

CITY PROFILES

D5.2 ULaaS: factsheets baseline and city profiles

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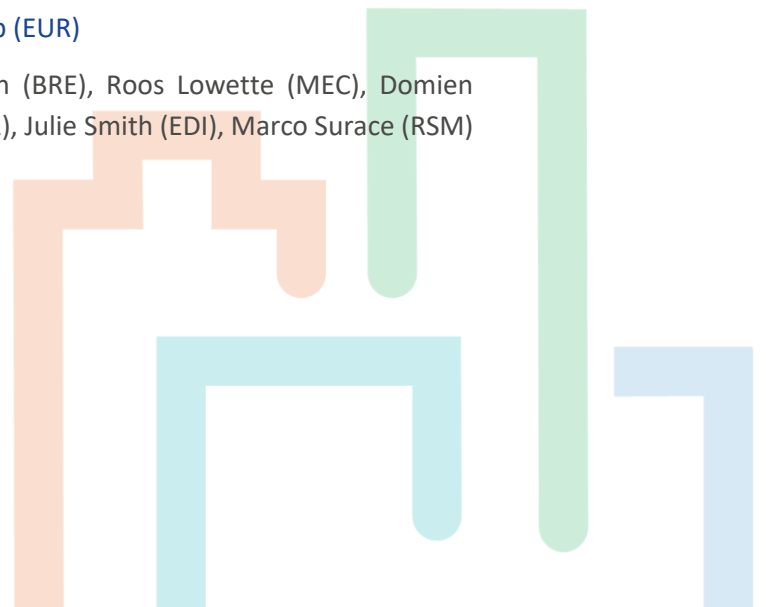
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Project abstract

ULaADS sets out to offer a new approach to system innovation in urban logistics. Its vision is to develop sustainable and liveable cities through re-localisation of logistics activities and re-configuration of freight flows at different scales. Specifically, ULaADS will use a combination of innovative technology solutions (vehicles, equipment and infrastructure), new schemes for horizontal collaboration (driven by the sharing economy) and policy measures and interventions as catalysers of a systemic change in urban and peri-urban service infrastructure. This aims to support cities in the path of integrating sustainable and cooperative logistics systems into their sustainable urban mobility plans (SUMP). ULaADS will deliver a novel framework to support urban logistics planning aligning industry, market and government needs, following an intensive multi-stakeholder collaboration process. This will create favourable conditions for the private sector to adopt sustainable principles for urban logistics, while enhancing cities' adaptive capacity to respond to rapidly changing needs. The project findings will be translated into open decision support tools and guidelines.

A consortium led by three municipalities (pilot cities) committed to zero emissions city logistics (Bremen, Mechelen, Groningen) has joined forces with logistics stakeholders, both established and newcomers, as well as leading academic institutions in EU to accelerate the deployment of novel, feasible, shared and ZE solutions addressing major upcoming challenges generated by the rising on-demand economy in future urban logistics. Since large-scale replication and transferability of results is one of the cornerstones of the project, ULaADS also involves four satellite cities (Rome, Edinburgh, Alba Iulia and Bergen) which will also apply the novel toolkit created in ULaADS, as well as the overall project methodology to co-create additional ULaADS solutions relevant to their cities as well as outlines for potential research trials. ULaADS is a project part of ETP ALICE Liaison program.

Keywords

Fingerprints, baseline, lighthouse cities, satellite cities, state of play.

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Executive summary

The deliverable D5.2 “ULaaDS: factsheets baseline and city profiles” offers an overview of the main characteristics of the seven ULaaDS cities, summarises the state of play in relation to urban logistics/urban freight and gathers preliminary information on the solutions that will be tested and implemented during the ULaaDS project. This document will form the basis of the replication strategy, that will be developed by M25.

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1. Introduction

The deliverable D5.2 “ULaaDS: factsheets baseline and city profiles” offers an overview of the main characteristics of the seven ULaaDS cities, summarises the state of play in relation to urban freight and gathers information on the solutions that will be tested and implemented during the ULaaDS project.

This document will form the basis of the replication strategy that will be developed by month 25 of the project. D5.2 will serve to all ULaaDS cities to get acquainted with the status of urban logistics in the other cities and will be the basis for Satellite cities (Alba Iulia, Bergen, Edinburgh, and Rome) to select the solutions they will replicate from the Lighthouse cities (Bremen, Mechelen and Groningen).

The document is divided in seven chapters, one for each of the ULaaDS cities. The first three are dedicated to the lighthouse cities Mechelen, Bremen, and Groningen (based on the order of the ULaaDS study visits that will be hosted by the lighthouse cities); followed by the satellite cities in alphabetical order Alba Iulia, Bergen, Edinburgh, and Rome. For each city, the following features are described: the local context, including the city size, geography, population, surface, and modal split.

This is followed by a section on urban freight strategies and initiatives at local, as well as at regional and national level when available. The deployment approaches are also described, good practices that can be beneficial to other cities, as well as the remaining challenges and barriers that could be addressed through targeted capacity building activities. For the lighthouse cities, a section on the planned ULaaDS solutions is added. ULaaDS focuses on two categories of logistics solutions which will be tested in the lighthouse cities:

1. collaborative delivery models – aimed at enhancing logistics efficiency and enabling multi-modal urban freight transport; and the
2. integration of urban freight and passenger transportation networks.

These are further specified in five different logistics schemes:

- Containerised urban last mile delivery
- Logistical network integration of crowdsourced bike couriers
- City-wide platform for integrated management of urban logistics
- Location and infrastructure capacity sharing
- Transport vehicle capacity sharing

This document is not to be intended exhaustive or complete, but rather as a living document. As a matter of fact, it has been regularly updated by the Lighthouse cities to capture the developments happening in the ULaaDS trial set-up between M6 and M18.

2. Mechelen



2.1 Local context

2.1.1 City size and context

Mechelen is a medium-sized typical European city and municipality in the province of Antwerp, Flanders, Belgium. It has almost 88.000 inhabitants and estimated to count 100.000 inhabitants by 2030.

Lately the city attracted more inhabitants, entrepreneurs, employers, visitors and tourists which implies a lot more traffic and transport flows.

The inner city is the area that used to be situated within the city ramparts with narrow cobble stoned streets. There are only a few remains of these ancient ramparts. They have been replaced by the ring road around the city. In this part of the city there are about 20.000 inhabitants. The low car- and car free-zones are situated in this area. In these streets there are timeframes for delivery with four different regimes. These zones are being monitored and maintained by the police via Automatic Number Plate Recognition (ANPR) cameras. See figure 1 below for a map of the access restrictions in Mechelen's city centre.

KEY FIGURES

Population: 88 000 inhabitants

Area: 65,8 km²

Density: 1345 inhab/km²

NUTS level: NUTS 3

TEN-T corridors: North Sea - Baltic
and North Sea – Mediterranean

In this area vehicles that weight more than 10 tons and/or that are longer than 11 metres, are not allowed.



Figure 1 Access restrictions in Mechelen's city centre

2.1.2 Geography

Mechelen is centrally located in between bigger cities like Antwerp, Brussels, Leuven and Ghent.

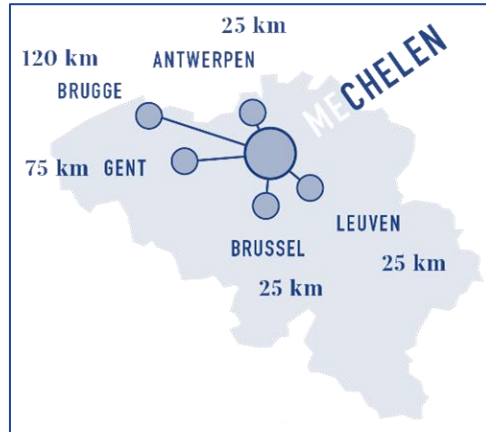


Figure 2 Mechelen’s distance from main Belgian urban agglomerations

The corresponding NUT level is 3. Belgium is centrally located in Western Europe; Mechelen in its turn is centrally located in Belgium. The region of Mechelen and its ring roads and highways give way to transit traffic coming from the North and going to the South and vice versa.

Mechelen is part of the North Sea – Baltic and North Sea – Mediterranean highspeed TENT-T corridor.

2.1.3 Population

Mechelen counts 88.000 inhabitants, represented in the figure below by half of the circle. The other half represents the same numbers but divided by age group.

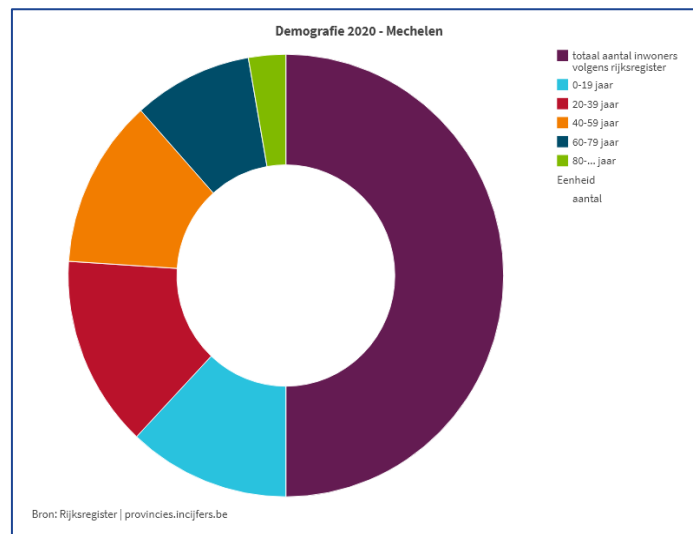


Figure 3 Mechelen’s demographic split in 2020.

Source: provincies.incijfers.be

2.1.4 Area (km²)

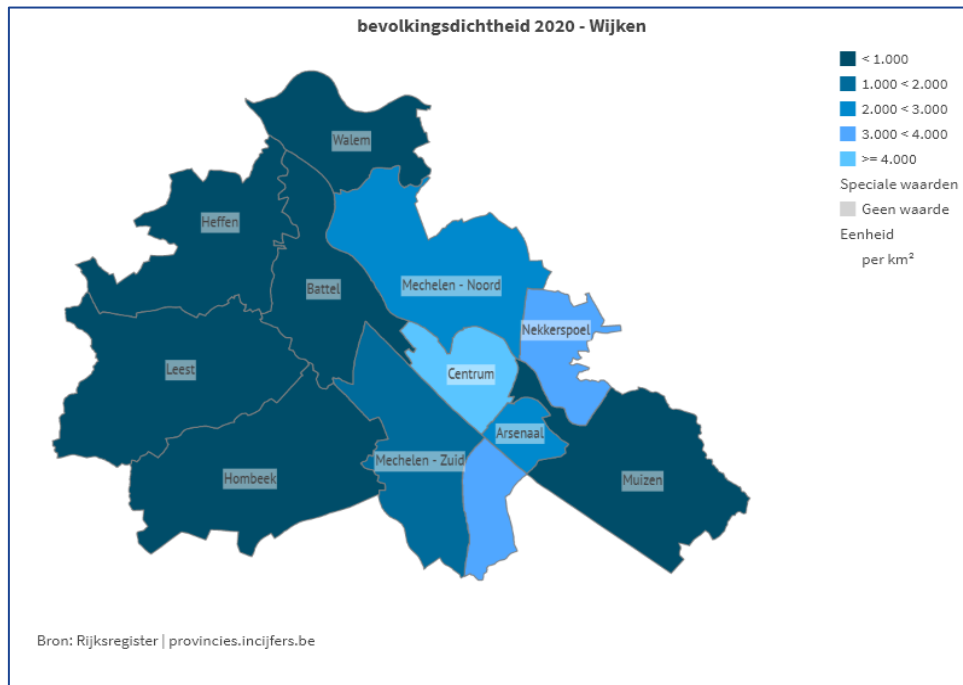


Figure 4 Population density in Mechelen in 2020

Source: provincies.incijfers.be

The population density is 1345 inhabitants per km² on an area of 65,8 km².

In the urban area next to the inner city we find quarters at its outskirts, namely the districts of Nekkerspoel and Battel, as well as the villages of Walem, Heffen, Leest, Hombeek, and Muizen. These are mainly urban housing areas with a high density. However, in the villages the density is lower as there are mainly detached houses with a larger total surface.

The peri-urban area includes the industrial zones in the north and south of the city. It also encompasses the main access road to the industrial area in the neighbouring municipality, called Willebroek. There are logistics traffic flows going back and forth between the city of Mechelen and this industrial zone in Willebroek, the two areas are connected by one main national road (N16) making it a very congested zone.

2.1.5 Modal split

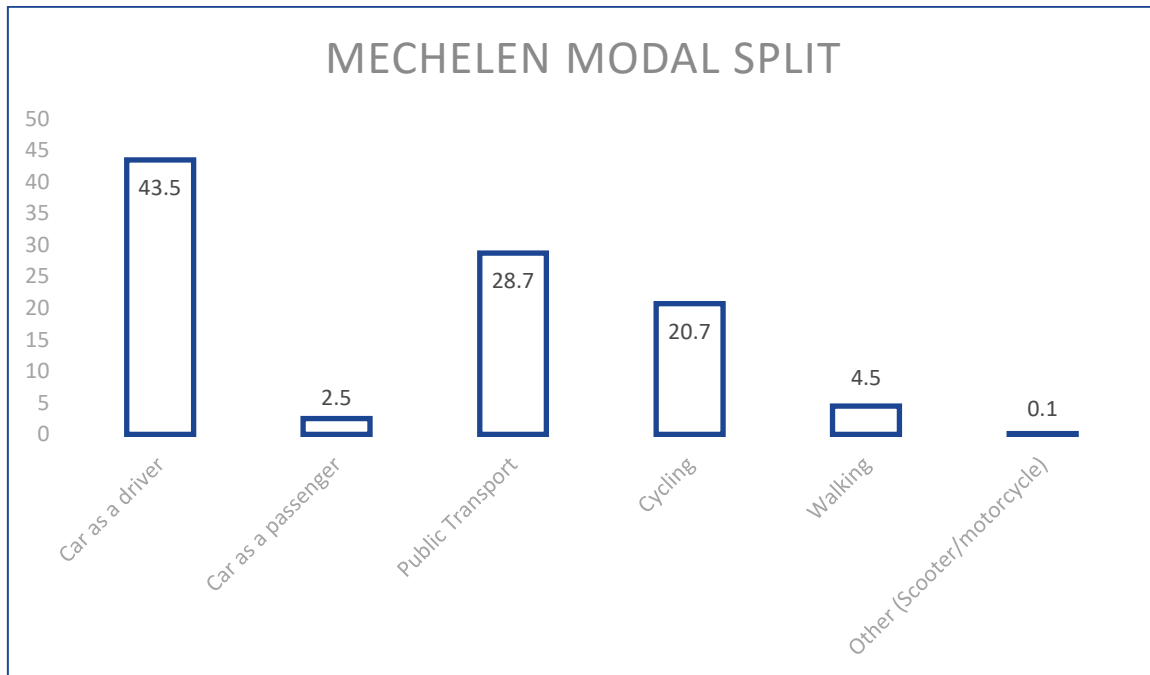


Figure 5 Mechelen modal split

Data source: The % are based on method B (number of trips; respondents had to indicate how often they use a specific kind of mode of transport (very often/often/not often/.....)).

2.2 Sustainable Urban Logistics Strategies and Initiatives

2.2.1 Logistics ecosystem

Logistics traffic flows are going back and forth between the city of Mechelen and the industrial zone in Willebroek, as previously mentioned to the areas are connected by one main national road – the N16 - and which often suffers from congestion.

The city also faces traffic congestion on its main ring road and access roads to the districts and villages. This has an impact on logistics with delays in time of delivery and failed home deliveries in e-commerce.

Mechelen has a city logistics hub in the South district of the city which handles deliveries from different logistic handlers in the field. From there on, last mile deliveries to the city centre are done with zero-emission vehicles. Most freight transport however, leaves from the respective warehouses of each logistic partner and have their handling finished in front of the door. The following logistics services providers (LSPs) are active in Mechelen: UPS, GLS, Bpost, PostNL, Fedex.

Negotiations are ongoing between the city of Mechelen and City Depot. The latter has a national strategy to implement city hubs in some important Belgian cities. From one central and bigger hub,

different vehicles drive out to the cities and goods are consolidated before departing for their zero-emission last-mile deliveries. No final decisions have been taken yet, but this possible cooperation could have an impact on the logistic flows of Mechelen in the years to come.

Mechelen is home to a railway station with direct connections to bigger cities like Brussels, Antwerp and Brussels Airport. Freight handling by rail within the country is marginal.

2.2.2 Decentralised warehouse(s) / distribution centre(s) description

Mechelen counts two warehouse areas as follows: CityDepot in the North district of the city. From there on, the ECOkoeriers are providing first and last mile deliveries with their cargo bikes.

Also, bpost runs a city hub in the South district, giving the possibility to perform last mile services to retailers, as well as limited stock keeping.

2.2.3 Existing urban logistic solutions

Table 1: Existing urban logistics solutions in Mechelen.

	Total	Description
Cargo bike schemes	Unknown	Several local entrepreneurs organize their own transport and deliveries via cargo bikes
Electric cargo bikes	Unknown	<ul style="list-style-type: none"> - Local entrepreneurs who purchase a cargo bike get a discount from the city of Mechelen (52 entrepreneurs have applied for the discount in the past 4 years, for up to 100.000 euro in total) - bpost has fully implemented a fleet of more than 30 bike trailers plus other electrical vehicles to perform daily deliveries of mail and parcels - Ecokoeriers manages last and first mile transport with its cargo bikes
Mobility Hubs	2	One city hub in the South district, and one city hub in the North district. In addition, bpost is trialling with 2 microhubs in the inner city – one container and one empty building owned by the city
Bicycle couriers	2	Two cargo bike companies operate in the city of Mechelen, next to privately owned cargo bikes by retailers that deliver goods themselves.
E-vans		Bpost is fully operational with around 65 e-vans, 1 LEV and 2 collibusses
Smart Lockers	55 + 3 + 11	<ul style="list-style-type: none"> - 55 small lockers that operate autonomously and can both function as a first mile and a last mile hub. - 3 bigger lockers that are directly connected to the power system - During the end of year period and the upcoming sales for retailers, the city approved adding 11 additional small lockers <p>All lockers are operated by Bpost.</p>

Source: Mechelen

2.2.4 Supporting policies for sustainable urban logistics

The city has a SUMP¹ in place since January 27, 2015 (approved by local council). The text is in Dutch, but other than a short ‘the city needs to implement a sustainable logistics plan’, no other freight initiatives are tackled in there.

In September 2020 no less than 29 partners signed a ‘covenant’² – a document in which every public or private partner commits to certain actions, ultimately to reduce urban logistics’ emissions in the city to 0% by 2030 (in line with the EU-guideline of zero-emission logistics). It took time and effort to gather these partners, but the real challenge now is to put these words into practice and, as a city, continuously remind all partners of their commitments.

Mechelen’s goal is to make urban freight more sustainable and more efficient by:

- Reducing the number of vehicle movements
- Reducing the number of driven kilometres
- Reducing CO² emission.

The City of Mechelen is also one of the 76 partners that signed the first Green Deal³ together with the Flemish government and set various objectives. This cooperation agreement aims to ensure that the number of car sharers, car poolers and bicycle sharers increase. This green deal includes amongst others measures such as low emission zones, shared mobility schemes, a charging infrastructure and e-mobility strategy, citizen science-based traffic counting which indirectly affects the future of the cities’ sustainable urban logistics.

2.2.5 SUMP and SULP at a glance

Table 2: Mechelen SUMP and SULP at a glance

City	MECHELEN
Type of strategy	SUMP 2015 Sustainable and Efficient City Logistics Covenant in Mechelen 2020
Goals	<ul style="list-style-type: none"> • Become a pleasant, sustainable and accessible city • Become a zero-emission city by 2030 • Work towards a more sustainable and efficient freight transport, with a primary focus on the city centre and the station environment: <ul style="list-style-type: none"> ○ a reduction in the number of transport movements & km driven ○ better air quality and reduction in CO² emissions by 40% by 2030 ○ zero-emission urban distribution by 2030

¹ Mechelen SUMP, 2015. <https://www.mechelen.be/mobiliteitsplan>

² Sustainable and Efficient City Logistics Covenant in Mechelen, 2020. <https://www.mechelen.be/convenantduurzamelogistiek>

³ Mechelen Green Deal. <https://www.mechelen.be/greendeal>

<p>Transport measures (with potential impacts on logistics)</p> <p>Authority level specified in brackets (L = local, R = regional, N = national)</p>	<p>SUMP</p> <ul style="list-style-type: none"> • Coordinate infrastructure projects with spatial projects (supra-municipality mobility projects) (L) • Create mobility vision for neighbourhoods and areas around the city centre to improve multimodality, liveability, accessibility, road safety and the proper functioning of the various traffic networks (L) • Create a wide spread bicycle network (L, R) • Establish a coherent and hierarchical road structure (L, R) • Regulate heavy traffic routes to minimise the negative impact of road traffic on liveability in residential areas (L, R) • Improve road safety through an improved accident policy (L, R, N) • Improve public transport (R)
<p>Logistics measures</p> <p>Authority level specified in brackets (L = local, R = regional, N = national)</p>	<p>SUMP</p> <ul style="list-style-type: none"> • Create a freight route network coordinated at regional (Flanders) level (R) <p>Covenant:</p> <p><i>Period 2021-2022:</i></p> <ul style="list-style-type: none"> • Experiment: define and roll out collaborative POCs (proof of concepts) to test new solutions (L) • Draw up an investment plan to determine how the fleet can be adapted to zero-emission vehicles (L) • Research and shape up the corresponding policy (L) <p><i>Period 2023 - 2024:</i></p> <ul style="list-style-type: none"> • Provide a legal framework that offers stakeholders legal certainty in the long term (L) • Implement concrete policy with gradual transition towards a zero-emission fleet (L) • Ensure transition to zero-emission taking into account technical innovation and availability of zero emission vehicles (L): <ul style="list-style-type: none"> ○ 2023: 20% of deliveries with zero-emission vehicles ○ 2027: 50% of deliveries with zero-emission vehicles ○ 2030: 100% of deliveries with zero-emission vehicles • Horizon 2030: zero-emission urban logistics (L) <ul style="list-style-type: none"> ○ Align with guidelines and policies, including at Flemish level

Source: Mechelen

2.2.6 Regional or national frameworks

Unfortunately, the existing regional and national frameworks regarding urban logistics are rather unambitious, if existing at all. Often cities aim for higher goals than are expected from them, which is the case in Mechelen as well.

At the regional level one can still cite the Green Deal guidelines which are put in place to start green projects between private partners and the Flemish government.⁴

The Flemish Green Deal on Sustainable Urban Logistics⁵ has four main objectives to reach:

- Reduce the number of driven kilometres
- Shift to more environmentally friendly means of transport
- Increase the number of zero-emission vehicles
- Connect actors around sustainable urban logistics

2.3 Relevant projects

Various projects show the dynamism in Mechelen for the deployment of sustainable urban logistics.

