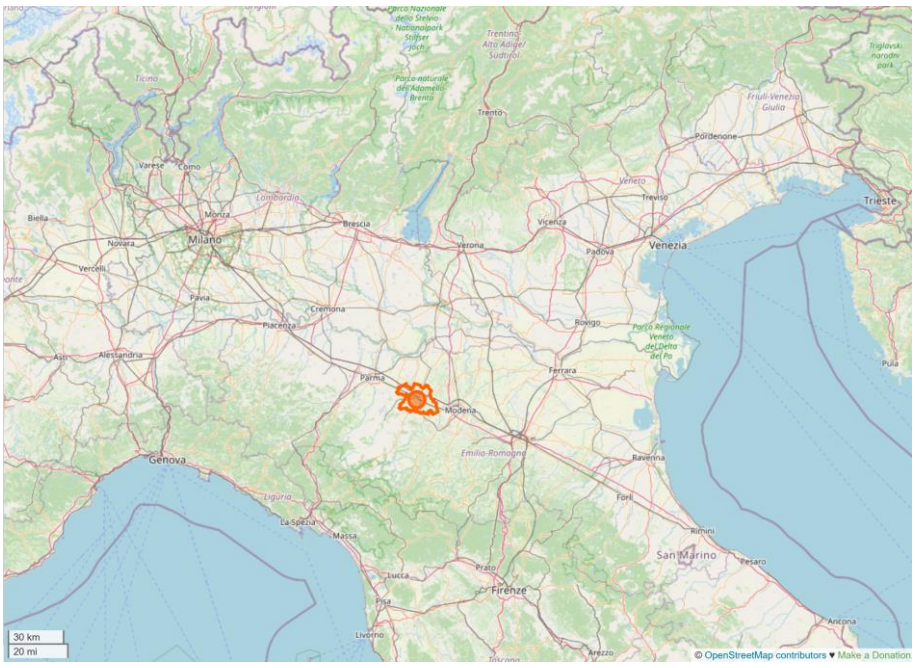

Figure 12: Map of Reggio Emilia FUA – location in Italy (8)

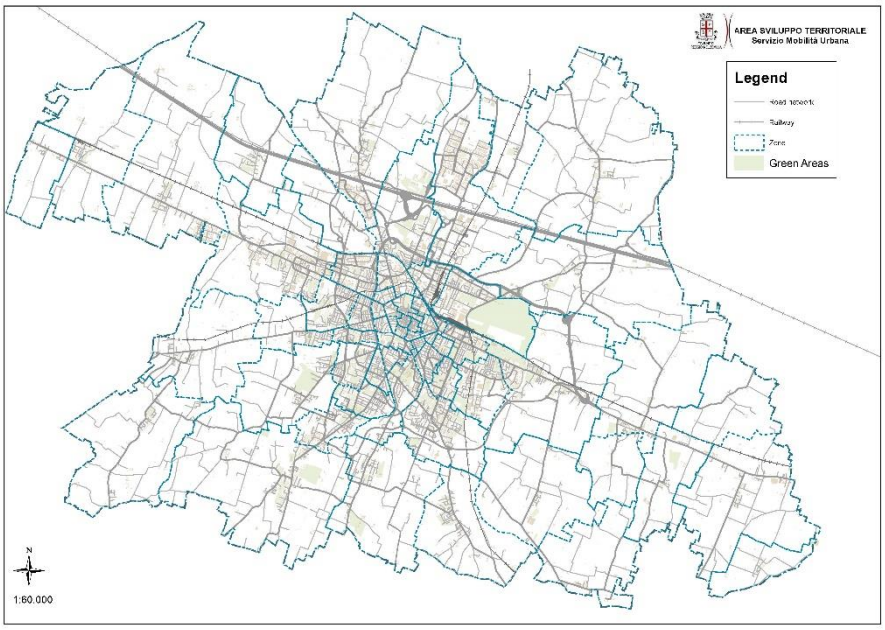

Figure 13: Map of Reggio Emilia FUA transport network [City of Reggio Emilia]