As a city, Mechelen has been working both top down and bottom up to achieve improvements concerning sustainable urban logistics. For five years, bottom-up initiatives have been abundant, and the city is continuing to invest in trials. The inner city of Mechelen has a few car-free shopping streets with restricted access (see figure 1 above). Unless a motorized vehicle has a permit (one time or permanent), it cannot enter the car-free zone. ANPR cameras are operating to check for irregularities and fine unauthorized vehicles if necessary. As mentioned, in this area vehicles that weight more than 10 tons and/or are longer than 11 metres, are not allowed. Currently, the city is thinking of a framework to allow freight vehicles falling under the European category L to enter the access restricted zone. Car sharing platform fleets are allowed access 24/7. It's not unlikely that Mechelen car-free zone will be extended in the coming years.

Additionally, Mechelen is testing the relevance of a [microhub](#).

The [lean lockers of bpost](#), the Belgian national postal service, are doing so well that capacity in some lockers is already reached. Additional lockers have been placed to cover the end of year period.

The city introduced a shopping shuttle that drives back and forth between a parking just outside the inner city and the inner city itself. Saturday shoppers are offered a free electrical ride to the city and are encouraged to keep their car at the border.

The cooperation between ECOkoeriers and the city remains close. Thanks to other European funding ECOkoeriers services have become more and more efficient. When Mechelen based retailers show interest in making their logistics flows zero emission, ECOkoeriers often represent the go-to player.

European funded projects with Mechelen involvement are listed here below:

⁴ Flemish Government Green Deal guidelines. <https://omgeving.vlaanderen.be/green-deals>

⁵ The Flemish Green Deal on Sustainable Urban Logistics. <https://omgeving.vlaanderen.be/green-deal-duurzame-stedelijke-logistiek>

- Through the [City Changer Cargo Bike](#) (CCCB) project, Mechelen further exploits within the inner ring road the limitless potential of cargo bikes promoting their usage amongst public, private, and commercial users.
- By participating in [Surflogh](#) (Interreg North Sea Region Project), the city of Mechelen has the ambition to achieve a sustainable improvement of first and last-mile transport movements; decrease transport movements; optimise data models; strengthen and broaden the stakeholders network; improve air quality, reduce CO² emissions and noise. In November 2019, three Cubee smart lockers were installed in Mechelen. In these lockers, both parcel delivery and shipment is possible 24/7. By installing these lockers, the city of Mechelen is providing an answer to the continuously growing e-commerce boom, a trend that can no longer be denied.
- The [Sprout](#) project aims to support urban mobility policy, based on practical experiences, identifying, monitoring and applying innovative solutions to help steer future local policy. In the framework of this Horizon 2020 project, the city of Mechelen uses data processing and simulations to develop a relevant loading and unloading policy.
- The [Novelog](#) project was the follow up project of the *Cycle Logistics Ahead* project and had the objective to expand the existing cycle logistics service in order to research flows of freight traffic, to identify the optimum location for the establishment of three urban consolidation hubs, and to establish the appropriate business models for the operation of these hubs. The City of Mechelen piloted the development of an IT platform for communication between the bike couriers and the traders. This helped bundle flows together and identify flows for capacity sharing and optimisation, as well as in building a model for the development of distribution centres that create economic benefits. In the framework of Novelog, Mechelen started scanning license plates through the ANPR technique.

2.4 Success factors and enabling conditions

Following success factors can be highlighted:

1. The department of mobility is lucky to have a city council that is ambitious when it comes to urban logistics. The need for improvements is clear and our policy makers aren't afraid of taking bold decisions.
2. Additionally, Mechelen has a structure that facilitates bike courier services. The city is rather small and has a clear outline with an inner city inside the ring road. On top of that, the city is centred around a canal and is therefore flat and easy to cycle with large loads.
3. The warehouse of ODTM is strategically located. Professionalising their services, expanding to a second location and nudging retailers to have their deliveries pass through here are next steps that would even further improve their success.

2.5 Challenges and barriers

On the one hand Mechelen has an historic core with a busy shopping centre and the ambition to create a car-free pedestrian shopping triangle. On the other hand, Mechelen wants to stay accessible for all sorts of visitors and logistic players. To find a good balance between liveability and accessibility, the city must work on and develop new and innovative ways to perform the deliveries and pick-ups in and out of the city centre. Especially with the growing requirements of the on-demand economy. The market of parcel deliveries for example has grown from 2016 to 2017 with 19% in volume (up to 205 million deliveries) and with 13,6% in value (up to 1,3 billion €).

The EU guideline of zero-emission logistics by 2030, is seen as the absolute parameter.

To reach those goals, the lack of an ambitious regional or national framework represents a clear challenge. Every city tries to answer its logistic challenges by itself, putting in much effort that could be lightened by having an overarching framework with clear guidelines. However ambitious the city council may be, they're not always keen on approving a trial that has never been tested before in the county. Specific technology exists, answers to logistic challenges have been proven efficient, but sometimes it's a big leap for the council to take the decision to implement new pilots.

Finally, a physical barrier on a more local level is that crossing the ring road to and from the inner city can be a hazard with long cargo bikes, especially when pulling an extra trailer. The waiting area in front of traffic lights is rather small.

2.6 ULaaDS solutions

The schemes that will be trialled in Mechelen are highlighted in bold.

Table 3: ULaaDS schemes that will be trialled in Mechelen

Solution	Scheme
1) Collaborative delivery models to enhance logistics efficiency and multimodal mobility in cities	1. Containerised urban last mile delivery 2. Logistical network integration of crowdsourced bike couriers 3. City-wide platform for integrated management of urban logistics
2) Effective integration of passenger and urban freight mobility services and networks (Cargo hitching)	4. Location and infrastructure capacity sharing 5. Transport vehicle capacity sharing

2.6.1 MEC.01 UPS last-mile solutions – Solution 1, Scheme 3

Description

UPS will trial a collaborative delivery model together with ODT. UPS will rent a SME-box in the city hub, have their goods delivered in their box and drive out with cargo bikes for the last mile.

Objectives

With this initiative, available infrastructure is wisely used and UPS avoids the burden of driving in and out the city with their vans.

Timing

UPS planned to start trialling as soon as they had their cargo bike (Rytle). However, restrictions from the unions regarding Health and Safety prevented them from starting. The route to and from the city by cargo bike would not meet the required standards. UPS is now considering subcontracting the transport by cargo bike to a third party. This will be internally agreed upon, and then approved within the ULaaDS administration process.

2.6.2 MEC.02 bpost Ecozone – Solution 1, Scheme 3

Description

The Belgian postal service bpost has made impressive progress with its Ecozone-initiative that started as part of the European Surflogh project. It entails smart lockers, microhubs, a city hub, electrical vans and cargo bikes that all operate in the inner city of Mechelen.



Figure 6 Mechelen Ecozone - bpost parcel locker

Objectives

Bpost has found in Mechelen a real testing zone and is eager to continue testing to find what combinations of these building blocks can provide sustainable solutions for urban freight handling.

With the help of the city of Mechelen, bpost has installed two microhubs in the inner city to refill the cargo trailers used by their bike couriers. Results will be expected as of January 2022 when these hubs will be in full use.

Bpost will also experiment working together with other logistics service providers (LSPs). The national player committed to make the network of lockers open and accessible to all LSPs. However, giving every LSP access to every locker will only create extra mileage, which is what we try to avoid. That's why in the first local forum, bpost will enter into a dialogue and ask other LSPs what would be needed for them to have their inner city parcels dropped off at the bpost city hub at the border of the city. Bpost would then deliver them to any locker, physical address or pick-up point for them – zero emission and traced.

Timing

The microhubs have been installed (two containers on a parking and a temporary empty building from the city) and are being tested by bpost already.

The local forum will take place will take place in the first 6 months of 2022.

2.6.3 MEC.03 ECOkoeriers – Solution 1, Scheme 3

Description

The ECOkoeriers are the go-to partner when it comes to last mile deliveries in Mechelen. Although they are very experienced, they have a strong ambition and commitment to further professionalise their business.

Objectives

ECO was prepared to cooperate with Dropper that promised them a track and trace system. Due to Dropper's insolvency, ECO had and still has a hard time refocusing on a new theme. One option we have in mind now is investigating reverse logistics. Food waste, dirty diapers from kindergartens, paper and cardboard are potential options at the moment.

Timing

ECO is reaching out to potential partners to check what is possible and to make preliminary agreements. The company is confident that this trial will be up and running by spring 2022. As a city, we keep a close eye on this.

2.6.4 MEC.04 ECO, UPS and BPO – Solution 1, Scheme 3

Description

The above-mentioned trials will each take place in three separate realities. To have a common theme in which all three partners have their role, we defined an overarching trial. The theory has been defined, further details and a plan for the practical approach will follow.

Objectives

Mechelen has a highly developed zero-emission network, which has the potential to become even better. A blind spot in terms of services is the B2B part. Thus, the city is trying to create a strategy to reduce the burdens for retailers even more, based on their needs. Mechelen is primarily thinking of pick-ups and return flows from retailers – today different LSPs drop by to pick up parcels at different times. In addition, due to the small volumes of some retailers, LSPs do not drop by and the retailer has to go to a drop off point. This situation has potential to be more consolidated and sustainable.

UPS, BPO and ECO will explore together which role they could take in this trial.

Timing

The research question has been defined – the actual details will be cleared out in the coming weeks and months.

2.6.5 MEC.05 VIL and other partners to be defined – Solution 2, Scheme 5

Description

Together with VIL, Mechelen will trial an autonomous vehicle. Five scenarios were described and analysed through stakeholder inquiries:

- express delivery from the outer city to inner city businesses
- B2B delivery in the inner city
- B2C delivery in the inner city
- an autonomous driving parcel locker
- cargo-hitching with private logistics on a business park.

Stakeholders that were interviewed are the city itself, the government (department of mobility), developers of autonomous vehicles, experts with experience in previous autonomous vehicles projects, and LSPs.

Objectives

The scenario selected as the outcome of the analysis carried out is the one covering the testing of an autonomous driving parcel locker with a cargo-hitching component. The autonomous vehicle will be tested in the outer city on a business park. The most important reason for this choice is the complexity of city traffic and the distance of the route. The more complex the traffic and mobility, the more difficult the programming becomes, and the more likely the possibility to fail. We choose to test a solution where we feel chances for positive results are feasible.

In this trial, an autonomous vehicle will transport people on a business park, from their last bus stop to their working place. Naturally, parcels also need to be transported within the business park. Therefore, we foresee two options we want to test:

- Cargo-hitching with passengers: passengers will take the parcel from a parcel locker and drop it off, in exchange for a free ride on the autonomous vehicle. “Payment” will be validated if the parcel is signed for drop off.
- A parcel locker built in the vehicle: Parcels will be loaded on the vehicle, and end-customers can pick up their package in the vehicle on demand.

We foresee the necessity of double use (passenger and freight transport) to ensure optimal use of the vehicle, so costs can be minimized. During peak hours, the vehicle can be used for passenger transport, during working shifts, the vehicle can be used to drop off (or pick-up) the parcels.

Timing

Planning on implementing the trial as of M21.

3. Bremen



3.1 Local context

3.1.1 City size and context

Bremen is a harbour city in the Northwest of Germany, the larger of two cities that together form the Free Hanseatic City of Bremen, Germany's smallest federal state. Two cities forming one state („Zwei Städte, ein Bundesland - Bremen und Bremerhaven“) make for a unique configuration in Germany's federal system.

Economic background:

Bremen has a strong maritime tradition: since 1358, the Free Hanseatic City of Bremen has been a member of the Hanseatic League. Maritime trade and logistics have remained a key industry in the city. The Norddeutscher Lloyd (NDL), founded in Bremen in 1857, became one of the world's leading shipping companies. The port facilities of Bremen and Bremerhaven, which, administratively and economically, form one unit, incorporate free-port status, whereby imported goods can be handled and stored without time limits and without customs formalities. Bremen is among the ten biggest industrial sites in Germany

KEY FIGURES

Population: 566,000 inhabitants

Area: 326.25 km²

Density: 1,622 inhabitants/km²

NUTS level: NUTS 2

TEN-T corridors: North Sea - Baltic

ULaaDS role: Lighthouse city

(with key players in aerospace, automotive, and logistics industries), and the German state with the highest industrial export rate.

Historical background:

Public transport has a long history in Bremen. The city’s horse-drawn tram company went into operation in 1876, and by the end of the century, switched to electrified lines. The first trolley bus was operated in 1910, while the first diesel bus network started in 1924. The public transport network has been expanding ever since, offering 8 tram lines since 2020 and 38 bus lines. In addition, the Bremen S-Bahn has been in operation since 2010, covering the Bremen/Oldenburg Metropolitan Region. The city also benefits from an international airport, located south from the centre.

Besides, the City of Bremen is well known for its shared mobility offer, being the first city that defined a Car-Sharing Action Plan. Car-sharing was first introduced in Bremen in 1990 and has helped reduce the number of private cars, reaching 20.000 Carsharing users by 2020⁶. The city was also an early implementer of mobility hubs (mobil.punkte & mobil.püнкtchen) – multimodal points which offer users options for sustainable travel (public transport, shared bikes and cars, walking), reducing parking pressure and private car use.

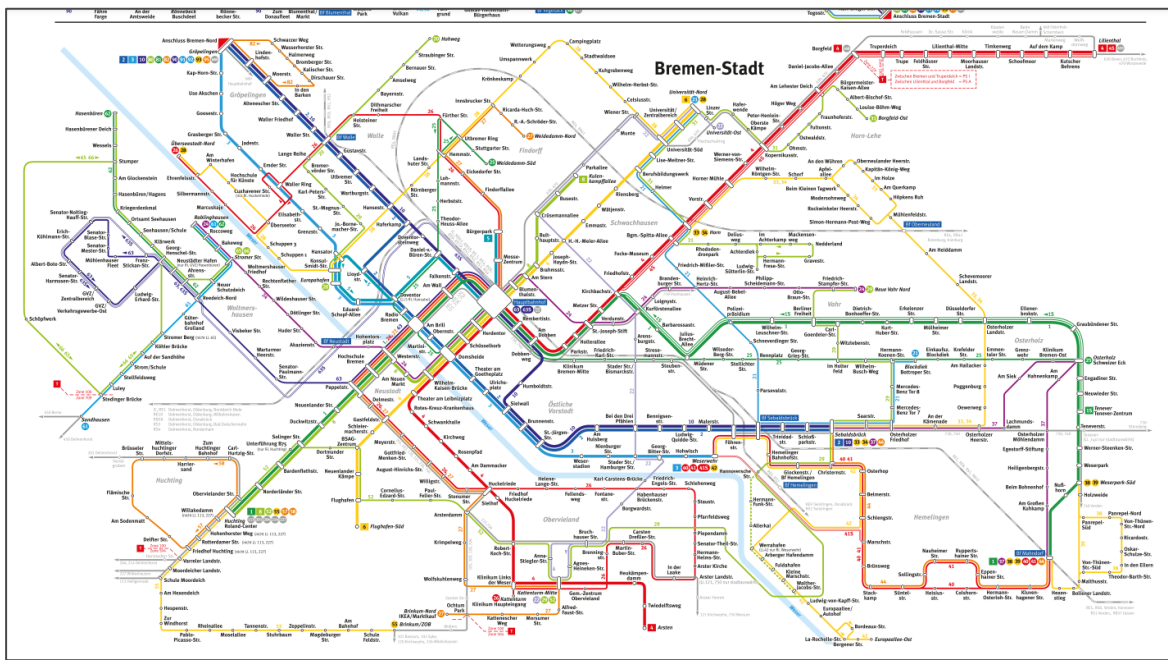


Figure 7 Bremen BSAG Public Transport System

Source: <https://www.bsag-netz.de/>

⁶ 20,000 people in Bremen are using car sharing, 2020. <https://share-north.eu/2021/05/mission-accomplished-20000-people-in-bremen-are-using-car-sharing-over-6000-cars-replaced-goals-of-the-carsharing-action-plan-achieved/>

3.1.2 Geography

Bremen is the largest city in North-western Germany and accordingly actively involved in the “Metropolregion Nordwest”. Its maritime history and proximity to the North Sea have made Bremen (and Bremerhaven) major hubs for logistics.

Bremen is connected through the North Sea – Baltic TEN-T corridor; NUT level 2, DE50.

3.1.3 Population

Around 2.7 million people live in the metropolitan region of Bremen and Oldenburg (50 km west of Bremen). With a population of 566,000, Bremen is Germany’s eleventh-largest city. The average age in 2020 was 43.6 years. At its eight universities, it counts close to 38,000 students (with more than one out of six being international students). Population density across its five boroughs (and very diverse 23 districts) averages at 1,622 inhabitants/km². With over 432,000 jobs in Bremen, the city handles around 120,000 commuters (accounting for over 20 percent of Bremen’s workforce) on their way from the surrounding state of Lower Saxony every day.

3.1.4 Area

The City of Bremen spans an area of just over 326 km². The inner city (the core of which is the old town) makes up for an area of 3.2 km².

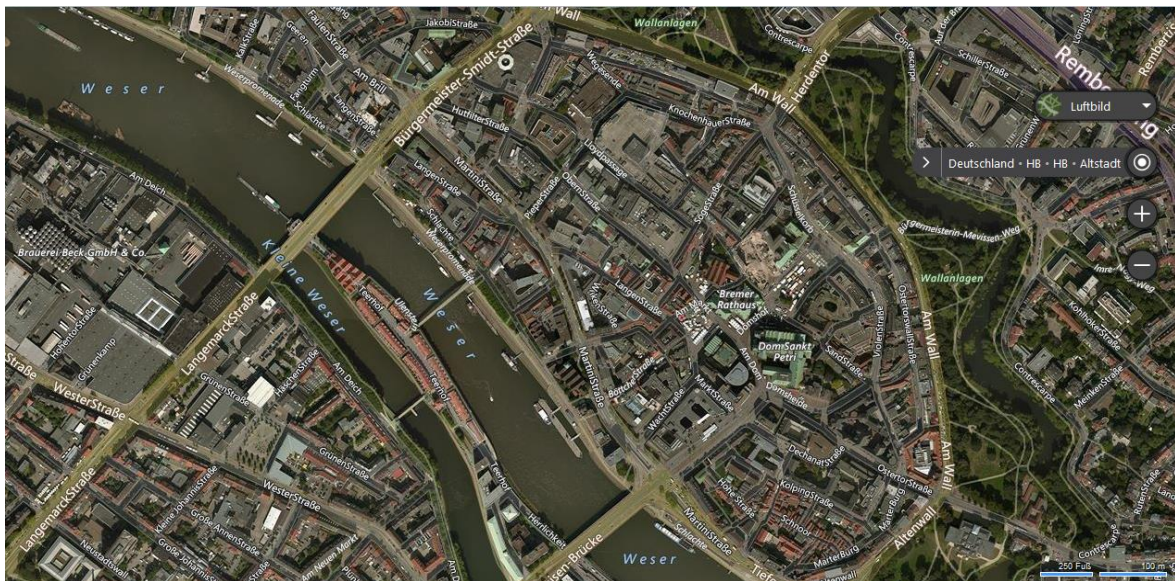
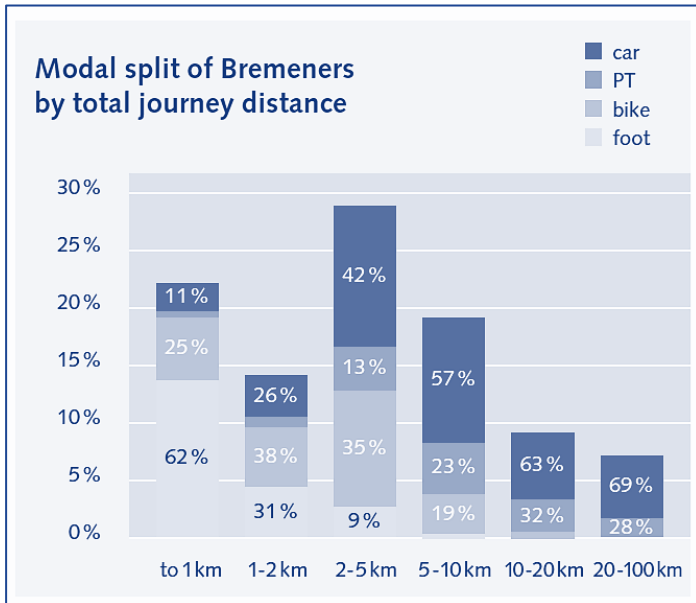


Figure 8 Bremen inner city aerial view

3.1.5 Modal split

Bremen has been a forerunner in sustainable mobility – with a share of about 64 percent of all trips done by the sustainable modes (public transport, cycling, and walking).

At 23 percent, Bremen shows the highest share of cycling of all large German cities (500,000+ inhabitants), and at the same time the lowest NO₂-level – fulfilling the European Air Quality requirements. Like many other ‘cycling cities’, Bremen shows a relatively low level of congestion (according to TomTom congestion index).



As a port city and a commercial and industrial centre, commercial traffic is of particular importance for Bremen. Its management on the road network and the accessibility of commercial centres are key factors. With 26% of traffic on the road being commercial traffic and 10% of all traffic being heavy-duty vehicles, the volume of commercial traffic in Bremen is disproportionately high⁷.

As a port city and a commercial and industrial centre, commercial traffic is of particular importance for Bremen. Its management on the road network and the accessibility of commercial centres are key factors. With 26% of traffic on the road being commercial traffic and 10% of all traffic being heavy-duty vehicles, the volume of commercial traffic in Bremen is disproportionately high⁷.

Figure 9 Modal split of Bremeners by total journey distance

3.2 Sustainable Urban Logistics Strategies and Initiatives

3.2.1 Logistics ecosystem

Bremen has Germany’s largest and Europe’s second-largest heavy goods port. The five docks in Bremen specialise mainly in handling conventional breakbulk cargo, heavy cargo, and bulk cargo. A complementary logistics network has developed around the region’s ports that channels the flow of goods to their European destinations. A total of 1,000 logistics companies employ almost 20,000 people, making one in three local jobs dependent on the maritime or transport sector⁸. As the map below shows, Bremen is well connected to the TEN-T network, both by road and railway.

⁷ Sustainable Urban Mobility Plan Bremen 2025

⁸ Logistics hub Bremen – by land, sea and air. Jann Raveling, Bremen Invest, 2019. <https://www.wfb-bremen.de/en/page/bremen-invest/logistics-hub-bremen>

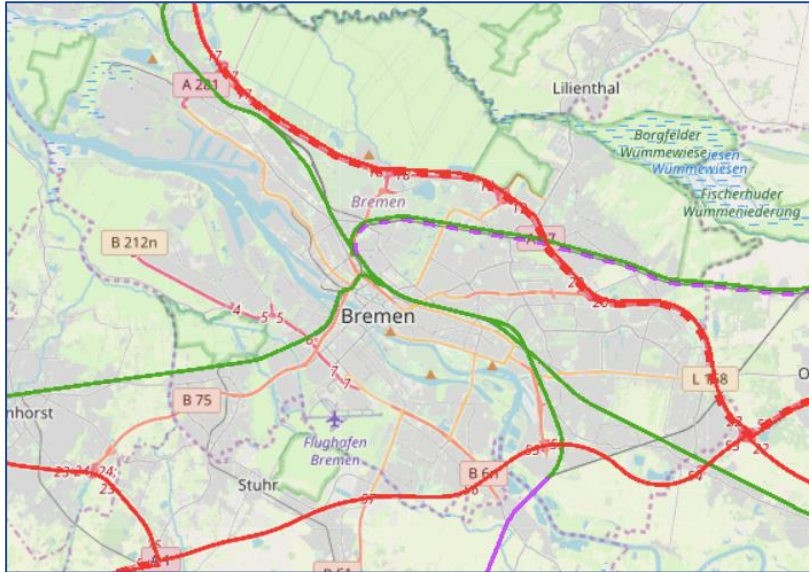


Figure 10 Road and railway TEN-T Network – Bremen

Source: <https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html>

3.2.2 Decentralised warehouse(s) / distribution centre(s) description

Bremen has seven commercial areas relevant for its logistics, which act as decentralised distribution centres.



Figure 11 Bremen commercial areas and decentralised distribution centres

Source: “Studie zur Untersuchung und Ermittlung der Bedeutung der Logistik insgesamt, deren Wertschöpfungsketten und Zusammenhänge in Bremen und der Region”⁹

The total logistics area in Bremen covers close to three million m². A key role (also with regard to urban logistics) falls under the Cargo Distribution Centre (GVZ), Germany’s first and largest, featuring Europe’s largest high-bay warehouse. The GVZ is connected trimodally (waterborne, rail, road), and the starting point for many an urban delivery trip.



Figure 12 Cargo Distribution Centre (GVZ) in Bremen

Source: <https://www.wfb-bremen.de/>

3.2.3 Supporting policies for sustainable urban logistics

Innovative logistics projects were integrated into the city’s “Green City Masterplan” (2018). The Masterplan established 81 measures to improve the air in Bremen and, in particular, reduce nitrogen dioxide pollution. These were grouped in four categories:

- Car sharing and non-motorized transport,
- Digitalisation and connectivity in the transport system,

⁹ Study to investigate and determine the importance of logistics as a whole, value chains and connections in Bremen and the region (in German). Dr. Thomas Nobel & Susanne Knieriem, to-be-now-logistics-research-gmbh, 2020. <https://www.bremen-innovativ.de/wp-content/uploads/2020/11/Logistikstudie-Langfassung.pdf>

- Automated driving, and
- Changes caused by drives and fuels.

The Masterplan established a political base for developing ULaaDS and implementing trials.

Bremen has a low emission zone since 2019, encompassing the historic city, the Eastern suburb and some areas of Schwachhausen, as well as big parts of the new town (Neustadt).

3.2.4 SUMP and SULP at one glance

The City of Bremen developed a Sustainable Urban Mobility Plan¹⁰ (“Verkehrsentwicklungsplan 2025”) early on. It was politically adopted in 2014 and earned Bremen the EU’s SUMP award in March 2015 due to its clear orientation towards sustainable modes and its innovative participatory concepts (like online participation tools and a participatory game tool for an urban transport concept). Following the award, Bremen hosted the European SUMP conference in April 2016.

The City of Bremen is committed to sustainable mobility planning and its implementation through a number of political decisions and practical implementation. The respective ministry (since 2019, The Ministry for Climate Protection, the Environment, Mobility, Urban and Housing Development, in short “SKUMS”, based on its name in German), has been a well-known partner in European projects – as partner and coordinator. In the European CIVITAS initiative, Bremen became CIVITAS City of the Year (2005), and being awarded with the European Sustainable Energy Award 2013, The European Sustainable Mobility Plan Award (2015), German Cycle Award (2018) and others. The City of Bremen is also active member in international city networks like Covenant of Mayors, Eurocities, ICLEI, the Climate Alliance and ERRIN.

Table 4: Bremen SUMP and SULP at a glance

City	BREMEN
Type of strategy	SUMP (2014, partial update in 2019, final update spring 2021)
Goals	<ul style="list-style-type: none"> • Enable social inclusion of all people and strengthen the equality of all transport users • Increase transport safety and security • Offer and optimise alternative transport options in the entire city • Improve the connection of the systems and services for walking, cycling and public transport between Bremen and the surrounding region • Strengthen Bremen as an economic centre by optimising commercial transport • Improve the accessibility of Bremen as a regional centre • Reduce the negative effects of road transport on people, health and the environment in a lasting and perceptible way <p>2020 objectives:</p>

¹⁰ Bremen SUMP, 2014. [Link](#)

	<p>20-25 % increase in bicycle traffic</p> <p>15-20 % increase in public transport (bus and tramway)</p> <p>50 % increase in rail transport (suburban railway)</p> <p>20 000 car-sharing users</p> <p>Completion of the ring motorway A 281</p> <ul style="list-style-type: none"> • Make city centre car-free by 2030
<p>Transport measures (with potential impacts on logistics)</p>	<ul style="list-style-type: none"> • Improve walking conditions and encourage local mobility (e.g. pedestrian-friendly street design and improved quality of sojourning in public space) • Encourage cycling through infrastructure improvements and the further development of the cycling network • Improve local public transport, regional and local passenger rail (e.g. Counteract the known service deficits to create new user potential; better link services for walking, cycling and public transport; strengthen the transport connections across the river through attractive services; reduce the negative impact of noise and emissions on residents) • Design street space to improve accessibility and a balanced space allocation • Increase traffic controls to prevent illegal parking • Increase inter- and multi-modality through expansion of car sharing, bike+ride services, qualitative improvements of park+ride locations, introduction of park+bike • Use data for traffic and mobility management • Encourage electric mobility and pilot EV in local bus fleet • Reduce the number of traffic fatalities to zero • Increase knowledge about traffic regulations and improve mobility culture through focused communication and public relations
<p>Logistics measures</p>	<ul style="list-style-type: none"> • Improve motor vehicle traffic/commercial traffic: <ul style="list-style-type: none"> ○ expand the national long-distance roads (motorways and national roads) ○ optimise specific road sections ○ optimise junctions ○ improve the traffic signal timing on individual roads

Source: Bremen

3.2.5 Regional or national frameworks

Germany passed the 2030 Climate Action Programme in October 2019, aiming to reach up to 10 million EVs and 1 million charging stations by 2030. For this, the government is offering several EV incentives which are supplemented by the post-COVID-19 stimulus package of €130 billion. The package allocates significant funding into infrastructure development, tax cuts, and further subsidies to support Germany's EV market.

3.3 Relevant projects

Urban-BRE - electromobile city logistics in Bremen – aims to meet the requirements of today's urban distribution, same-day delivery tendencies, but also the increased environmental requirements. Urban-BRE focuses on the conception and implementation of a modified logistical concept for the last-mile, energy-efficient, climate-friendly and environmentally friendly supply of Bremen city centre and neighbouring districts. Inner-city deliveries of parcels and pallets (general cargo) are being optimized through the introduction of an additional distribution level: a micro hub depot.

GreenCharge (Horizon 2020) is developing a smart charging system that lets people book charging in advance, so that they can easily access the power they need. The pilot in Bremen focuses on combining the promotion of e-cars with car sharing, and the use of stationary batteries to balance peak demand from charging stations. It includes new housing projects built to avoid privately owned cars, charging facilities at intermodal hubs, and the use of second life car batteries as stationary storage.

ART-Forum (Automated Road Transport – Forum for the North Sea Region) develops the impact assessment of Automated Road Transport (ART) and has a capacity building for local and regional authorities in the North Sea Region. The City of Bremen is coordinator of the project.

3.4 Success factors and enabling conditions

- Privileged location and connection by road, railways and waterways
- Experience in implementing new mobility solutions and innovative urban logistics pilots
- Dense urban form which supports sustainable deliveries by cargo bikes
- Well-developed logistics ecosystem, with numerous decentralised hubs and diverse businesses and industries

3.5 Challenges and barriers

- Maintain the balance between accessibility and decarbonisation, while also managing the expectations of diverse stakeholders (e.g., car industries)
- Finding space to develop infrastructure such as micro-hubs in the city centre and other dense urban areas
- Developing sustainable business models

3.6 ULaaDS solutions

The schemes that will be trialled in Bremen are highlighted in bold.

Table 5: ULaaDS schemes that will be trialled in Bremen

Solution	Scheme
1) Collaborative delivery models to enhance logistics efficiency and multimodal mobility in cities	<ol style="list-style-type: none"> 1. Containerised urban last mile delivery 2. Logistical network integration of crowdsourced bike couriers 3. City-wide platform for integrated management of urban logistics
2) Effective integration of passenger and urban freight mobility services and networks (Cargo hitching)	<ol style="list-style-type: none"> 4. Location and infrastructure capacity sharing 5. Transport vehicle capacity sharing

3.6.1 BRE.01 Containerised urban last mile (micro hubs and dedicated cargo-bikes) - Solution 1, Scheme 1

Description

The first ULaaDS trial in Bremen will focus on expanding the number of micro hubs and cargo bike freight transport building on the forerunner project called Urban BRE which run from 2019 to 2021 and was funded by the Bremen Ministry SWAE. Within this forerunner project, a micro hub was set up, from which cargo bikes from the ULaaDS partner company Rytle do the last mile to the inner city. Within ULaaDS, the focus will be on general cargo instead of courier express freight itself and on expanding the number of micro hubs within the city.

Two new locations for micro hubs have been identified on top of the original pre-existing one.

The second micro hub is located in an area neighbouring the inner city, called Viertel. It started operations in July 2021 and the freight volume doubled after two months of operation.

The third micro hub is located in the northern part of the inner city of Bremen called Findorff and operations are planned to kick off in the first semester of 2022.

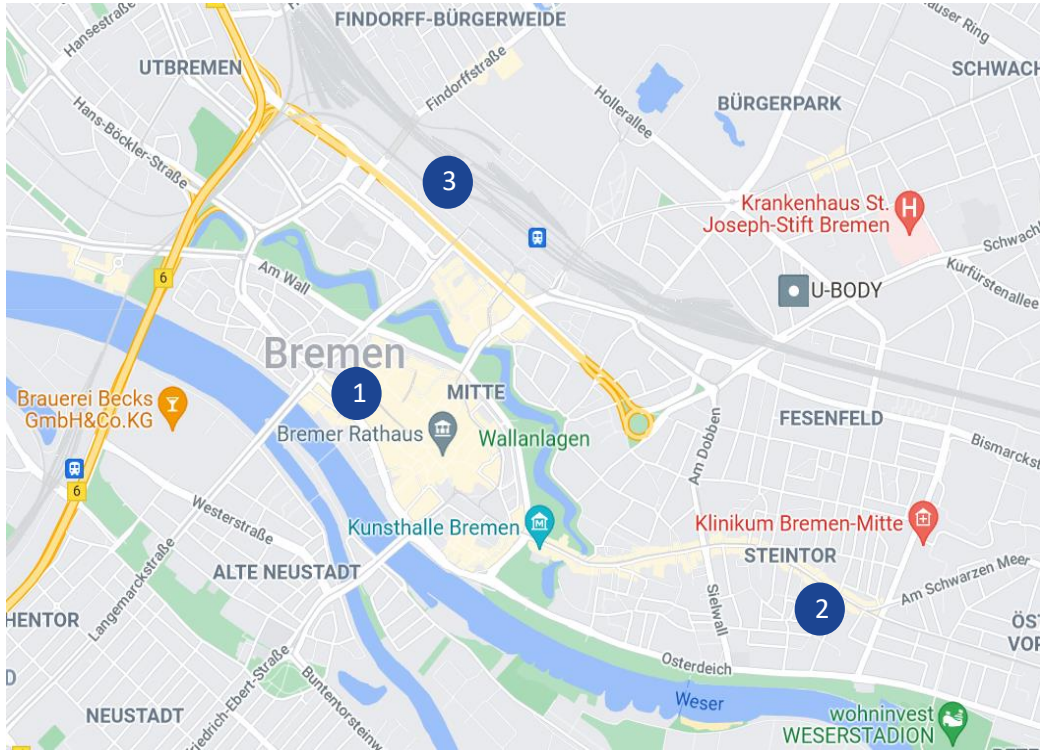


Figure 13 Micro hubs locations in Bremen

ULaaS partner Rytle, is providing the technical solution for the implementation of this trial.



Figure 14 Rytle technical solution – infographic

Bremen will test containerised urban last-mile delivery in this trial by grouping together parcels and general cargo heading towards the same city area. These will be sorted according to the delivery zone already at the warehouse. Then, containers heading to the inner city will be delivered at micro hubs and collected by cargo bikes for the final stretch.



Figure 15 Bremen micro hub and Rytle cargo bikes in action

Objectives

- reducing the number of polluting vehicles entering the city centre
- improving space management thanks to last-mile delivery by cargo-bikes
- increasing the efficiency in the interaction between long distance freight transport and urban freight transport

Timing

Micro hub 1: operational since 2019

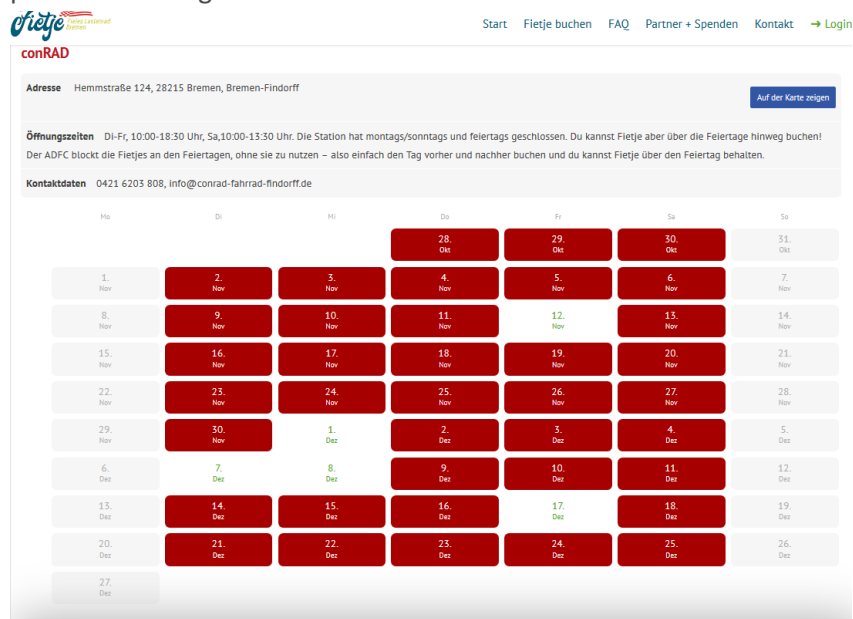
Micro hub 2: operational since July 2021

Micro hub 2: to start operation in the first semester 2022

3.6.2 BRE.02 Private micro-logistics (network of cargo-bike rental-stations) - Solution 2, Scheme 4

Description

The second trial will focus on private logistics. Within the ULaaDS project and together with ADFC, Bremen will install 24/7 cargo bike sharing options for five cargo bikes. This measure can be implemented either together with already offered services or with the city's initiative of a comprehensive city driven cargo bike sharing network that was announced during the ULaaDS project. The city-wide sharing network shall consist of cargo bikes which will be offered for little monetary compensation. Therefore, the ULaaDS solution will be a complementary measure for private micro logistics.



The screenshot shows the 'conRAD' booking interface. At the top, there are navigation links: Start, Fietje buchen, FAQ, Partner + Spenden, Kontakt, and Login. The main content area includes the address 'Hemmnstraße 124, 28215 Bremen, Bremen-Findorff' and a button 'Auf der Karte zeigen'. Below this, the opening hours are listed: 'Di-Fr, 10:00-18:30 Uhr, Sa, 10:00-13:30 Uhr. Die Station hat montags/sonntags und feiertags geschlossen. Du kannst Fietje aber über die Feiertage hinweg buchen! Der ADFC blockt die Fietjes an den Feiertagen, ohne sie zu nutzen – also einfach den Tag vorher und nachher buchen und du kannst Fietje über den Feiertag behalten.' Contact information is also provided: 'Kontakt: 0421 6203 808, info@conrad-fahrrad-findorff.de'. The main part of the interface is a calendar grid showing booking slots for each day from October 28th to December 27th. Most slots are highlighted in red, indicating they are available for booking. Some slots are highlighted in green, indicating they are not available for booking.

In this trial, users will be able to book online their preferred slots to rent the cargo bikes, use them and return them to the rental location once done.

Figure 16 Online cargo bikes booking system – private logistics Bremen

Objectives

- Avoid car trips for private logistics, thus reducing pollution and congestion
- Offer users the possibility to familiarise with cargo bikes without having to invest in purchasing a privately owned one

Timing

The five ULaaDS cargo bikes have been acquired.

The trial is planned to kick off in the first six months of 2022.

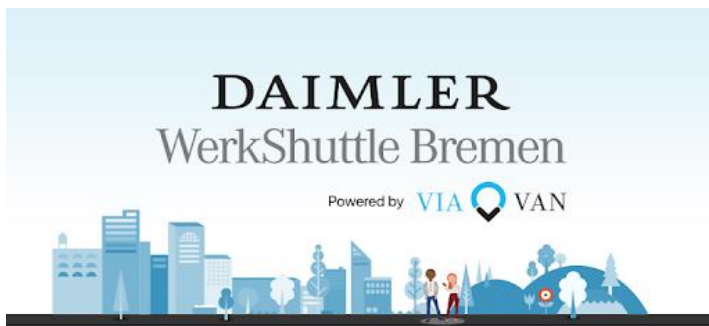


Figure 17 ADFC cargo bikes in Bremen

3.6.3 BRE.03 Cargo-hitching (combined passenger and parcel transport) - Solution 2, Scheme 3

Description

In the third trial Bremen together with Via Van, will test cargo-hitching a scheme meant to combine passenger and freight transport. This trial aims for the reduction of freight transport traffic within the industrial test site by taking advantage of other passenger trips that take place simultaneously. In this trial shared mobility and MaaS (Mobility as a Service) functionalities offer a dynamic solution that increases the level of service provided to businesses and private recipients in the industrial test site.



The trial will build upon existing operation of the “WerkShuttle” within Daimler’s manufacturing plant in Bremen. ULaaDS partner Via Van will adapt their app for on-demand mobility to include the cargo-hitching functionalities.

Objectives

- Increasing network efficiency as a result of higher load factors
- Increasing synergies with other spatial developments
- Limiting environmental emissions
- Increase flexibility and service availability
- Keeping people transportation and freight transportation at socially acceptable levels in an economically viable way



Figure 18 Daimler “WerkShuttle” in Bremen

Timing

The trial is planned to kick off in the first six months of 2022.

4. Groningen



4.1 Local context

4.1.1 City size and context

Groningen is the 6th biggest city in the Netherlands and the biggest city in Northern Netherlands.

About 1.6 million people live in North-Netherlands and the daily urban system of Groningen counts around 500.000 people.

Economic background:

Groningen has no big industries anymore. In the past the province of Groningen used to be called the 'grain republic'. Yet, since this type of agriculture was moved to low-wage countries, agriculture is not a big economic player in Groningen anymore. Nowadays the biggest employers in Groningen have a governmental, educational, and medial background.

Historical background:

Planned in the 1930's and introduced in 1950's, the Bodenterrein is a site (hub) where the carriers from the region parked their trucks and from where they went to pick-up goods in the city centre with their handcart. The Bodenterrein was replaced by a business park at the edge of the city in the 1970's. However, this new site never functioned never well. Nowadays the trucks are back in the city centre to deliver and pick-up goods. From the 1950's onwards the city centre of Groningen needed to be accessible for cars like every western-world city. In 1977 Groningen introduced the 'traffic circulation plan'. Cars were not allowed anymore to pass from one quarter of the inner city to another quarter. This measure against car traffic stimulated cycling and created space for pedestrians in the inner city. Twenty

KEY FIGURES

Population: 230 000 inhabitants

Area: 60 km²

Density: inhab/km²

NUTS level: NUTS 3

TEN-T corridor(s): No

ULaaDS role: lighthouse city

years later, in 1996 the 'Space for space' inner city plan was introduced. This plan focused on the design and use of public space, prioritising pedestrians and cyclists.

Since 2016 Groningen is working on the 'Space for You' inner city plan. With this plan Groningen creates approximately 20% extra space for cyclists, pedestrians and recreational activities. Main measures are taking two bus routes out of the city centre, and replacing the asphalt lane by a street wide space for cyclists, pedestrians and recreation. Measures on logistics traffic are also part of the comprehensive approach of the plan 'Space for You'. In 2014 Groningen signed the national *Green Deal Zero Emission City logistics 2025* (GD ZES 2025 in Dutch) and in 2017 set up the *Focus Group Sustainable Logistics Groningen* with representatives of all stakeholder groups. After one year all members of the Focus Group Sustainable Logistics Groningen signed the Covenant Sustainable Logistics Groningen. In February 2020 the City Board signed the Draft Sustainable Urban Logistics Plan.

Key milestones past and future are:

- March 2021: adoption of the Sustainable Urban Logistics Plan by the City Council
- 2022: Expansion of the delivery time window
- 2025: implementation of the Zero Emission Zone (ZES) for Logistics

4.1.2 Geography

Groningen is a growing city in a shrinking region. Residents of the region depend more and more on the city. Meanwhile, the residents in the city face an increasingly busy city. Its location in North-Netherlands places the city at a relatively long distance to national oriented warehouses. The distance to the warehouses of national cooperating businesses is mostly too big to be covered by electric vehicles, while most other Dutch Cities are in a feasible distance from those warehouses.

In the Northern Netherlands, the three northern provinces and the four largest cities (Groningen, Leeuwarden, Emmen and Assen) have set a joint ambition for an emission-free Northern Netherlands by 2035. For logistics, this means that everything within the sphere of influence of the government, must be emission-free by 2035. More logistics over rail and waterways can make a major contribution to this. This ambition is further elaborated in the joint Logistics North agenda.

Groningen is not connected to the TEN-T-Network. NUT level 3, NL113

4.1.3 Population

Groningen is a vibrant student city, with the youngest average age of inhabitants in the Netherlands.