6.5. Verona

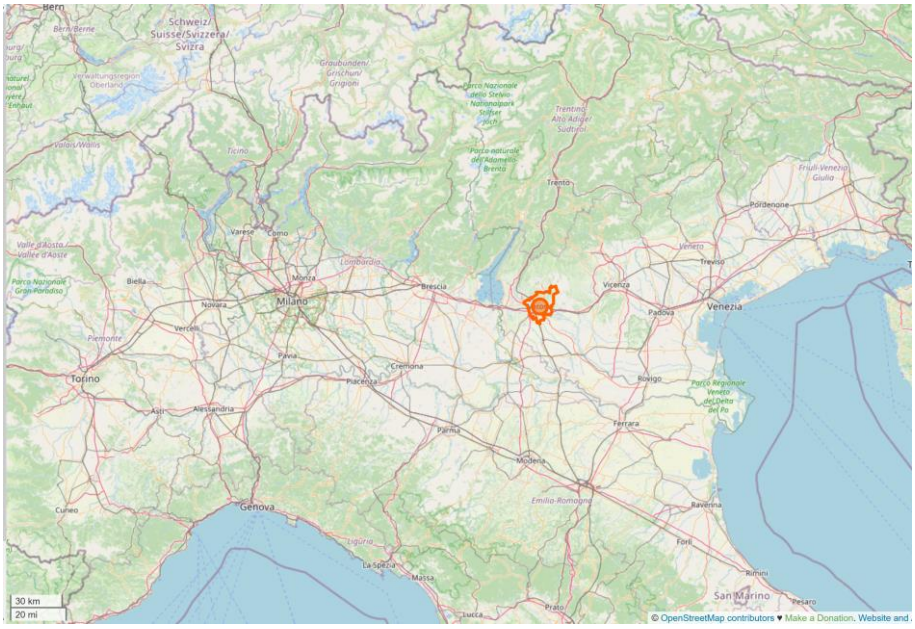

Figure 14: Map of Verona FUA – location in Italy (8)

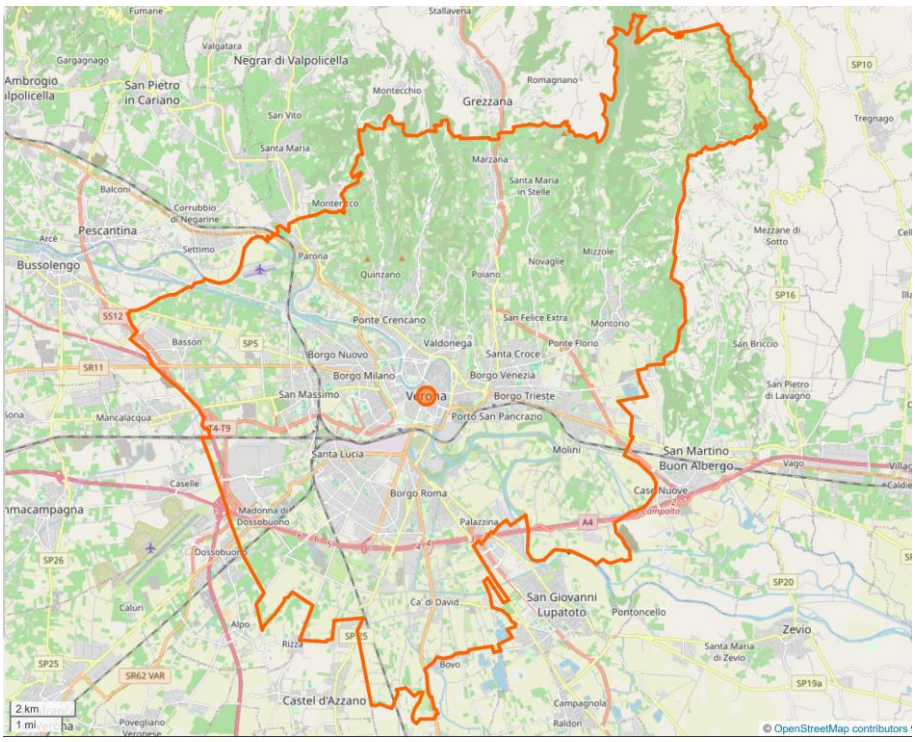

Figure 15: Map of Verona (8)