- Population 2019: 230.000
- Daily Urban System 500.000
- 140.000 jobs
- 60.000 students
- 8.000 international students

- Average age: 36.4 years

4.1.4 Area (km²)

Inner city: 1 km²

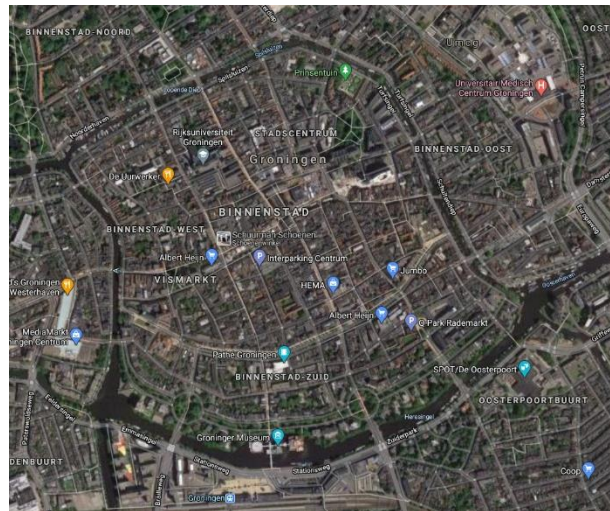


Figure 19 Inner city of Groningen

Urban area: 60 km² (radius of circa 4,5 km around inner city)

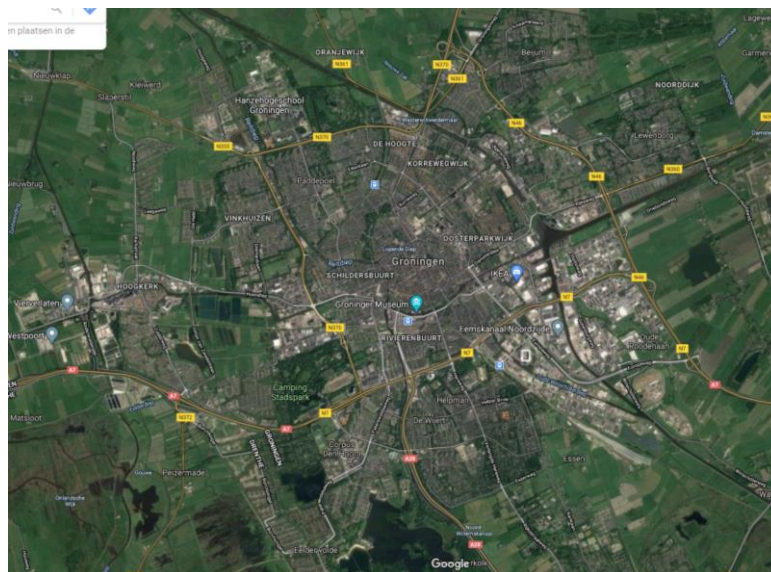


Figure 20 Urban area of Groningen

Peri urban area: 1.200 km² (30km*40 km)

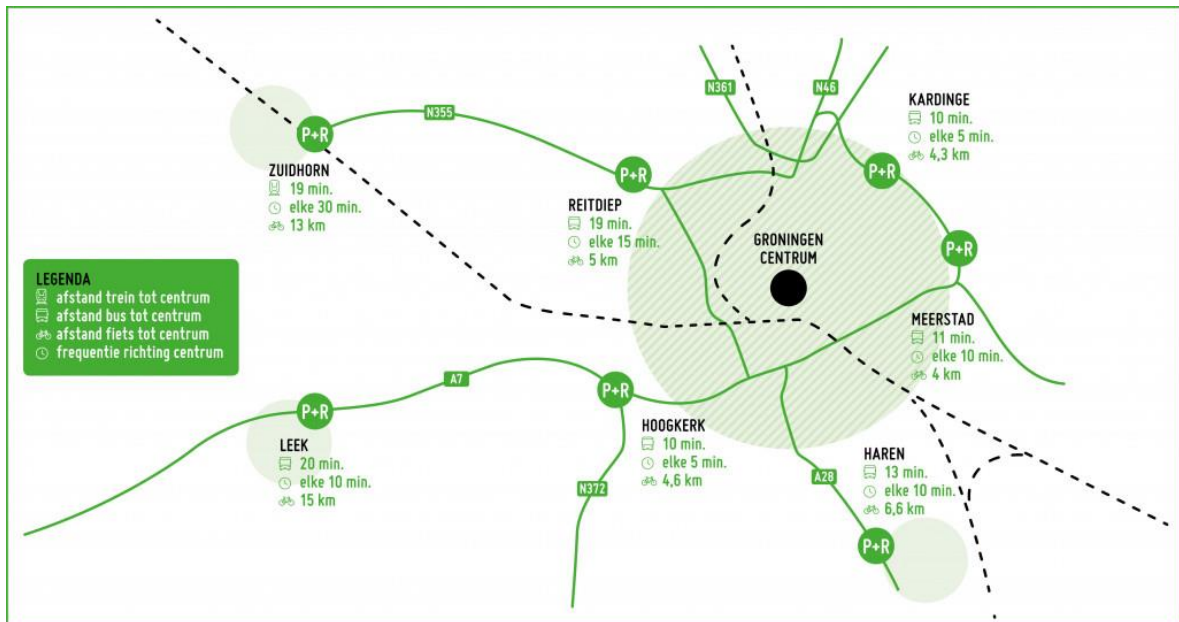
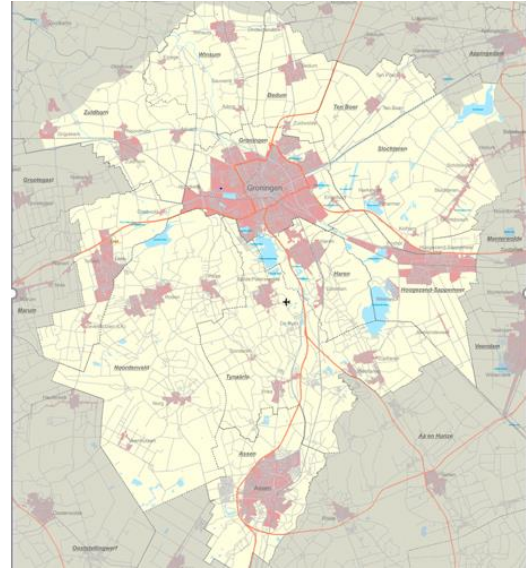


Figure 21 Groningen’s transport network

The peri urban area is home to about 500.000 inhabitants and is connected to the city of Groningen by road and by a public transport network of trains and busses. Park & Rides are located in the outskirts of the city of Groningen for commuters to leave their car and take the bus to different locations in the city.

4.1.5 Modal split

Passenger transport

Table 5: Passenger transport in Groningen.

	All movements (inside, towards and from the Gemeente Groningen) (2014- 2017)	Movements towards and from the Gemeente Groningen (2014-2017)	Movements inside the Gemeente Groningen (2018-2019)
Passenger car	37,4	68,1	22,8
Driver	27,4	51,8	15,6
Passenger	9,9	16,2	7,2
Public transport	9,0	21,6	2,9
Train	4,9	13,7	
Bus	4,0	7,9	
Bicycle	35,2	6,5	47,2
Other categories	18,5	3,8	27,1
Walking	15,5		25,3
Other	3,0		1,8
Total	100%	100%	100%

Source: Groningen

Logistics

The number of and the ratio between transport vehicles and passenger vehicles in the inner city (with numbers on a daily base on 9 separate locations, not covering all traffic in the inner city)

Table 6: Logistic transport in Groningen.

TOTAL of vehicles in 9 locations of the inner city	passenger vehicle	transport vehicle	van	box truck without trailer	box truck with trailer	truck and trailer	total
Number of vehicles	14572	6246,8	4297	1802	58	90	20819
Percentage	70%	30%	21%	9%	0%	0%	100%

Source: Groningen

4.2 Sustainable Urban Logistics Strategies and Initiatives

4.2.1 Logistics ecosystem

In our city many logistic flows are moving by road, water and rail. Most logistics movements in Groningen take place by road. With the reconstruction of all crossings of the ring road in recent and coming years, we ensure that there are good and direct connections to our business parks. Freight transport by water and rail is relatively marginal within the municipality.

The city of Groningen attracts many visitors, companies and tourists, and therefore also a lot of logistics operators. These logistics companies are usually located at locations in the outskirts of the city of Groningen, but we also see many smaller logistics companies spread across the city. At the Westpoort business park, space is still available for new large-scale companies in the logistics sector. This space is also badly needed for the transition towards sustainable, future-proof logistics.

In the city centre of Groningen, we see that city logistics is often accompanied by congestion, unsafe traffic situations for pedestrians and cyclists, noise nuisance and air quality issues. That is why we are committed to reducing and making logistics flows more sustainable.

4.2.2 Decentralised warehouse(s) / distribution centre(s) description

There are various depots in Groningen from which logistics are organised. Parcel services such as PostNL and DHL, for example, have small and larger hubs spread across the city. Moving companies and food wholesalers also function as a 'hub'.

4.2.3 Existing urban logistics solutions

Table 7: Existing urban logistics solutions in Groningen

	Total	Description
Cargo bike schemes	6	<ul style="list-style-type: none"> - Governmental: Cargo Bikes have free access to the city centre outside the time windows frame. - Governmental: Express service between buildings owned by the municipality are done by cargo bikes - Governmental + commercial: warenhuis.groningen.nl (online platform for 200+ local shops). Deliveries are done by cargo bikes within the municipality. - Governmental: the city offers two cargo bikes for bringing bulky waste to the waste depots. - Commercial: Stadswerkplaats offers rental cargo bikes for consumers and companies. - Semi-governmental: Groningen Bereikbaar offers free testing of cargo bikes for local businesses.

		- Commercial: several local businesses organise their own transport and deliveries via cargo bikes.
Electric cargo bikes	20	Gemeente Groningen (2) DHL (5) CityE (3) Dropper (3) Cool Blue (2) Dolmans (cleaning company) (5) (non-exhaustive number)
Mobility Hubs	10	Stadlogistiek Groningen Dropper Cycloon PostNL DHL AZ-Express Foodhubs: Hanos, Bidfood Zernike-hub(University) UMCG (hospital) hub
Bicycle couriers	4 companies	Cycloon (40 bicycles) Dropper (private couriers) Go Fast (3 bikes, staff of 4) CityE (2 bikes)
E-vans		Koopmans Transmission DHL PostNL Cycloon Gemeente Groningen CWS Boonstra (Probably more)
Smart Lockers	1	Decathlon / PostNL
Others (please specify and add as many lines as you wish)		Grokaalbox Bezorgbakkie (fresh food market deliveries)

Source: Groningen

4.2.4 Supporting policies for sustainable urban logistics

SULP. The Municipality has drawn up their strategy to reduce freight and delivery traffic in the inner city centre in a concept plan - 'Ruimte voor Zero Emissie Stadslogistiek' (Space for Zero Emissions City

Logistics)¹¹. The overall goal is to improve air quality and the liveability of the city, thereby creating more space for people, pedestrians and cyclists. Together with the transport sector, businesses and retail organisations, Groningen's authorities have designed a strategy to significantly decrease congestion caused by deliveries, particularly in the narrow streets of the historic centre. The plan functions as a SULP and was approved by the City Council in Q1 in 2021.

SUMP. Groningen has also worked on a mobility vision which was presented as a SUMP in 2021.¹²

Vision Space for Zero Emission City Logistics: in the coming years, Groningen will focus on the transition to more efficient and cleaner city logistics. In 2014, the city already expressed its support for emission-free city logistics by 2025, by signing the *Green Deal Zero Emission City Logistics* and gave substance to this with the *Vision Space for Zero Emission City Logistics*. The following measures are central to the vision.

The following key deliverables will be described in our approved document for urban logistics:

- 1a. Expanding the time-window area in 2022
- 1b. Introducing a Zero-Emission zone for urban logistics in 2025
2. Introducing digital enforcement in 2022
3. Smart and strict exemptions policy in 2022

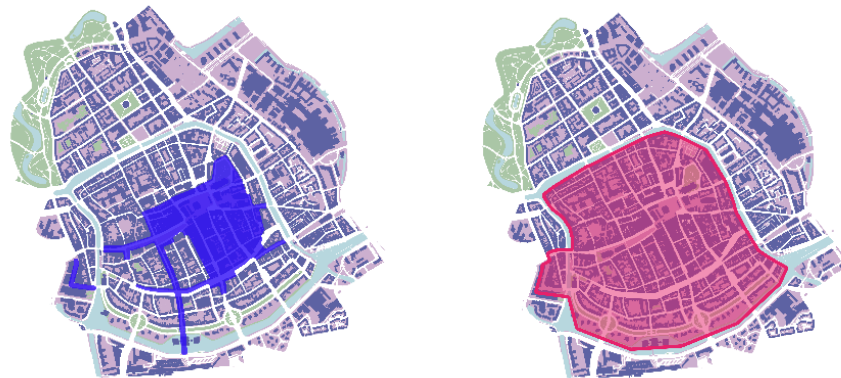


Figure 22 The current (left) and future (right) time-window area for logistics

In addition to ensuring zero-emission logistics, Groningen also wants to act upon the amount of logistics vehicles in and around the city centre. The city will take a critical look at who is allowed to

¹¹ Groningen 'Ruimte voor Zero Emissie Stadslogistiek' (Space for Zero Emissions City Logistics) 2021. (In Dutch) <https://gemeente.groningen.nl/sites/default/files/Ruimte-Voor-Jou-visiedocument-2021-aanpassing-27-oktober.pdf>

¹² Groningen SUMP, 2021. <https://gemeente.groningen.nl/sites/default/files/Mobiliteitsvisie---Groningen-goed-op-weg-English.pdf>

access and when. With the help of a new logistics traffic enforcement system, the city can provide very targeted access to parties. Groningen aims for a balance between supply traffic and a pleasant living environment for residents and visitors to the city centre.

In recent years there has been considerable growth in smaller forms of logistics transport, partly because more private individuals and companies are opting for online store purchases. This growth is increasingly putting pressure on space availability in the city. To reduce this pressure, Groningen is looking, together with logistics businesses, for more efficient logistics solutions, such as central collection points.

By 2035, Groningen wants all logistics transport flows within the municipality to be zero emissions. The city administration is exploring which measures in shopping centres, residential areas and villages have the potential to stimulate and accelerate the transition to zero emission logistics in these areas. This is done by making wider use of measures that will be implemented for the city centre in the coming years and by introducing new business models for high-volume logistics and supply. New urban areas will be designed in such a way that heavy logistics, for supermarkets and catering, for example, do not have to pierce the neighbourhood deeply.

Groningen sees that logistics service providers itself want to contribute to this transition. However, it is too early to give the market a free hand. The control over which alternatives to allow and not to allows in the city centre is crucial. This is done by:

- Connecting: bringing different parties from the "logistics chain" together, look for suitable locations together with logistics businesses and make it possible to create new, efficient concepts.
- Boosting: helping set up logistics hubs that act as transshipment centres for goods delivered by large long-distance vehicles into small, clean vehicles such as cargo bikes and light electric transport vehicles. In the short term, this requires an active role from the city; in the long term we think we will take a step back and leave initiatives to the market.
- Supporting: helping businesses with the introduction of sharing platforms for logistics vehicles.

Finally, the Focus Group for Urban Logistics convenes three to four times a year under the chairmanship of the City of Groningen. It includes representatives from the Groningen City Club, Koninklijke Horeca Nederland (organisation representing the hospitality industry), market vendors (CVAH), business associations TLN and Evofenedex, TopDutch Logistics, VNO-NCW MKB Noord, the University of Groningen and EnergyExpo. The focus group reflects on policy and projects and liaises with members.

4.2.5 SUMP/SULP at a glance

Table 8: Groningen SUMP and SULP at a glance

City	GRONINGEN
Type of strategy	SUMP, 2021 Space for Zero Emissions City Logistics (SULP, April 2021)

Goals	<ul style="list-style-type: none"> • Reclaim public space and reduce obstacles for pedestrians • Ensure that city logistics fit the size, scale and use of the city’s streets and squares in the city centre, with as little traffic as possible and the shortest possible duration of stay. • Create space for zero emission city logistics by 2025 • Ensure all logistics transport flows within the municipality are zero emissions by 2035
Transport measures (with potential impacts on logistics)	<ul style="list-style-type: none"> • Ensure city centre is free of motorized vehicles between twelve and six • Restrict buses from running straight through the city centre • Provide attractive, clean and safe public spaces, such as streets and squares • Design new urban areas ensuring that heavy logistics do not have to pierce the neighbourhood deeply
Logistics measures	<ul style="list-style-type: none"> • Expand the <i>time-window</i> area for logistics in 2022, and potentially use Automatic Number Plate Recognition • Introduce a Zero-Emission zone for urban logistics in 2025 • Introduce digital enforcement in 2022 • Implement smart and strict exemptions policy in 2022 • Ensure communication and participation of all stakeholders

4.2.6 Regional or national frameworks

There is a Dutch national framework for zero-emission zones for logistics. The Dutch National Climate Agreement sets the goal zero-emission zones in the 30 to 40 largest Dutch cities. The Urban Logistics Implementation Agenda (Uitvoeringsagenda Stadslogistiek) is a further elaboration of the National Climate Agreement (2019). The Implementation Agenda contains further agreements between municipalities, the Ministry of Infrastructure and the Environment, Stichting Natuur & Milieu and sector organisations to jointly work towards zero emission city logistics from 2025. Dutch cities are working with the National government in the Expert Pool on Urban Logistics (SPES) partnership on uniform schemes for the zero-emission zones. On a regional level the three Provinces and four largest cities of the Northern Netherlands set the joint goal for zero-emission logistics in the whole Northern Netherlands by 2035. In terms of work coordination at the regional level together with other cities and provinces in the Northern Netherlands information on logistics, policies and ongoing projects are shared and presented via a digital platform: www.logistieknoord.nl

Finally, on the national level the Collaborative Project by the Expert Pool on Urban Logistics (SPES) was set up by the Green Deal for Zero-Emission Urban Logistics and the Netherlands Ministry of Infrastructure and Water Management in order to support local authorities with the introduction of zero-emission zones for urban logistics. SPES focuses on preparing for, and managing, the municipal decision-making process for gradually introducing zero emission zones for urban logistics. As part of the SPES project, Groningen is working together in the Northern Netherlands with the Groningen Assen region, the three northern provinces (Groningen, Friesland and Drenthe) and the local authorities of Assen and Leeuwarden. Many of the problems affecting these cities are comparable, and the various parties share their knowledge as much as possible. In Groningen, SPES has been implemented for a project involving businesses on Oude Kijk in’t Jatstraat. The city is exploring ways

together to make this vibrant street, lined with shops, bars and restaurants, an emission-free logistics zone from 2025.

4.3 Relevant projects

Groningen takes part in several projects in the domain of sustainable urban logistics, such as:

SURFLOGH: *Smart Urban Freight Logistics Hubs (Interreg)*. Core challenge of the project is to achieve a more efficient cargo distribution in urban areas, and thereby maintain efficiency in long distance transport. To promote efficient logistics sustainably, the focus is on optimising the interaction between hubs and urban logistics systems in smaller and medium-sized cities and city networks.

FCCP: *Fuel Cell Cargo Pedelecs*. Due to the constantly and rapidly increasing e-commerce, more and more goods are delivered in small quantities to individual postboxes instead of the consolidated transport of huge volumes to large shopping centres. Therefore, the project partners from logistic services, online retailers, research institutes and currently four partner cities (Aberdeen, Groningen, The Hague and Stuttgart) develop together a logistic concept, which is tailor made for the requirements of today's "Last Mile"- deliveries and the performance specifications of the fuel cell technology.

SMILES: *Shared connectivity in Mobility and Logistics Enable Sustainability (NWO, TKI Dinalog, Ministerie van Infrastructuur en Waterstaat)*. Societal challenges such as the greenhouse effect and an increasing population invite us to rethink logistics systems. In this project we focus on open-sharing networks based on the architecture of the 'Physical Internet'. In such systems, stakeholders can share tasks (transport orders), resources (vehicles, personnel, 3D printers), information (data, algorithms), space (infrastructure, buildings) and responsibilities (contracts, risks, rights, liabilities) depending on their preferences and their business.

Hive.Mobility is the innovation centre in the field of mobility in Northern Netherlands. Here we work together on the development of smart and green solutions in the field of mobility for passenger and freight transport. One of the spearheads of hive.mobility is organising (city) logistics differently. This requires more cooperation between the business community, government and consumers. This is done, among other things, within the Green Deal Zero Emission City Logistics (GDzes). Within GDzes it has been agreed that by 2025 the city centres will be served by emission-free vehicles. This is in anticipation of European legislation that states that by 2050 only emission-free vehicles may enter the city. The aim is to reduce CO₂, NO_x and particulate matter emissions from city logistics to zero and to limit traffic noise.

ANPR

In 2019 and 2020 Groningen was running a pilot project involving electronic enforcement using ANPR (Automatic Number Plate Recognition) surveillance cameras in three inner city streets. The results have been promising; the technology performs well and the software is easy to use for employees. Before we can actually start enforcing the new rules, we will need to determine where the cameras will be located, how many cameras are required, who will be responsible for management and maintenance of the cameras and data, and, finally, the changes in the operating processes for exemptions and enforcement.

4.4 Success factors and enabling conditions

Communication and networking activities as well as meetings are key when working on urban logistics. There are many different stakeholders within the logistics chain and it's important to bring them together to develop a shared ambition. The focus group on Urban Logistics in Groningen has worked really well for us. Not only in creating the content of our draft plan but also by involving them in further developing the various deliverables. The Focus Group has been requested to comment on the plan for decision-making purposes, so that the Council will have an objective idea as to the position and interests of the various parties that are and will be faced with the transition to zero emission urban logistics. The members of the Focus Group have been asked to actively share all information with their stakeholders. In conjunction with the members of the Focus Group, the city authorities will be organising several meetings to address in greater depth the content of the draft plan, as well as discuss the ramifications for local businesses, residents and visitors.

On the website www.logistieknoord.nl, up-to-date and useful information regarding Zero-Emission Urban Logistics in Groningen are shared. The website is an initiative of the cities of Groningen, Assen and Leeuwarden together with the provinces of Groningen, Drenthe and Friesland and contains information about 'trailblazers', relevant projects, policy goals and news items. 'Trailblazers' are businesses working with zero emission vehicles or involved in pilot projects designed to create new, smart and effective concepts for sustainable urban logistics.

Last but not least, it's very important to clarify the cities goals and to make freight operators and actors aware of the city's societal goals and long-term sustainability objectives.

4.5 Challenges and barriers

- Availability of affordable zero emission vehicles
- Shortage of investment possibilities, due to the pandemic.
- Uncertain and unclear future perspective
- Lack of technical knowledge / repairs

4.6 ULaaDS solutions

The schemes that will be trialled in Bremen are highlighted in bold.

Table 9: ULaaDS schemes that will be trialled in Groningen

Solution	Scheme
1) Collaborative delivery models to enhance logistics efficiency and multimodal mobility in cities	<ol style="list-style-type: none"> 1. Containerised urban last mile delivery 2. Logistical network integration of crowdsourced bike couriers

	3. City-wide platform for integrated management of urban logistics
2) Effective integration of passenger and urban freight mobility services and networks (Cargo hitching)	4. Location and infrastructure capacity sharing 5. Transport vehicle capacity sharing

4.6.1 GRO.01 Sharing platform for logistics – All solutions and schemes

Description

The city of Groningen (GRO) together with the Groningen City Club (GCC) will join forces in the development and rollout of a platform for the on-demand supply of shops and delivery to consumers. The goal is to develop and promote a platform for shared (zero-emission) vehicles to enable collaborative delivery models for shopkeepers and other entrepreneurs in the city. The main goal is to stimulate a platform that:

- can organize the delivery of orders from multiple shops in the city centre to consumers in the city and its neighbouring peri-urban and rural areas. The deliveries may include possibilities to deliver via mobihubs/parcel lockers, parking garages, offices, hotels etc.
- provides access to multiple zero-emission vehicles for shared use by local shopkeepers and entrepreneurs.



Figure 23 Cargo delivery in Groningen

Objectives

- Increasing the use of cargo bikes and other zero emission vehicles (and decreasing the use of polluting vehicles)
- Increasing the efficiency/use of transport vehicles

- Increasing liveability and safety because of the use of smaller, silent, and clean vehicles
- Giving more target groups the opportunity to use electric vehicles
- Reducing CO2 emissions

Timing

Preparation phase: started in November 2020

Piloting phase: started in January 2022

4.6.2 Urban Logistics as a Service for commuters – Solution 2, schemes 4 and 5

Description

In this trial Groningen will add urban logistics services to the Park and Ride (P&R) location Hoogkerk, just outside the city. This P&R location is used by commuters to park their car and take the bike, bus or taxi to the city centre. The ULaaDS trial focusses on two logistics services:

A. Parcel lockers at the hubs in the peri urban region

1. Commuters travel from the city centre to the multimodal hubs by public transport or bicycle
2. At the hub the parcel will be picked up from the lockers by the commuter
3. The parcel is taken home by car / bicycle by the commuter



Figure 24 Park and Ride (P&R) location Hoogkerk in Groningen and parcel lockers

B. A collective service for delivery of goods for inner-city entrepreneurs who will no longer be allowed to enter the inner city with their own car (2025).

1. The shop owner drives from home to the hub, delivers their goods and parks their car
2. The shop owner travels to their shop by bicycle or public transport

3. The goods of different shops are bundled and delivered (with zero emission transport) from the hub to the shops
4. The service also applies to the "first mile" (goods sent via e-commerce from shops in the inner city to customers)

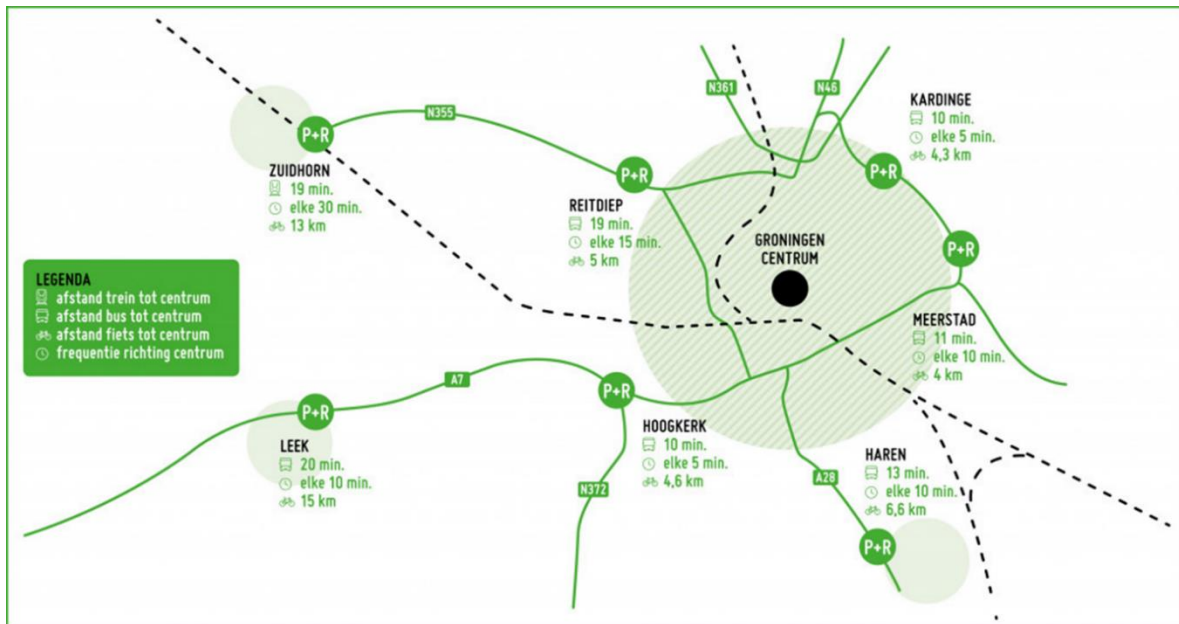


Figure 25 Park and Ride sites distribution in Groningen

Objectives

- Increasing the use of existing multimodal hubs by adding logistics services
- Increasing the satisfaction of people using the multimodal hubs
- Increasing liveability and safety in neighbourhoods by decreasing of the amount of delivery vans in neighbourhoods
- Reducing of CO2 emissions

Timing

Preparation phase: started in November 2020

Piloting phase: starts in January 2022

5. Alba Iulia Municipality



5.1 Local context

5.1.1 City size and context

Alba Iulia, the capital city of the Alba county in Romania, has a total population of 63,536 inhabitants (2011 Census). Alba Iulia Municipality is the local public administration which strives for the sustainable development and well-being of its local community. Its vision is to become a more attractive city to live, work, and invest in by 2020. Four strategic objectives were defined to achieve this vision:

1. Alba Iulia - a smart, accessible, and cohesive city,
2. Alba Iulia - a green city with efficient public services
3. Alba Iulia - a competitive and creative city, and
4. Alba Iulia - a European cultural and tourist attraction.

A short video regarding the local strategic development can be watched [here](#).

The Municipalities' goals in terms of local sustainable transport are defined under the strategic objective 1. Alba Iulia - a smart, accessible, and cohesive city and encompass:

- The development and modernisation of regional and national infrastructure;

KEY FIGURES

Population: 63,536 inhabitants

Area: 104 km²

Density: 610 inhab/km²

NUTS level: NUTS 3 (County)

TEN-T corridor(s): Rhine-Danube corridor (15km far)

ULaaDS role: satellite city

- The development of an efficient and sustainable public transport system;
- The implementation of intelligent transport systems.

Alba Iulia Intercommunity Development Association – Local Transportation (acronym AIDA–TL) is an association of 7 local administrative-territorial units (Alba Iulia and 6 surrounding villages) which aims to ensure a metropolitan passenger transportation system. The AIDA-TL area can be considered as Functional Urban Area of Alba Iulia. The local public transportation service is outsourced and managed by a private operator since 2012. The association is providing an integrated public passenger transport, interconnected transport services within a well-defined geographical area, with a single information provider service, a unique charging system, and a single transportation schedule, in accordance with the EC Regulation no. 1370/2007. The local public transportation is one of the most modern in the country and recognized at the European level.¹³ Besides public transportation, there are also private operators in AIDA areal, as there are many daily commuters who live in the surrounding villages and work in Alba Iulia.

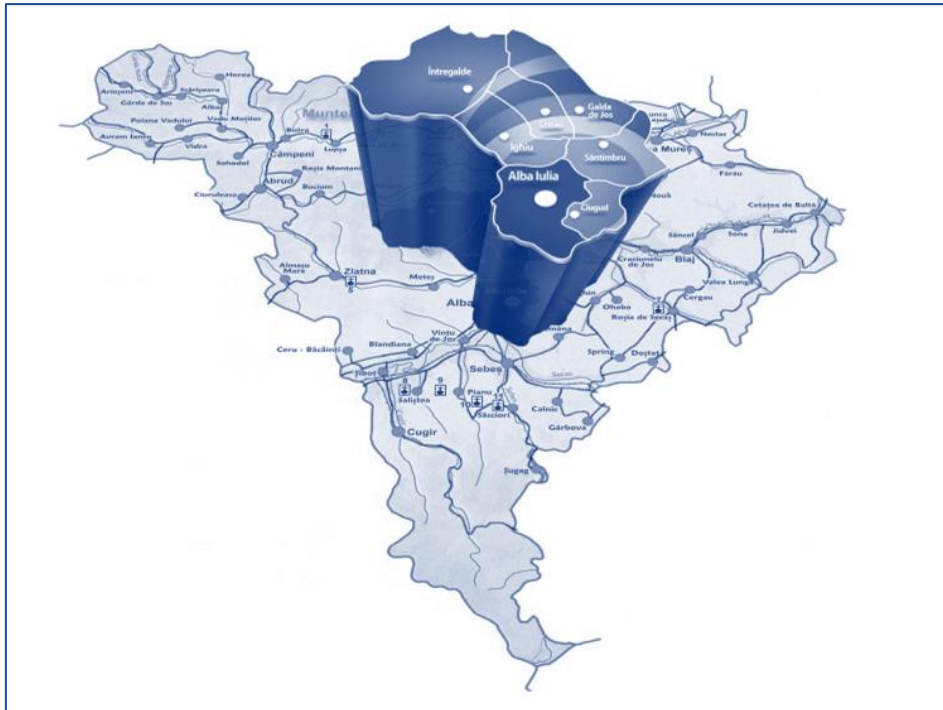


Figure 26 Metropolitan transport in AIDA region (Alba Iulia, Ciugud, Sântimbru, Ighiu, Cricău, Galda de Jos and Întregalde)

Source: https://www.stpalba.ro/sitenou/transport_metropolitan.php?lang=en

¹³ IRU Bus Excellence Award 2013.

http://www.busandcoach.travel/de/smart_policies/smart_awards/winners/2013.htm

5.1.2 Geography

Alba Iulia is the capital city of Alba County (NUTS 3), located within the Centre Region (NUTS 2) of Romania.

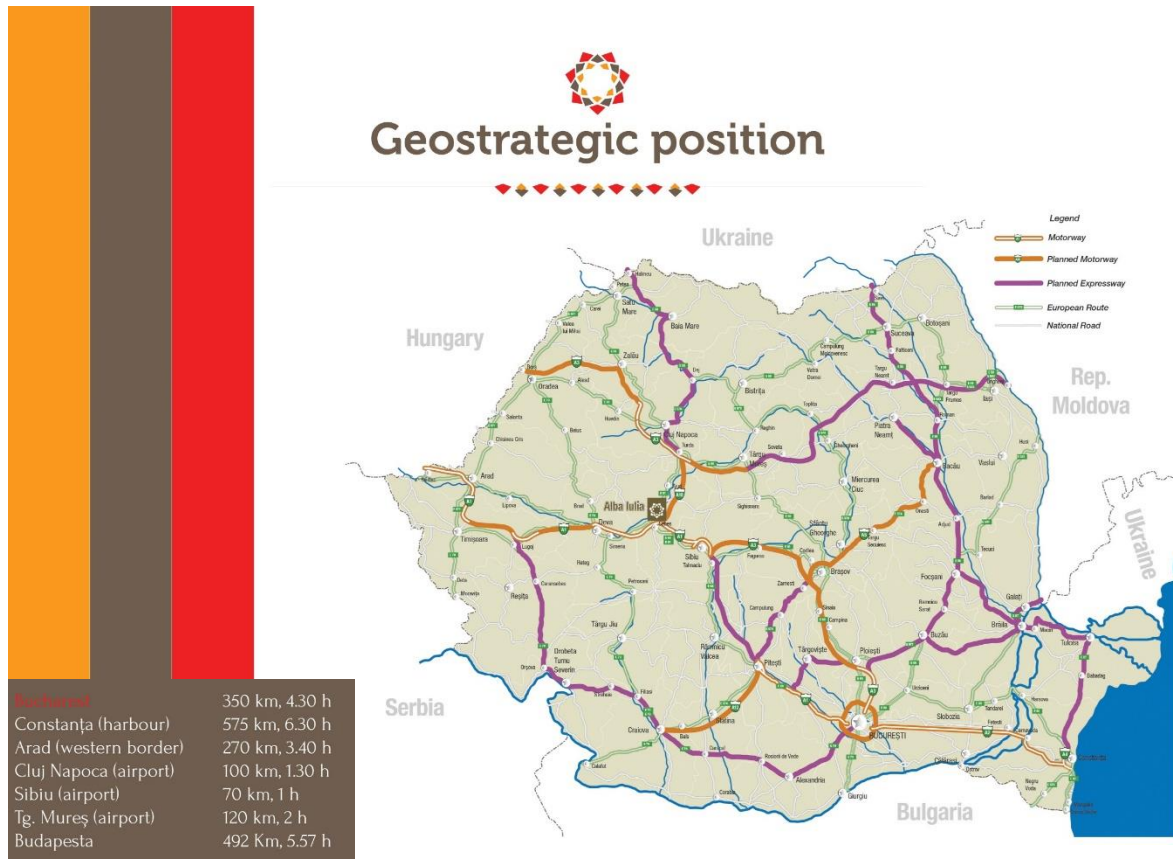


Figure 27 Geostrategic Position of Alba Iulia

Alba Iulia is situated 15km North from the **Rhine-Danube corridor** and crossed by two major highways.

- The **A1 motorway** (link [here](#)) connects Bucharest (the capital city of Romania) with the Western part of the country through Alba Iulia. As the motorway is built along the Trans-European Transport Network Rhine-Danube Corridor, the construction receives 85% funding from the European Union. Currently, the section between Alba Iulia and Sebes (15km from Alba Iulia) and the section between Alba Iulia and Aiud (20km from Alba Iulia) are still under construction. The A1 motorway is being built along the ring road of Alba Iulia and will highly impact the local mobility and transportation, as the traffic will be redirected on the motorway.

- **The A10 motorway** (link [here](#)) connects Sebes and Turda through Alba Iulia. 2 out of 4 sections are still under construction. When the A10 motorway will be finished, Alba Iulia will have two road junctions (one in the North and one in the South part of the city).

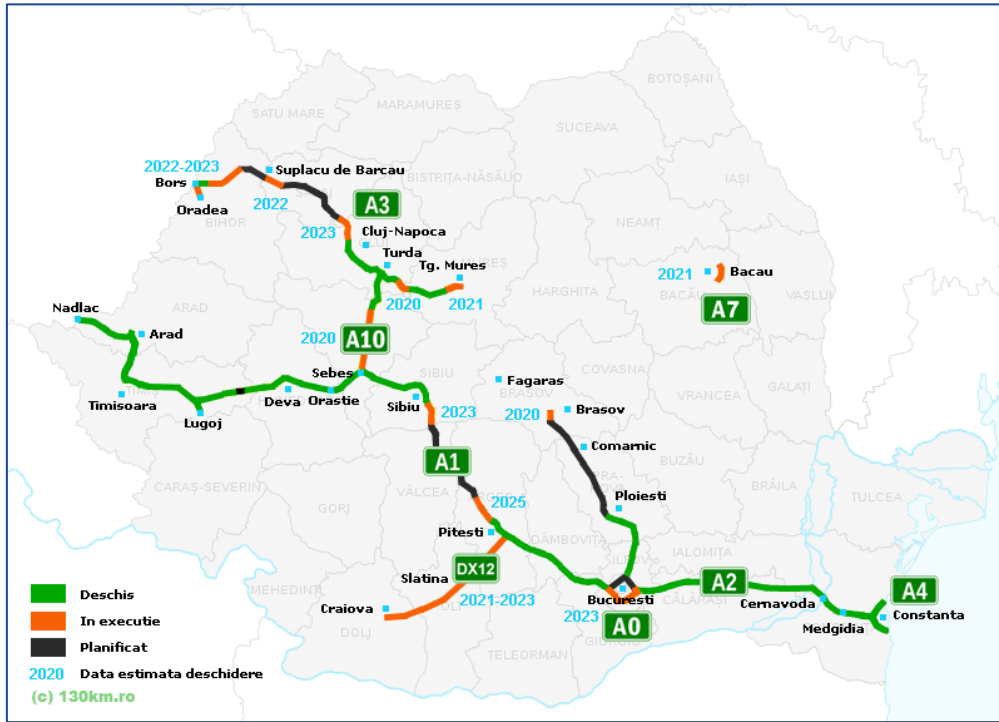


Figure 28 Motorways in Romania

Source: <http://www.130km.ro/romanianhighwaymap.gif>

The existing road and rail transport network at local level guarantees satisfying conditions for the development of the economic and commercial activity as well as for the transport of passengers and the commuting of the workforce. The railway line 200 (link [here](#)) Curtici – Brasov passes through Alba Iulia.

5.1.3 Population

Alba Iulia is the capital of Alba County, with a total population of 63.536 citizens according to the most recent National Census form 2011. Considering its total surface of 104 km², one can estimate a population density around 610 citizens/km². The total population of the AIDA region (FUA) is about 90.000 inhabitants.

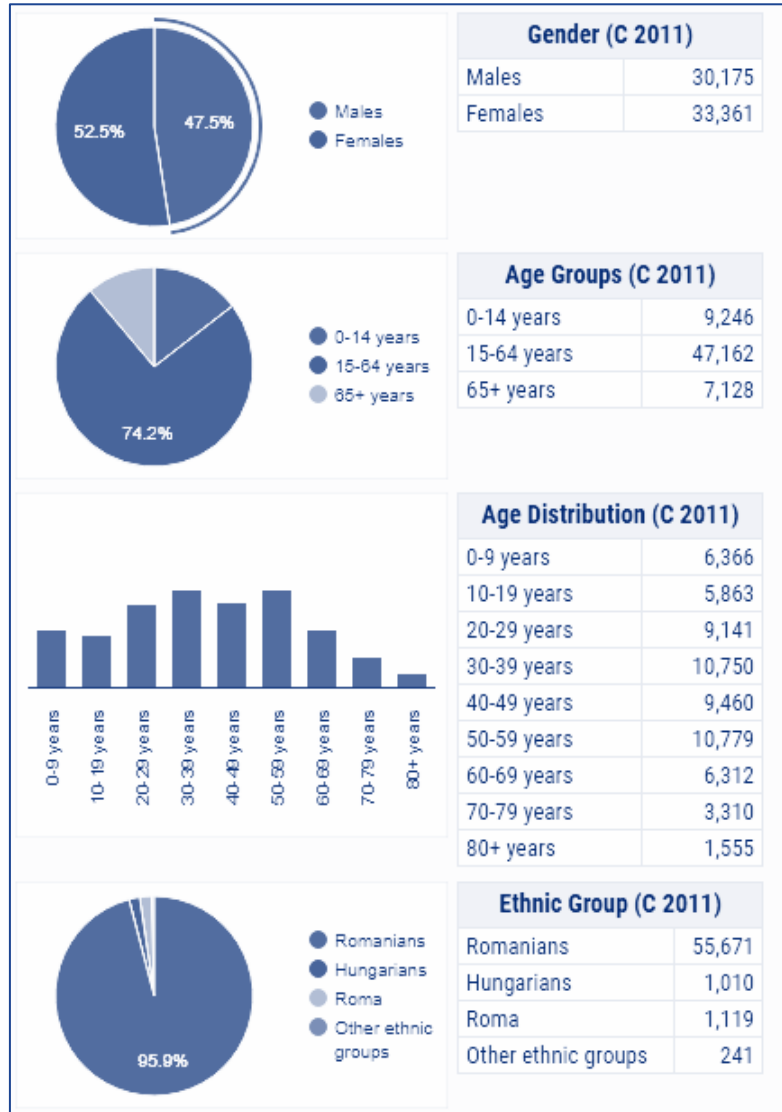


Figure 29 Alba Iulia demographics

Source: https://www.citypopulation.de/en/romania/alba/_/001017__alba_iulia/

The gender distribution of the population at the level of Alba Iulia is unequal (30,175 male and 33,361 female), resulting in a masculinity index of 0.9 (900 men for 1000 women). This gender imbalance is the consequence of the nearly 7-year difference between the average lifespan of women and the average lifespan of men.

Although it is the county capital with a rapid process of demographic ageing, the municipality of Alba Iulia has a relatively good situation in terms of the age structure of the population. According to the 2011 Census, the population aged over 65 years counts for 11% of the total population, which represents a small percentage of elderly people.

5.1.4 Area (km²)

The Area of the Alba Iulia city is 104 km² large, while the AIDA areal (FUA) reaches approximately 420 km².

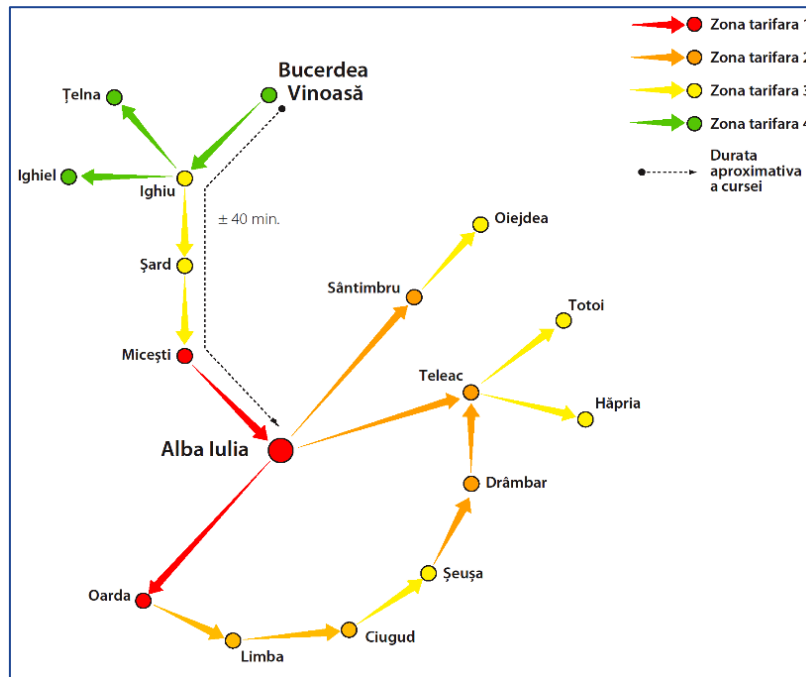


Figure 30 Alba Iulia functional area tariff planning

The existing metropolitan transportation system is managed by public transportation authority (AIDA-TL), divided in 7 administrative-territorial units: Alba Iulia Municipality together with Ciugud, Șantimbru, Ighiu, Cricău, Galda de Jos and Întregalde communes as well as one private transportation services provider.

5.1.5 Modal split

Alba Iulia’s current modal split is as follows:

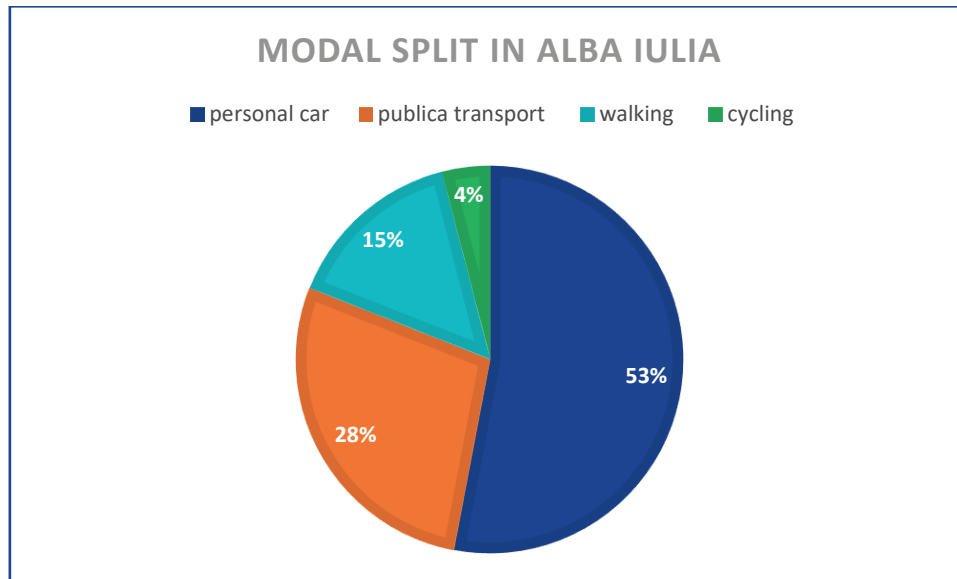


Figure 31 Modal split in Alba Iulia

The private car represents 53% of the modal split, with a **number of private vehicles registered in Alba Iulia** around **30.425**.

Currently at the city level, the STP Alba sells 2.222.477 bus tickets and 35.131 subscriptions per year and more than 9.500 inhabitants of Alba Iulia regularly use public transport (15% of the total population of Alba Iulia).

- There are **6 private taxi companies** at local level.
- There is **1 electric bus for tourists** operating in Alba Carolina Citadel since 2015.
- The Municipality has **1 electric vehicle** within the existing car fleet and **9 cargo bikes**.
- There is **1 private bike-sharing centre** in the city (I-Velo).
- **Total number of the public transportation means (buses and minivans) in Alba Iulia: 55**
- **Total number of the public transportation means at AIDA level: 77**
- **Number of means of transport adapted for persons with disabilities: 37**
- **Number of bus stops in Alba Iulia: 98**

Regarding the street network, the total length of streets in Alba Iulia (including private roads) is around **310km**, out of which 46% represent renovated roads, 9% represent cobbled roads and 45% represent ground roads. the

- **Total length of streets at the level of AIDA region: 455,60 km**
- **Total length of public bus/minivan routes in Alba Iulia: 52 km**
- **Total length of public bus/minivan routes at the level of AIDA region: 156 km**
- **Total length of bike lanes in Alba Iulia: 19 km**
- **Total length of bike lanes at the level of AIDA region: 26 km**
- **Total number of parking lots in Alba Iulia: 7.854**

However, at the end of 2022, to the above-mentioned figures, the Municipality will **add** the following outputs:

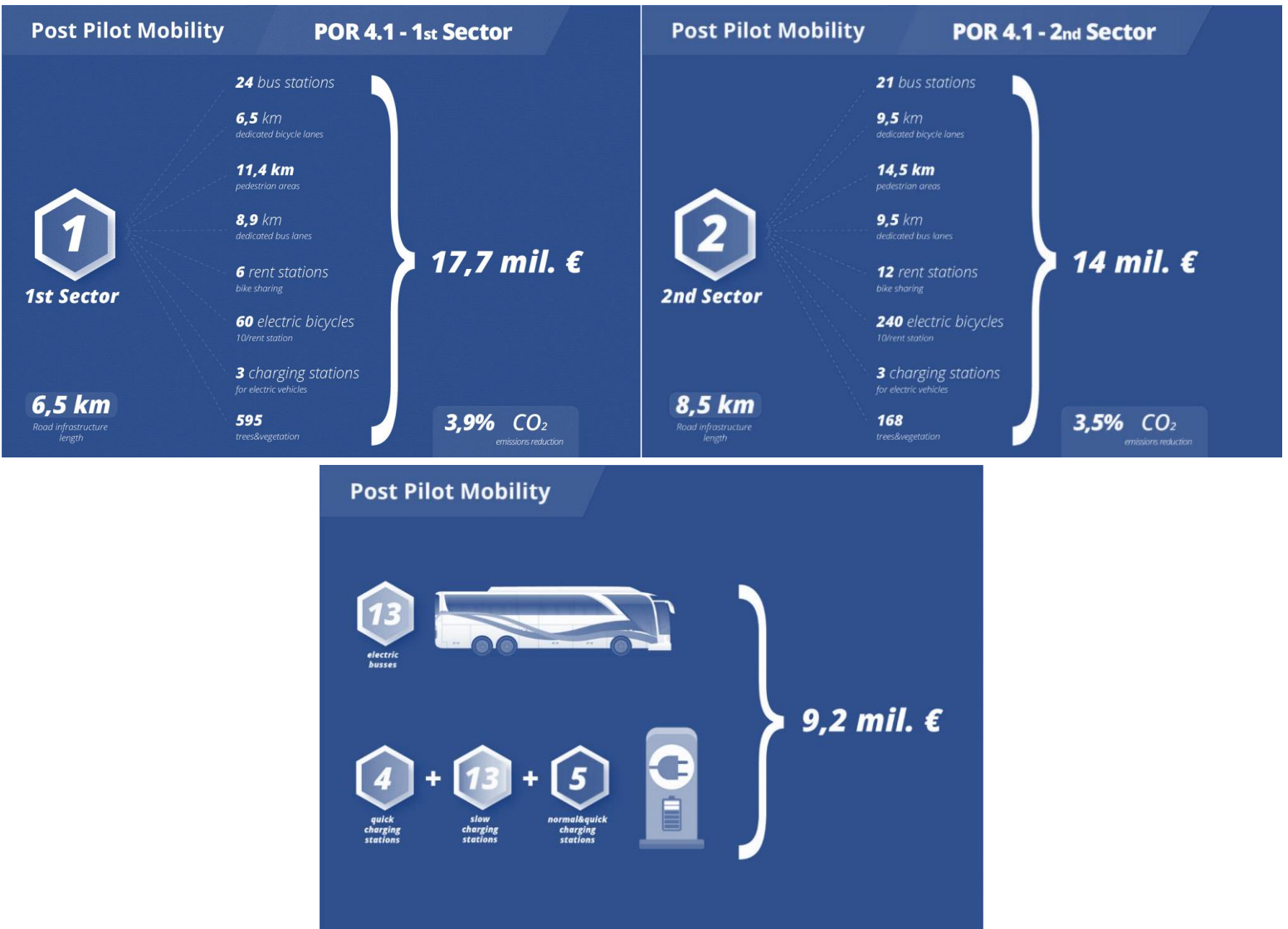


Figure 32 Alba Iulia Mobility projections for 2022

5.2 Sustainable Urban Logistics Strategies and Initiatives

5.2.1 Logistics ecosystem

The city logistics network of Alba Iulia Municipality:

With respect to the local freight transport, the private companies own and manage their physical warehouses/storages. Most of the warehouses are situated along the bypass road which is located at the South-Est part of the city.

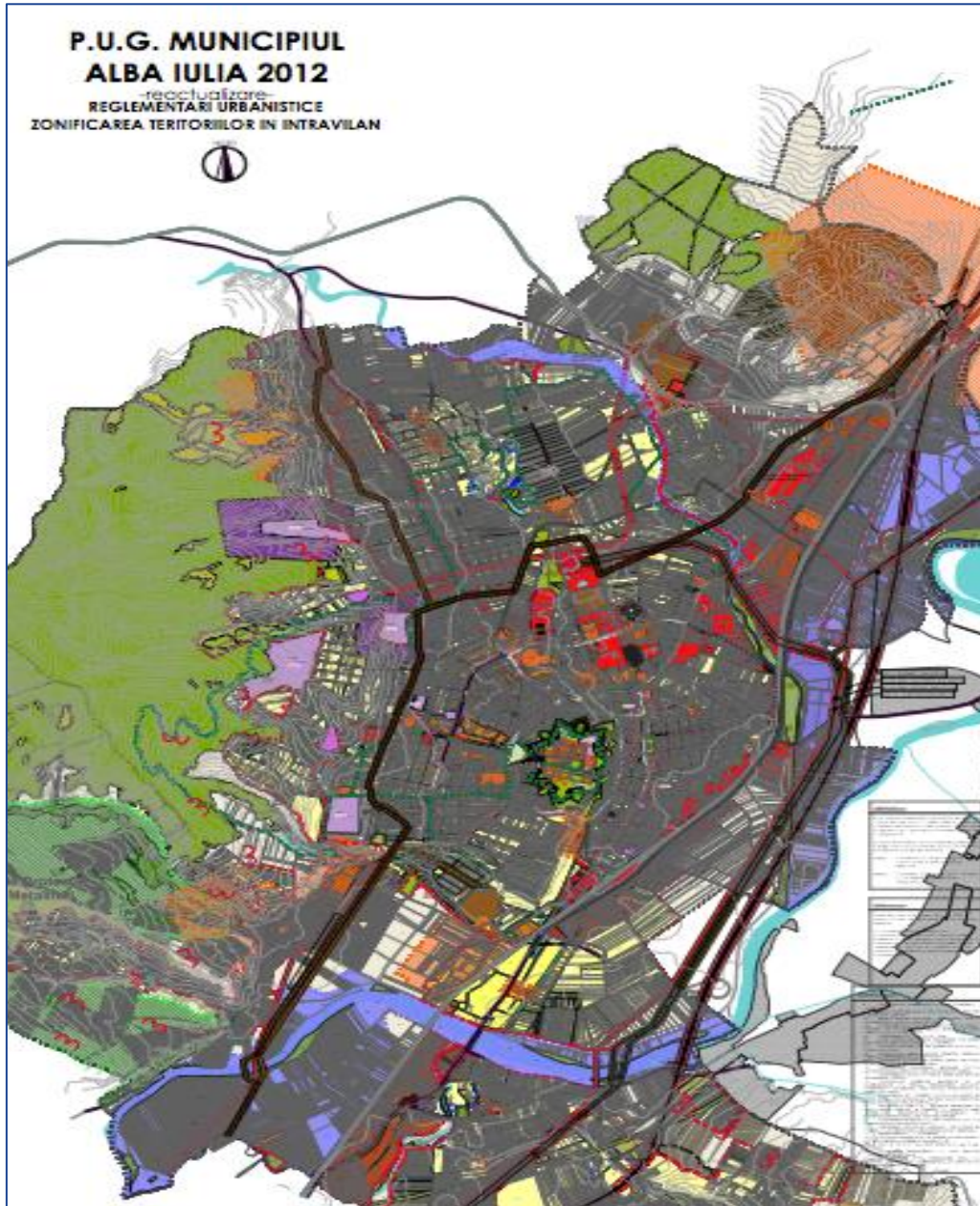


Figure 33 The General Urban Plan of Alba Iulia, 2012

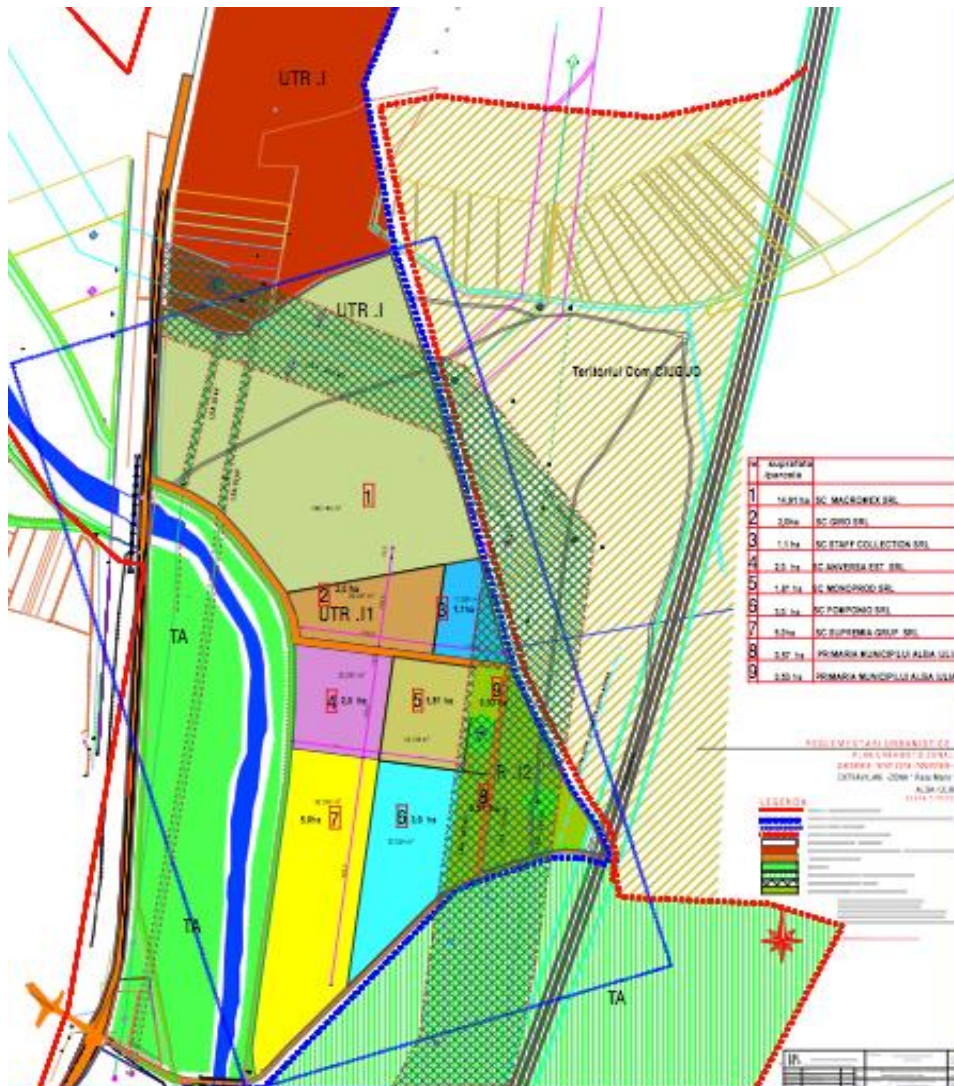


Figure 34 Alba Iulia economic development area

Alba Iulia Economic Development Area covers a surface of 40ha and is located on the East side, across the highway and the ring road that passes by the East side of the city. The Municipality provides investment opportunities for private companies if they comply with several requirements. The mechanism works as follows: The land is provided for free by Alba Iulia City Hall during the operation of an efficient investment in production, services, or logistics. The local administration also assures the necessary utilities and the accesses to the land. With an investment amounting to 5 million €, the investor has the possibility to directly buy the land at a price determined through an independent evaluation at the time of delivering the location for investment and before starting the construction works. The investor must invest at least 1.5 million € in tangible assets and open a working space in Alba Iulia. The submission of a business plan with certain guarantees regarding the investment financing capacity and economic viability, that will be evaluated by a Committee of City Council is mandatory. The investment must start in maximum 18 months after delivery of the land. If the business is sold, the buying company receives the land in the same conditions as the company that

sold it. The area is connected to the existing ring road (which further connects Alba Iulia with Cluj Napoca and Sebeş), Bărbant railway freight yard, Ciugud Industrial Area and the most important railway junction in Transylvania.

This whole area is thus intended for investment purposes only. The intention of the Municipality is to extend the area according to the conditions presented above, by inviting business operators to invest in the given area. The fact that the highway now crosses this area facilitates freight transport within it. One of the main purposes is therefore also to incentivise companies to implement logistic centres there to reduce the freight transport frequency through the city centre.

5.2.2 Decentralised warehouse(s) / distribution centre(s) description

According to the Sulp of Alba Iulia, there are certain areas where such platforms already exist, and which could be modernized and extended. There are also areas where such new platforms could be created, such as:

- "ICRA" Platform - with the possibility of expansion and modernisation;
- The former Refractara factory;
- The former "Utilajul" plant;
- In Cetate district, in the area of the ammunitions warehouse;
- In the development area along the existing bypass road;
- In the development area of the exit to Sebeş, on the right side, before the area known as "Three bridges".

All these platforms would benefit from excellent railway links to the main traffic routes and to the existing NR1 and NR74 as well as those planned in the near future - the Sebes - Turda motorway or the western bypass road as laid down in the General Urban Development Plan.

On the same principle as Consolidation and Distribution Centres, but at a smaller level, small platforms can be created to cater to limited areas on the perimeter of the town. These platforms could receive the goods from carriers so that the last mile to the shops and service providers could be travelled by small vehicles, environmentally friendly, such as carts or bicycles specifically designed for the delivery of goods. This would significantly reduce the flow of logistics in residential, administrative, or business areas in the town.

5.2.3 Existing urban logistic solutions

Table 10: Existing urban logistics solutions in Alba Iulia

	Total	Description
Cargo bike schemes	1	The Municipality owns 9 individual cargo bikes which are used in public events. The cargo bikes are not used by the residents due to high prices, hilly area, lack of dedicated bike lanes and existing mindsets and preconceptions related to the advantages of using private cars. In about two years from now, after the

	Total	Description
		implementation of the two planned active mobility projects, a cargo bike scheme might become an option to consider.
Mobility Hubs	N/A	Alba Iulia does not have modern mobility hubs. However, one can outline a specific area situated in the city outskirts, where four means of transport meet: the train station, public bus stations (bus terminal), private taxi operators and private transport providers. Also, one can highlight the mobility hub developed within the TInnGO project, where Alba Iulia Municipality is involved as project partner (link here).
Bicycle couriers	1	The private company Glovo (link here) extended its network in Alba Iulia in 2020 in the pandemic context. The services provided by Glovo met the people's need to reduce mobility, by providing home delivery of food, beverage, and other non-food products.
E-vans	N/A	The Municipality does not have E-vans within its public transportation fleet. Yet, to complement the public transportation system, the Municipality will purchase 13 electric buses, 13 slow re-charging stations and 4 fast re-charging stations for buses through the project entitled "Purchase of public transport means - electric buses"

Source: Alba Iulia

5.2.4 Supporting policies for sustainable urban logistics

Alba Iulia Municipality adopted the Sustainable Urban Mobility Plan (SUMP)¹⁴ in 2017, for the period 2016-2030. The document is now being updated and sustainable urban logistics is also envisaged. The six SUMP strategic objectives encompass:

- OS.1 Ensuring the accessibility of all categories of people, including people with disabilities
- OS.2 Ensuring a safe environment for the population
- OS.3 Ensuring an optimal level of accessibility within the locality and within the service area of Alba Iulia
- OS.4 Improving the efficiency of transport services and infrastructure
- OS.5 Implementing integrated systems of territorial use at the level of the area of influence of Alba Iulia municipality
- OS.6 Reducing the needs of motorized transport, reducing the impact on the environment and reducing energy consumption for transport activities.

Back in 2011 Alba Iulia Municipality elaborated a **Sustainable Energy Action Plan (SEAP)**, which was officially assumed by the Local City Council and also by the European Covenant of Mayors Office. In

¹⁴ Alba Iulia SUMP, 2017. <https://www.apulum.ro/index.php/primaria/document/3168>

2014, Alba Iulia Municipality elaborated a **Sustainable Urban Logistic Plan (SULP)**, which is based on identifying feasible solutions for the local implementation of sustainable logistics and energy efficiency measures. The development strategy of Alba Iulia Municipality takes into consideration the implementation of projects which are aiming to enhance the efficiency of urban mobility in the local community. The Municipality adopted the new **Sustainable Energy and Climate Action Plan (SECAP)** in 2019¹⁵.

Additionally, the **Integrated Urban Development Strategy of Alba Iulia Municipality, 2014-2023**¹⁶, constitutes another strategic plan, which is also being updated. The strategy covers both the general management of the city and the general development in the short, medium and long term. The general objectives of the strategy refer to a sustainable and smart growth and an economic competitiveness, considering an intervention area which aims to strengthen and develop ICT infrastructure for the population of Alba Iulia and the tourists visiting the city, together with a sustainable development of the cultural and business tourism and with an efficient use of city branding strategies for consolidating the position of Alba Iulia as a tourist destination of excellence.

Another strategic document is the Smart city Strategy for Alba Iulia, which is still in the making. The strategy will be finished next year and will set out the strategic development of Alba Iulia on its path to becoming a smart city. 11 smart relevant areas are analysed, smart projects are proposed to the municipality, as well as relevant funding sources.

5.2.5 SUMP and SULP at a glance

Table 11: Alba Iulia SUMP and SULP at a glance

City	ALBA IULIA
Type of strategy	SUMP (2017, new one currently developed following the 2019 Sustainable Energy and Climate Action Plan) SULP (2014)
Goals	<p>SUMP</p> <ul style="list-style-type: none"> • Ensure the accessibility of all categories of people, including people with disabilities • Ensure a safe environment for the population • Ensure an optimal level of accessibility within the locality and within the service area of Alba Iulia • Improve the efficiency of transport services and infrastructure • Implement integrated systems of territorial use at the level of the area of influence of Alba Iulia municipality • Reduce the needs of motorised transport, reducing the impact on the environment and the energy consumption for transport activities

¹⁵ Alba Iulia Sustainable Energy and Climate Action Plan (SECAP), 2019.

<https://www.apulum.ro/index.php/primaria/document/4953>

¹⁶ Integrated Urban Development Strategy of Alba Iulia Municipality, 2014-2023.

<https://www.apulum.ro/index.php/primaria/document/3597>

	<p>SULP (objectives outlined in SUMP)</p> <ul style="list-style-type: none"> • Facilitating the freight industry in obtaining support of national authorities • Improve travel times of vehicles transporting goods • Assist freight drivers and reduce number of trips and kilometres travelled • Assist freight companies at loading, delivery and collection points • Reduce the environmental impact and the risk of accidents involving freight vehicles
<p>Transport measures (with potential impacts on logistics)</p> <p>Authority level specified in brackets (L = local, R = regional, N = national)</p>	<ul style="list-style-type: none"> • Remodel and resize the street network (including sidewalks, roads and dedicated lanes), following regulations set by the National Road Administration (L) • Develop and extend street network, integrating it with the public lightning system, traffic lights & intelligent public transport systems (L) • Streamline city traffic at peak hours (L) • Prohibit parking on main arteries & create differential parking rates • Improve rural-urban mobility connections (L, R) • Modernise and extend intelligent transport systems for public transport (L) • Improve public transport routes in Alba Iulia (L) • Implement an integrated system of landscaped green spaces, interconnected at zonal and local levels (IZL) (L, R) • Implement an integrated parking system for residents and tourists (L) • Implement an integrated bike lane system (L) • Implement an integrated system for public spaces use (L) • Reduce motorised transport through the integrated land use system (L, R)
<p>Logistics measures</p>	<ul style="list-style-type: none"> • ‘Material’ infrastructure: <ul style="list-style-type: none"> ○ Linear measures - connections from the urban transportation network ○ Surface measures - areas of freight transportation and storage operations ○ Install/improve traffic signs, create special lanes for trucks ○ Simplify and harmonise weight, size and building regulations ○ Introduce loading points on street, proximity delivery areas ○ Encourage the use of green vehicles • ‘Immaterial’ infrastructure: <ul style="list-style-type: none"> ○ Use Telematics or Intelligent Transportation Systems (e.g., traffic information systems, route optimization services, etc.) ○ Support freight transportation partnerships ○ Offer information and maps for freight transport ○ Impose road fees ○ Implement time regulations for access and loading of goods for vans and trucks carrying goods & encourage night delivery ○ Standardise regulations on vehicle size, weight and GHG emissions • Provide/improve logistics ‘equipment’: <ul style="list-style-type: none"> ○ Cargo loading units ○ Transportation units (e.g., vehicles using alternative fuels solutions) ○ Urban consolidation centres

5.2.6 Regional and national frameworks

All mobility plans adopted at the local level must be coherent with the Central Development Region's strategies (Regiunea de Dezvoltare Centru)¹⁷.

Any local measure needs to consider the national legal framework, regulations, ordinances related to urban planning and land management, the supply and transportation of divisible goods, on-road transportation and finally national environment protection strategies.

Alba Iulia Municipality is also **member of the Covenant of Mayors** since 2010. By signing the Covenant of Mayors in partnership with the Alba Local Agency for Energy (ALEA), along with the main activities of the Sustainable Energy Action Plan, Alba Iulia engaged itself to reduce with 24% the CO2 emissions until 2020, compared to the reference year 2008. The first initiatives aimed at meeting the European standards for energy efficiency emerged in 2010, when Alba Iulia Municipality decided to join the Covenant of Mayors Initiative promoted by the European Commission. This commitment is the local government's response regarding energy and environment with the intent to counter the challenges posed by the urban development of the municipality in recent years: the environmental pollution induced by accelerated development, the management of the expanding traffic network, the constructions boom, the urban waste management, the need for public utility services of decent quality.

5.3 Relevant projects

Table 12: Relevant projects in Alba Iulia

#	Name of the project	Short description	Relevance to ULaaDS	Funding scheme Start-end
1	Rehabilitation of the major urban public transport infrastructure in Alba Iulia - Sector no. 1 and 2	<p><u>Activities:</u></p> <p>Development of a traffic management system, including all the subsystems (Traffic control machines, modern led lighting system for the traffic lights system within the foreseen conjunctions, detection system)</p> <p>Development of a video surveillance system which provides video traffic information from the e foreseen points of interest.</p> <p>Development of a traffic information system which allows</p>	Improving the local mobility in a sustainable manner	Regional Operational Programme, Priority axis: Supporting sustainable urban development, Operation: Reducing carbon emissions in county municipalities through investment based on sustainable urban mobility plans.

¹⁷ Regional Development Plan for 2014-2020. <https://www.centruregion.com/regional-development-plan-for-2014-2020/?lang=en>

		<p>the transmission of information to citizens through dynamic information panels.</p> <p>Development of an enforcement system in order to increase traffic discipline with beneficial results in terms of road safety.</p> <p>Development/upgrade of the public lighting management in the area of pedestrian crossings and the introduction of a smart system.</p> <p>Development of an electric vehicle power supply system to stimulate the use of private electric vehicles.</p> <p>Development of an automatic bicycle rental system: a total of 6 bicycle rental facilities were provided.</p> <p>Development of a Control centre with 2 subsystems - All systems will be coordinated from the control centre.</p>		<p><i>Start:</i> 2020</p> <p><i>End:</i> 2022</p>
2	Purchase of public transport means - electric buses	Under this project, 13 electric buses, 13 slow re-charging stations and 4 fast re-charging stations for buses will be purchased.	Improving the local mobility in a sustainable manner	The project is funded through a partnership with the Ministry of Regional Development and Public Administration, as a leading partner in the project "Acquisition of public transport means - electric buses", Priority Axis 4 - Support of sustainable urban development, Investment Priority 4e - Promotion of low-carbon strategies for all types of territories, especially for urban areas, including the promotion of

				sustainable multimodal urban mobility and adaptation measures relevant to mitigation, Specific objective 4.1 - Reducing carbon emissions in county-based municipalities through investments based on sustainable urban mobility plans.
3	Re-charging stations for electric vehicles	Development of 5 re-charging stations for electric cars.	Improving the local mobility in a sustainable manner	Environmental Fund Administration, Program concerning reducing greenhouse gas emissions in transport by promoting infrastructure for energy-efficient road transport vehicles: Re-charging stations for electric vehicles in municipalities of county-based financing.
4	Integrated Transport Systems: Transferable tools for Authorities, Acronym SUITS	This project represents a part of the CIVITAS initiative and it is coordinated by the lead partner Coventry University.	The project proposes the implementation of innovative actions with respect to urban mobility area while implementing the Sustainable Urban Mobility Plan at the level of each partner.	<p><i>Funding scheme:</i> HORIZON 2020</p> <p><i>Start:</i> October 2016</p> <p><i>End:</i> October 2019</p>
5	Transport Innovation Gender Observatory, Acronym TInnGO	The project that aims to contribute to the sustainable development of the city by developing intelligent mobility mechanisms with a focus	The project is addressing the current challenges in the area of mobility with priority on the	<p><i>Funding scheme:</i> HORIZON 2020:</p> <p><i>Start:</i></p>

		on promoting women's access to modern mobility services.	current needs of women, creating a route for "Sensitive Gender-sensitive Mobility", thus providing a strong connection with the current project proposal.	December 2018 <i>End:</i> November 2021
6	CityChanger CargoBike CCCB	The project aims to contribute to the sustainable development of the city by using cargo-bicycles as an alternative mean of transporting goods and an efficient tool for personal use for shopping, spending family leisure time etc.	The project contributes to the development of the interconnections of the existing local transportation systems.	<i>Funding scheme:</i> HORIZON 2020: <i>Start:</i> September 2018 - <i>End:</i> August 2021
7	Positive City ExChange - acronym CityxChange	<p>The project will address current challenges in the field of energy efficiency, prioritising current needs of the municipalities.</p> <p>Alba Iulia Municipality, being a follower city in the Positive CityxChange project, the city will try to create the first Positive Energy Building - PEB - within the city. The area is already defined in the Dorin Pavel college complex of buildings. 4 of these buildings are to receive energy from the PVs of the main building to create an energy sustainable mini district.</p> <p>The implementation of the project will be a challenge for the municipality, given the fact that the legal framework is not very well defined at the European level. Most probably the city will brace the prosumer law and use the national grid for energy transportation from a building to another. The main building "loses" almost 100.000 kw/year by putting</p>	The project aims to contribute to the sustainable development of the city by developing intelligent energy efficiency support mechanisms with a focus on promoting smart and innovative neighbourhood solutions.	<i>Funding scheme:</i> HORIZON 2020: <i>Start:</i> November 2018 - <i>End:</i> October 2023

		the electric power back in the national grid.		
8	iVelo bike sharing center	The project resulted as a collaboration between the Municipality and the Green Revolution Association. The project aims as implementing a bike-sharing center, for local citizens and tourists in the city and in the proximities of the city.	The project contributes to the development of the interconnection of the existing local transportation systems.	<i>Funding scheme:</i> private funding <i>Start:</i> 2014 <i>End:</i> present
9	Campaign: recycling with the cargo (Link)	Campaign carried out together with the private sanitation provider for collecting and recycling paper garbage within the local community. Cargo bikes are being used to collect the paper garbage.		<i>Start:</i> 2015

Source: Alba Iulia

As a result of these manifold projects implementations, Alba Iulia has built strong cooperation with local stakeholders.

5.4 Success factors and enabling conditions

Success factors: existing human resources; existing and potential non-reimbursement funding.

Crucial enabling conditions: good, agile leadership within Alba Iulia Municipality; long term vision for a local sustainable development, devoted and skilled staff for a successful project implementation; financial resources.

External stakeholders: local public authorities, STP Alba Iulia (the public transport company), private transport operators, private providers for fast courier delivery services, supermarket and hypermarket administrators, local NGOs and public entities focused on energy efficiency and sustainable urban mobility (Alba Local Energy Agency – ALEA, ADR Centru), representatives of large production companies representatives of local educational sector (“1st of December 1918 Alba Iulia” University, Technical University of Cluj-Napoca – Alba Iulia branch), residents, tour operators/travel agencies.

Other relevant stakeholders: large private companies located in Sebes, a smaller city located at about 15km from Alba Iulia. Sebes is known to have an important industrial area.

5.5 Challenges and barriers

Challenges: changing existing mentalities of the people who should be focused on green alternative solutions related to mobility, raise awareness about the challenges of energy efficient and sustainable urban logistics at local and metropolitan level, re-organisation of some areas with traffic issues,

discouraging ad-hoc parking on high traffic roads with negative effects on traffic safety and on the town's image.

Barriers: lack of financial resources to provide green logistic solutions, lack of a modern development strategy focused on the sustainable urban logistics plan at local level and at AIDA level, lack of knowledge on the topic of urban freight, the lack of a bypass roads in the North, West and South of the city which would pick up the heavy urban traffic, lack of public-private partnerships, lack of freight quality partnerships (between the freight transport industry, the local government, local businesses, local community, environmental groups and other stakeholders), lack of an industrial park. For now the lack of physical cycling infrastructure is a barrier to implement cargo bike solutions, yet in 2 years from now, the new bike lanes and smart bike scheme should facilitate the mentality change and enable new habits and new transport conceptions.

6. Bergen



6.1 Local context

6.1.1 City size and context

Bergen is the second biggest city of Norway and the Greater Bergen region serves as a major trade node of the Western coast of Norway. Located next to the North Sea, the city has a longstanding tradition of maritime industries and trade by sea. Today, both the main port and the railroad terminal are in the city centre, serving goods delivery directly into to city centre and its hinterland. Currently, the city is subject to the modern trend of transforming urban industrial zones into residential and recreational areas, pushing logistic facilities towards the hinterland.

Previously one of the most compact cities of Norway, the release of car sales to private households changed the terms for the city's urban development leading to urban sprawl. Since 2011 Bergen has boosted its effort to create a compact nodal city, with the help of the light rail system that has proven to be a major success in terms of replacing car traffic.

6.1.2 Geography

The city is located on the Western coast of Norway in a rugged and mountainous area, reason why Bergen is called "The City between the seven mountains". The city centre, and most of

KEY FIGURES

Population: 284 000 inhabitants

Area: 465 km²

Density: 600 inhab/km²

NUTS level: NUTS

TEN-T corridor(s):

ULaaDS role: satellite city

its neighbouring boroughs are situated in the narrow Bergen Valley, leaving limited room for improvements of infrastructure for logistics. The European Road E39 and E16 follow the valley floor, allowing goods transport through and to the city, but also generating challenges finding space for new infrastructure for public transport, bicyclists, and pedestrians.

The city's location next to the Atlantic Ocean makes Bergen prone to a wet and mild weather. The climate makes biking possible throughout the year – unlike in many cities on the same latitude. Thus, despite significant amounts of rainfall (a prohibiting factor for many people), there are still several thousand cyclists in the city (4% of the modal split), and the number keeps increasing.

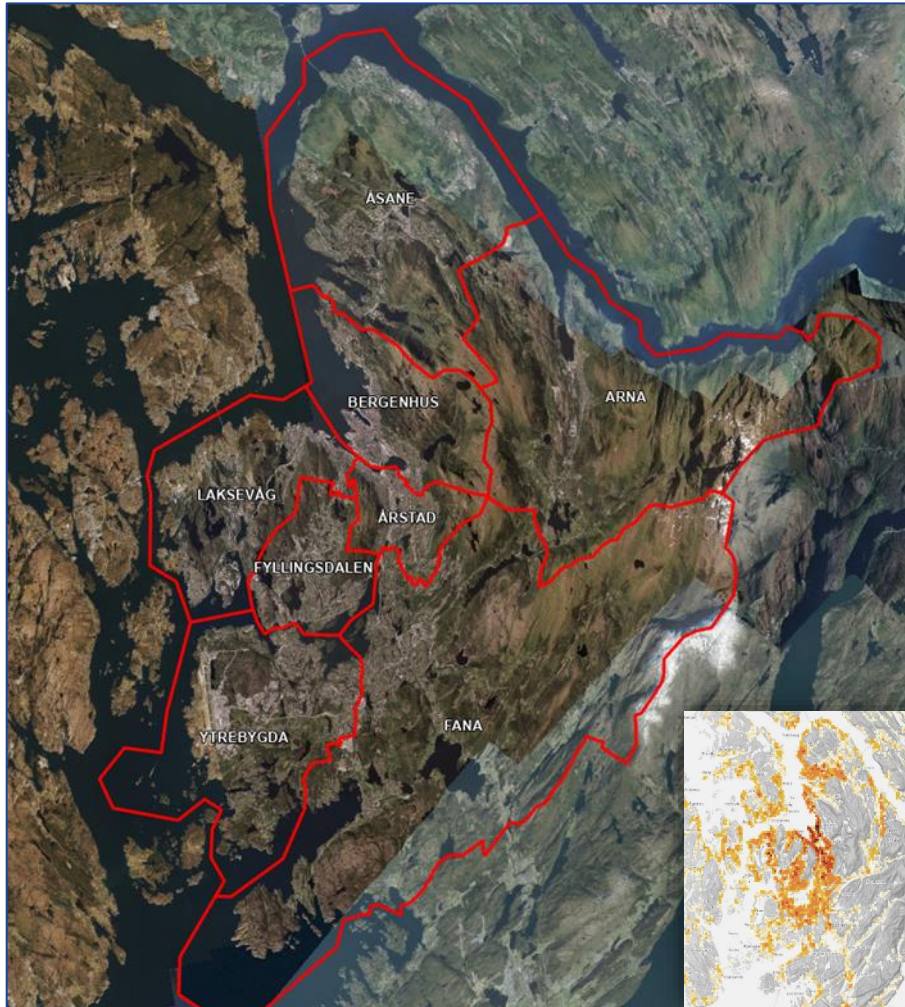


Figure 35 Map of the municipality of Bergen, and the distribution of citizens

Source: bergenskart.no and SSB.no

6.1.3 Population

The municipality of Bergen covers 465 square kilometres and has 284 000 inhabitants, with a density of about 600 people per square kilometre. The city has its own university and university college, and in total 35 000 students populate the city and add to the lively and creative environment of the city. The Greater Bergen region counts about 420 000 inhabitants.

6.1.4 Area (km²)

The municipality of Bergen covers 465 square kilometres. The city centre is located in the borough of Bergenhus (see figure 33), which along with Årstad and the eastern parts of Laksevåg make up the inner part of the city. Åsane, Arna, Laksevåg and Fana were all municipalities of their own until 1972, and to a certain extent they are autonomous with their own nodal centres developed around big city malls today.

The city is surrounded by the municipalities of Alver, Askøy, Øygarden, Bjørnafjorden, Osterøy, Samnanger and Vaksdal whom altogether make up the Greater Bergen region.

6.1.5 Modal split

Citizen's modal split

Since 2018, a travel survey among the citizens of Bergen is performed annually. The recent data shows that 47% percent of the traffic is done by walking, cycling or using public transport. 24 % of the citizens don't own car in Bergen, while 47% have access to one car and 30 % have access to two cars or more. The City of Bergen has one of the highest electric car shares in the world, and the county which Bergen is in had the highest sales of EVs in Norway in 2020 (64,8 % in December 2020). In terms of regular bikes, 55% have access to a regular bike while 6% have access to an electric bike.

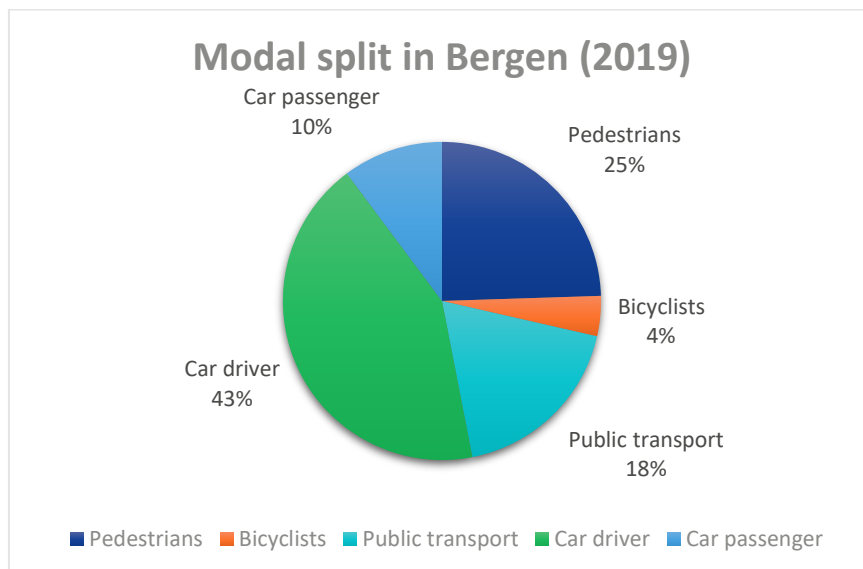
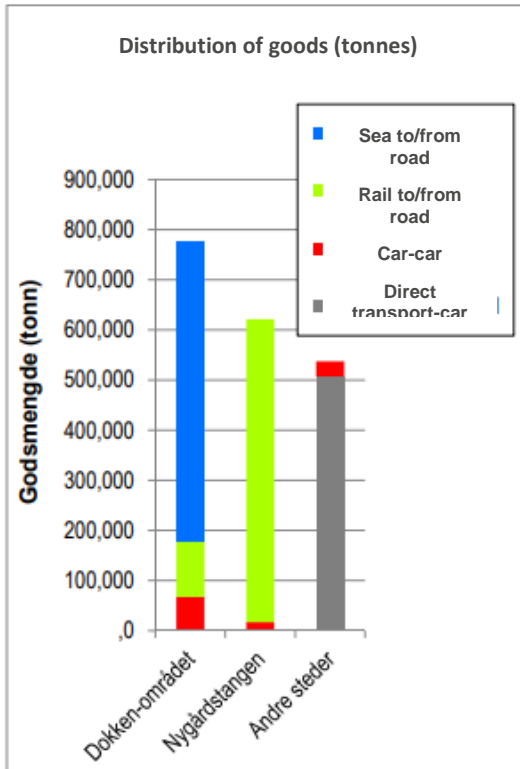


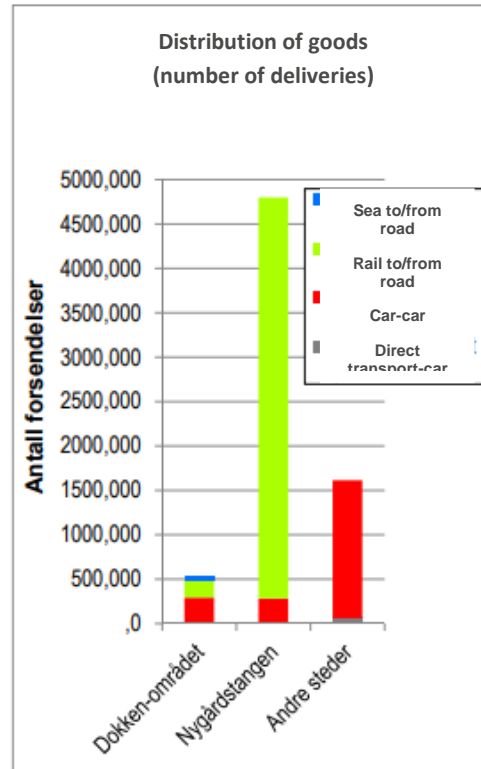
Figure 36 Travel Survey for Bergen, 2019 (RVU 2019)

Goods transport

Concerning goods transport, a thorough report on the goods flow in the Bergen region was published in 2013 (Asplan Viak, 2013). It shows that while the port (Dokken-area) has the lead in terms of total amounts of tonnes, the main share of deliveries arrives at the railroad terminal (Nygårdstangen).



Figur 14 - Fremstilling av hvor de ulike godsmengdene håndteres i Bergen. Fordeling på transport-type og omlastingssted er basert på vekt (tonn).



Figur 15 - Fremstilling av hvor de ulike godsmengdene håndteres i Bergen. Fordeling på transport-type og omlastingssted er basert på antall forsendelser

Figure 37 Bergen distribution of goods transfers

6.2 Sustainable Urban Logistics Strategies and Initiatives

6.2.1 Logistics ecosystem

Today the Port of Bergen is located near the city centre and close to the E39 highway, enabling easy access for transport of heavy goods to and from the Greater Bergen area. Many warehouses have moved their distribution centres to Eastern Norway, Sweden and The Netherlands, hence Bergen does today have a net-import balance of goods.

It has been decided that the Port of Bergen will move from its city centre location to a neighbouring municipality. This will allow an urban transformation of its current 250 000 square meter port area into housing, research and commercial activities, with the goal of creating an energetic and liveable environment for the citizens. This will also have a major impact on the goods flow of both The City Centre, The City and the whole Greater Bergen region. Great attention went into minimising traffic externalities from the new location of the port.

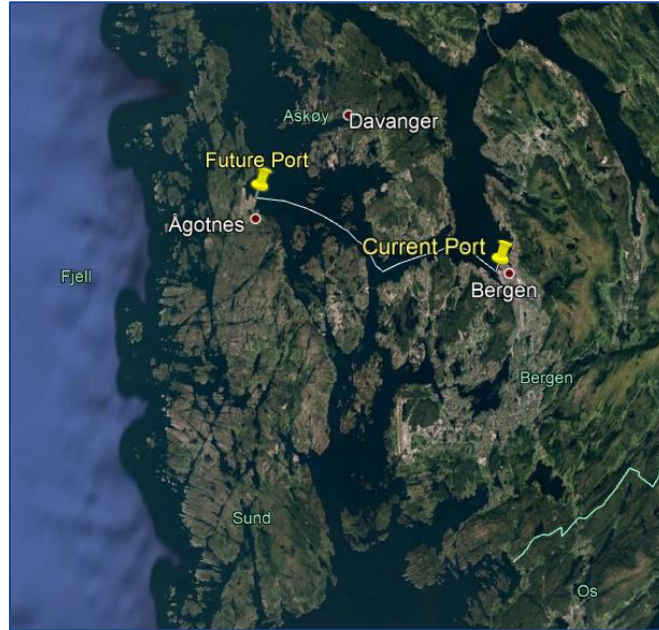


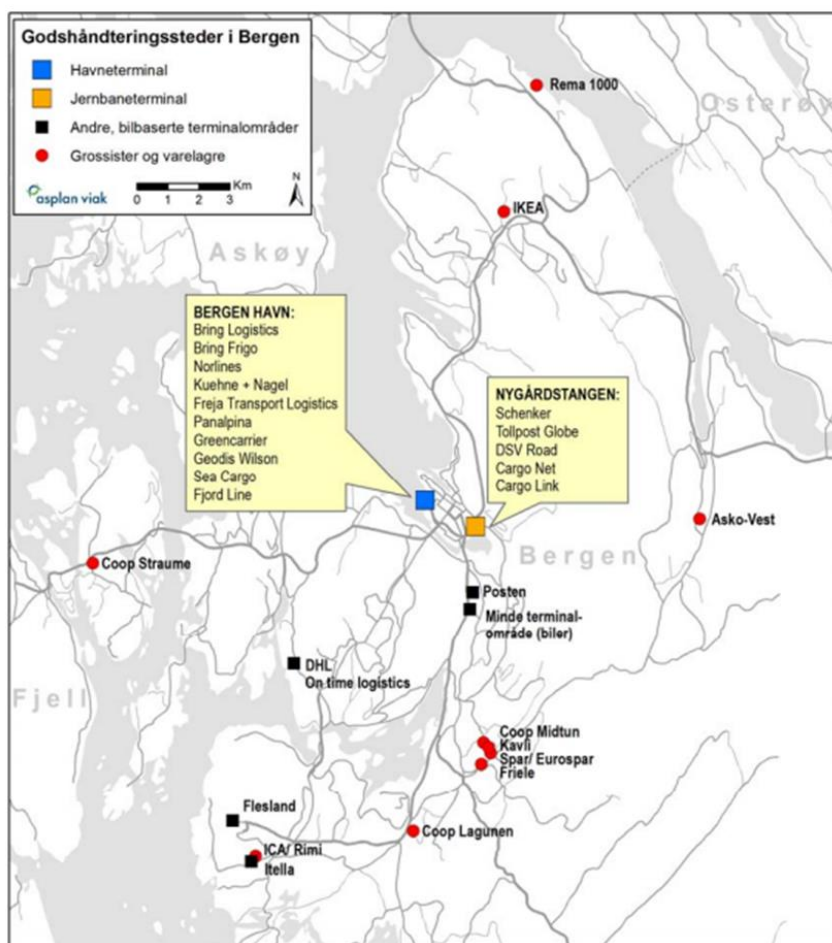
Figure 38 Current and future port locations - Bergen

The railroad goods terminal is located at the opposite side of the city centre. The railroad connects Bergen with the capital of Norway, Oslo, and further to Europe. The railroad terminal has started a modernisation process and is planning to become a zero-emission terminal by 2024.

6.2.2 Decentralised warehouse(s) / distribution centre(s) description

The major distributions centres of Bergen are located close to the city centre (Eg. Schenker and PostNord is located at the railroad terminal). Due to the aforementioned processes, all of the major companies will relocate to the area around the airport of Bergen, starting at the end of 2021. All of this together has created a spoken need for establishing smaller logistic hubs near the city centre.

The map below shows the status of goods flow change in Bergen as of 2013. The blue square signals the Port of Bergen, while the orange square is the Railroad terminal. Major changes are expected as Schenker and PostNord will move from Nygårdstangen (railroad terminal) in 2021, and the port (Bergen Havn) will move by 2025.



Figur 9 - Kart som viser lokalisering av alle aktørene i varestrømsanalysen, samt store grossister og varelagre i Bergen. Etter at datainnsamlingen var ferdig, har det skjedd endringer i bransjen. Tollpost er oppkjøpt av PostNord Logistics, og Ontime Logistics er oppkjøpt av DSV).

Figure 39 Bergen goods flow analysis performed by Asplan Viak, 2013.

6.2.3 Existing urban logistics solutions

Table 13: Existing urban logistics solutions in Bergen.

	Total	Description
Cargo bike schemes	1	The municipality offers a cargo bike rental scheme, allowing citizens to rent and test cargo bikes for free for 5 days.
Cargo bike grant	1	The municipality offers citizens to apply for a 1000€ fund support if they buy an electric cargo bike.
Mobility Hubs	6	The city of Bergen has 6 multimodal mobility hubs, and 6 more are planned to be established in 2021.
Bicycle couriers		No designated bicycle couriers, but the major delivery companies offer cargo bike delivery in the city centre.
E-vans	873 (5% of the fleet of	Electrification among delivery vehicles has seen a major boost the last couple of years. Eg. the main postal service of Bergen say they will do all deliveries by zero emission vehicles in "inner Bergen" by the first quarter of 2021.

	vans in Bergen)	
Smart Lockers		Non-existent in Bergen today, but the municipality are discussing placing parcel lockers at our mobility hubs with a company.

Source: Bergen

6.2.4 Supporting local policies for sustainable urban logistics

As of today, the City of Bergen does not have a sustainable urban mobility plan nor a sustainable urban logistics plan. One of the goals of participating in ULaaDS is to address the need of a SUMP and SULP and start the planning process.

As outlined previously in this document, both the Port of Bergen and major logistic companies are moving out of the city centre the coming years. Hence the Agency of Urban Environment in the city, along with port and railroad authorities and the actors of logistics in the city have recently started collaboration processes towards addressing the issues at hand regarding logistics in the city.

The **Green Strategy** – The Climate and Energy Action Plan of Bergen – is the main strategic document addressing policies supporting sustainable and zero emission logistic measures in the City of Bergen, enacted in 2016. The strategy was revised in 2021.

The strategy sets a clear goal of becoming a fossil fuel-free city by 2030. Zero emission logistics is highlighted as one of the main tools to achieve this goal, where implementing zero emission zones is described as one of the most important measures.

Driving a car shall not be a prerequisite for living a good life in Bergen. Pedestrians, cyclists, buses and light rail shall be prioritised ahead of private cars. The number of cars per private household is to be reduced to 1,0, and traffic is to be reduced by 20 % by 2030. As for transport and logistics, all goods transport shall be done by fossil-free light commercial vehicles by 2025. The municipality is also set to help facilitate emission free heavy goods vehicle transport and construction work.

An important tool for adjusting the numbers of polluting cars is the toll ring surrounding the city. By differentiating prices for electric and combustion engines, the city can give strong economic incentives to buy electric vehicles instead of fossil fuelled ones. This toll ring is said to be one of the most important reasons for why Bergen has the highest electric car sales in Norway.

The city is currently working to implement zero emission zones in the city, with a goal of establishing the whole city centre as emission free by 2030. As part of this work, the municipality is collaborating with transport companies to find solutions that will help increase emission free goods deliveries.

6.2.5 SUMP and SULP at a glance

Table 14: Bergen SUMP and SULP at a glance

City	BERGEN
Type of strategy	<ul style="list-style-type: none"> No SUMP/SULP The Green Strategy – The Climate and Energy Action Plan of Bergen (2016, new version in 2021, recommends SUMP implementation & ULaaDS expected to help defining a SULP)
Goals	<ul style="list-style-type: none"> Become a fossil-free city by 2030 Make the transport sector fossil-free by 2030 and ensure all fuel comes from renewables
Transport measures (with potential impacts on logistics) Authority level specified in brackets (L = local, R = regional, N = national)	<ul style="list-style-type: none"> Reduce passenger car traffic in Bergen by at least 10% by 2020 and 20% by 2030 compared with 2013 (46.4% cars in modal split) (L)* Introduce zero emission zones in parts of Bergen city centre by 2020 and make the whole city centre a zero emission zone by 2030 (L) Ensure all growth in passenger traffic is in the form of walking, cycling, public transport and the use of unoccupied car seats (L, R, N) Support public transport by means of an active polity to improve traffic conditions for public transport and facilitate park-and-ride facilities for cars and bicycles (L, R, N) Ensure better use of the capacity of vehicles on the roads, so as to double the number of passengers per car during rush hours by 2020 (L, R, N) Promote shared mobility & reduce the number of cars per household in Bergen – from 1.35 to 1 car per household by 2025 (L, R, N) Provide good access to renewable fuel (charging stations, hydrogen filling stations and biofuel filling stations) for vehicles and machinery in the city (R, N) Encourage people to choose environmentally friendly vehicles. Zero emission vehicles shall always have more favourable conditions than other vehicles (L, R, N) All new passenger cars shall be fossil-free as of 2025 (N) Promote fossil-free public transport by 2020 (R)
Logistics measures Authority level specified in brackets (L = local, R = regional, N = national)	<ul style="list-style-type: none"> All goods transport by light commercial vehicles shall be fossil-free as of 2025 (L, N) Facilitate fossil-free heavy goods vehicle traffic and construction from 2025 (L, N) Move a greater proportion of cargo from road transport to rail or sea (N) Facilitate fossil-free solutions for shipping (L) Offer shoreside power to all ships by 2020 (L, N)

6.2.6 Supporting regional or national frameworks

Bergen is committed to an agreement with national authorities and its closest municipalities to work towards fulfilling the aforementioned Zero Growth Target. This acts as an important framework, where the city must not have an increase in private traffic to get important funding for public transport and road infrastructure.

Regarding the set-up of zero emission zones, until now the municipality has not been able to use existing law to establish first zones. This is because there are no specific laws regarding zero emission zones, but there is a possibility to ban certain types of vehicles. The use of this law lies in the power of national authorities, and both the city of Bergen and the city of Oslo are in dialogue with national authorities to gain approval for establishing such zones in their cities.

Furthermore, the legislation is not in line with the need of creating more liveable cities, where cyclists and pedestrians are prioritised.

6.3 Relevant projects

The Agency of urban environment in Bergen is to this date in discussions with several companies that offer solutions for sustainable urban logistics. These projects consist of:

- Establishing a multi-actor logistic hub near the city centre
- Run a pilot on the use of geofencing technology to alter urban logistic behaviour towards the benefits of pedestrians and cyclists. In relation to the project around the implementation of Zero Emission Zones in the City, Bergen has been looking at solutions with how to handle goods delivery that still must be performed by heavy duty trucks. Inspired by the progress in using geofencing technology to alter the use of electric scooters in Bergen, the city is investigating possibilities of using this technology to give economic incentives to only drive into the city centre with trucks when there are small amounts of pedestrians and cyclists around. On the flip-side, this can also be used to award the use of zero emission logistic vehicles. At this stage, there are still many steps ahead of the concrete implementation.
- Run a pilot on pick-up/drop-off parcel lockers at our mobility hubs

Furthermore, in January 2021, the Port of Bergen sent an application for the EU Green Deal-programme, where one of the work packages especially is linked towards connecting the port, the city and its hinterland. Urban logistic measures for freight transport to the city by the sea is a crucial part of the application.

The Norwegian School of Economics, located in Bergen, started in late 2020 a research project called [CityFreight: Freight logistics in sustainable cities](#) funded by the Research Council of Norway. The aim of the project is to provide public authorities with a toolbox for evaluating decisions that would make the cities more energy efficient and sustainable in terms of freight transportation.

Finally, by offering shared sustainable mobility solutions to citizens through impactful project activities in [SHARE-North](#) (Interreg project), the City of Bergen has been able to incorporate various integrated mobility solutions into local transport and city planning strategies, like mobilpunkte (mobility hubs) and bike-sharing. Bergen plans to use the project extension as an opportunity to expand the number of mobilpunkte, as well as collaborate with companies to introduce a sustainable travel plan network for employees and companies.

6.4 Success factors and enabling conditions

The success factors are the following:

- Defining a shared common goal for logistics in Bergen
- Maintaining close contact with both terminal operators at the railway terminal and the port when planning for the future solutions
- Close contact with market actors as for what are actually viable innovative solutions for logistics in the city
- Create a shared understanding among planners, politicians, citizens and commercial activities on urban logistics as an important part of the puzzle in creating liveable and attractive city areas

6.5 Challenges and barriers

To this day, Bergen has had many benefits of near-city distribution centres in regard to sustainable urban logistics. But as most of the companies and the port must move out to the hinterlands, it becomes a challenge for the companies to support compact zero-emission delivery in the city centre. For this reason, we have started collaborative processes so that the stakeholders together can address this issue and develop solutions to cope with our new reality.

The geography of Bergen also makes it difficult to establish high-standard bicycle road infrastructure in the city. The lack of such infrastructure makes cars and electric micro-vehicles (such as the Paxsters) better solutions in comparison to electric cargo bikes for many. This issue is also illustrated by the low modal share of cyclists in the city, but COVID-19 has turned out to boost such cycle traffic to a great extent. Hopefully, this is a lasting trend, enabling more to realize the benefits of the use of bikes in our city.

A challenge is also of course the lack of tools for urban access regulations. Pushing the companies to deliver with smaller vehicles in the city centre is not always a plausible solution, especially regarding delivery to grocery stores. As in many other places in Europe, there are issues regarding enabling necessary goods delivery and creating more and better pedestrianised zones.

7. Edinburgh



7.1 Local context

7.1.1 City size and context

Edinburgh is one of the fastest growing cities in the U.K. and by 2040, will have a population of almost 600,000. Throughout its history, Edinburgh has been a city of innovation, heritage and change. The last 30 years have been no different.

With this growth come challenges. The way people travel, shop, socialize, work and play are changing, reflecting global trends and new technologies – and most importantly the vision for a better quality of life for all.

City growth will provide new jobs, homes and amenities but it must be carefully balanced to provide a high quality of life, access to services and opportunities for all residents, particularly communities living with inequality. Congestion and associated air pollution and health conditions, exacerbated by inactive lifestyles, are directly related to the kinds of places we create and inhabit.

KEY FIGURES

Population: 600 000 inhabitants

Area: 264 km²

Density: 1,830 inhab/km²

NUTS level: NUTS 3

TEN-T corridor(s): North Sea-Mediterranean

ULaaDS role: satellite city

Edinburgh has successful bus and tram networks. The bus network has been in place for over 100 years, the tramway existed prior but was removed. In 2014 the current line was opened and in 2019 it was agreed that this line should be extended with work commencing in 2020. Both bus and tram are publicly owned by City of Edinburgh Council form part of the Transport for Edinburgh Group, along with Edinburgh Cycle Hire Scheme which was launched in 2018 with much success. Edinburgh is served with two major train stations and an international airport.

7.1.2 Geography

NUTS level 3	NUTS level	Country order	Region order
Edinburgh, City of	3	28	1814

Edinburgh is part of the North Sea-Mediterranean TEN-T corridor. The North Sea-Mediterranean Corridor stretches from Edinburgh in the north, to the French ports of Marseille and Fos-sur-Mer in the south; passing through Ireland, England, the Low Countries and the French capital, before skirting the French/German boarder en-route south. As part of this Edinburgh and Glasgow are improving their rail connectivity.

7.1.3 Population

Edinburgh has a rather young population with around 60% aged below 44. This is also due to Edinburgh's University which counted 62,100 enrolled students in 2018.

Age group	Male	Female	All people	% of population	Scotland % of population
All people	256,303	268,627	524,930	100.0	100.0
0 to 15	40,588	38,479	79,067	15.1	16.9
16 to 24	31,106	33,858	64,964	12.4	10.5
25 to 44	89,355	91,124	180,479	34.4	26.1
45 to 64	60,343	60,722	121,065	23.1	27.5
65 to 74	20,364	22,518	42,882	8.2	10.6
75 and over	14,547	21,926	36,473	6.9	8.5

Source: Population Estimates Time Series Data

Figure 40 Edinburgh population by age and sex in 2019

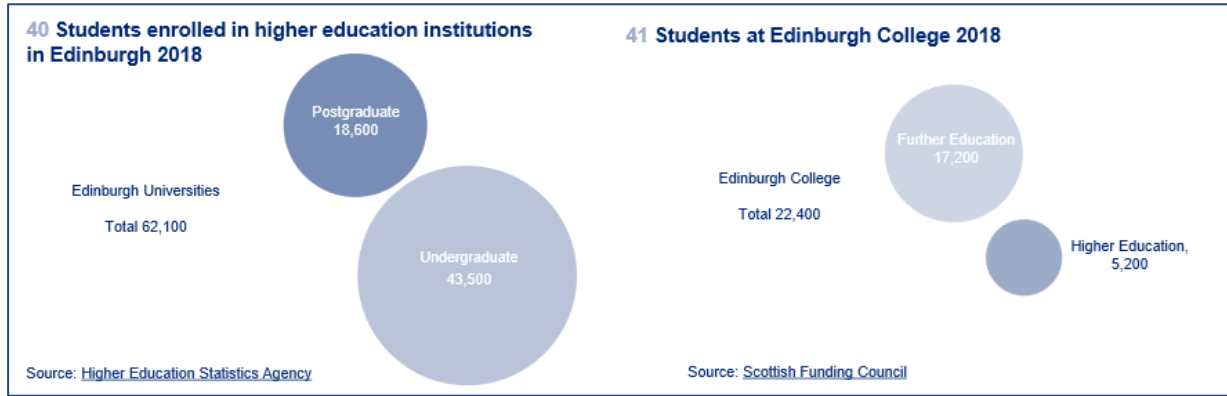


Figure 41 Students enrolled in higher education in Edinburgh in 2018

7.1.4 Area (km²)

Edinburgh has a population density of 1,830 people per square kilometre (4,730 per square mile) in the city proper. The larger urban population is estimated at 820,000. The total surface area in Edinburgh is 264 square kilometres (102 square miles).

Edinburgh remains a relatively compact city, where redundant inner-city land has been effectively ‘recycled’ for residential use and more people are living in and close to the city centre. In fact, 55% of the city’s population now live within 4 km. of the centre of Edinburgh, compared with just 48% in 1981.

Local changes in the concentration of population have important implications for service planning in the public, private and voluntary sectors. Large numbers of people living in close proximity may help to sustain both public and commercial services and provide a conducive setting for enterprise and growth. Although high densities may exert pressure on urban infrastructure, the potential economies of scale may also justify investment in innovative, sustainable solutions such as high-capacity public transport systems which would not be viable elsewhere.

In common with many other cities, population densities in Edinburgh are highest in inner suburban areas surrounding the commercial core of the city centre, notably in the Leith Walk, Fountainbridge and South Side areas. The location with the highest population density in Edinburgh is the Leith Walk area, with a peak of nearly 26,000 people residents within an 800 metre radius (equivalent to a density of 12,900 persons per sq.km.). This is a higher local population density than anywhere else in Scotland, including Glasgow.

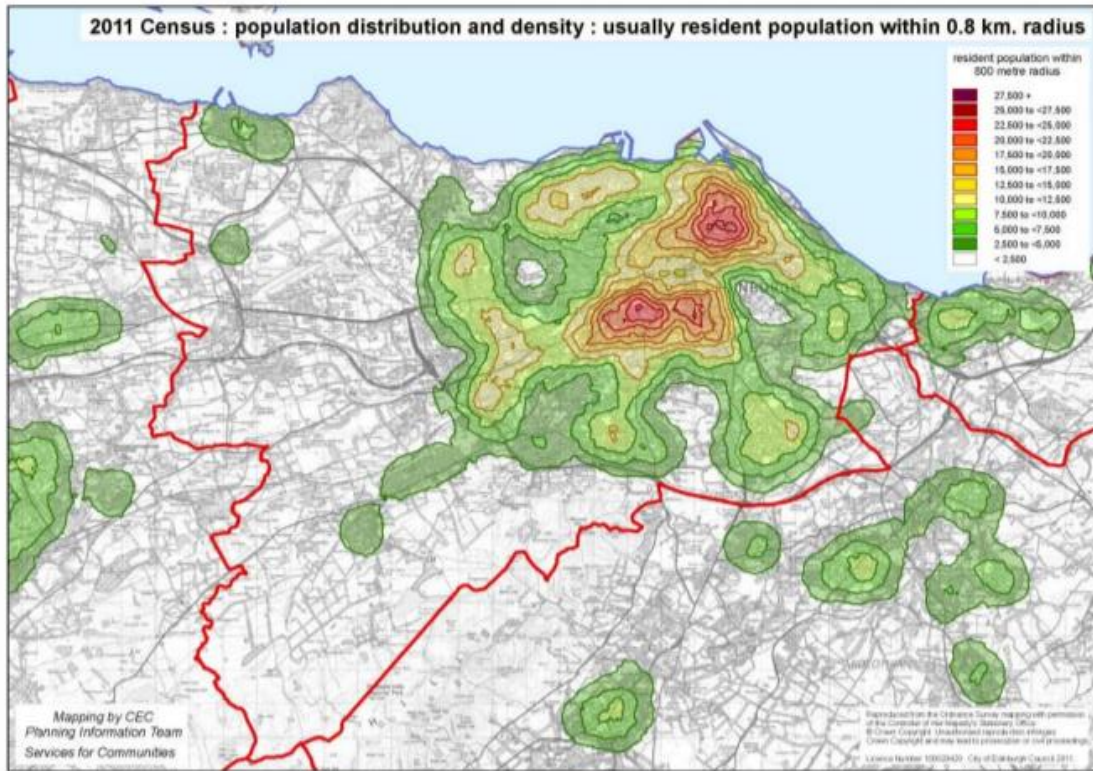


Figure 42 Edinburgh resident population within 0.08 km radius in 2011

Source: <https://www.edinburgh.gov.uk/downloads/file/24263/population-distribution-and-density>

7.1.5 Modal split

Edinburgh’s modal split shows the importance of public transportation as 72% of the population goes around in bus and active modes of transport with 52% declaring to go by foot. Yet, 41% of the modal split is still allocated to car use.

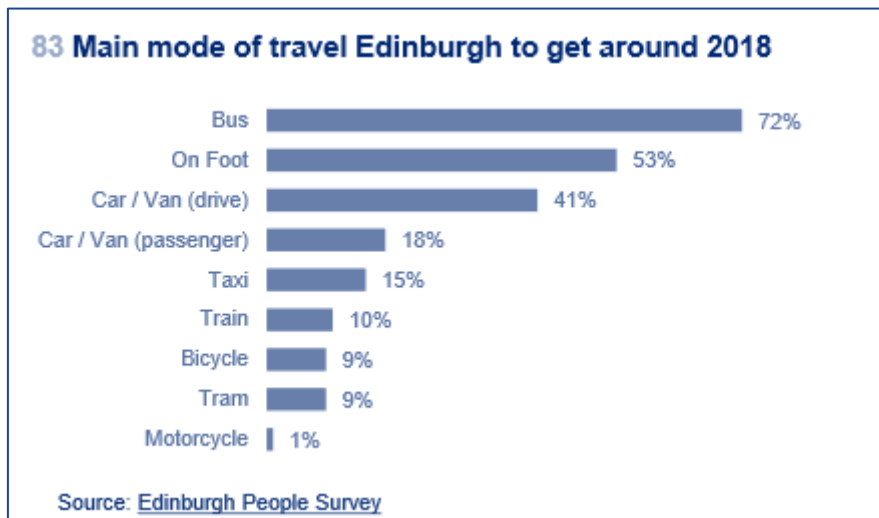


Figure 43 Edinburgh modal split in 2018

7.2 Sustainable Urban Logistics Strategies and Initiatives

7.2.1 Decentralised warehouse(s) / distribution centre(s) description

At present this is not available in Edinburgh but there are aspirations for this to be created within the City Mobility Plan.

7.2.2 Existing urban logistics solutions

Table 15: Existing urban logistics solutions in Edinburgh.

	Total	Description
Cargo bike schemes	2	Sustrans E - Cargo Bike Library – Fleet of 20 bikes loaned for free (Short and long term) to businesses organisations and community groups to foster cargo bike use in Edinburgh. Trams to Newhaven – the use of cargo bike (4 trikes and 5 trailers) and logistics hubs to support and maintain businesses trading while road access is limited.
Electric cargo bikes	Under 200	Including Sustrans Cargo Bike Library
Mobility Hubs	0	Aspiration to set up mobility hubs within City Mobility Plan
Bicycle couriers	Unknown	Private courier services available within the city
E-vans	Unknown	Used by City of Edinburgh Council, Lothian Buses and some of the higher education institutions.
Smart Lockers	Unknown	Smart lockers available through Amazon
Others	Unknown	UberEATS, Just Eat and Deliveroo (food delivery) Farrou Deliveries - Cargo bike delivery service Edinburgh Courier Network - Cargo bike delivery service Zedify - Cargo bike delivery service City Couriers - Cycle and electric van

Source: Edinburgh

7.2.3 Supporting Local Policies for Sustainable Urban Logistics

Edinburgh is part of a European network of cities dedicated to cleaner, better transport in Europe through the Sustainable Urban Mobility Plan programme.

City of Edinburgh Council has recently created the City Mobility Plan which has replaced the previous local transport strategy. The City Mobility Plan is a 10-year strategy covering four strategic priorities:

- Enhancing public transport
- People friendly streets
- Planning new developments
- Managing demand Delivery

As additional strategic priority relevant for the ULaaDS project, we can also mention the objective (28) to rationalise, coordinate and integrate freight and goods vehicles and deliveries in the city, including edge of town goods consolidation centres, micro distribution centres in the city, click and collect hubs in communities to support walking and cycling deliveries and access restrictions and emissions standards to control vehicle types.¹⁸

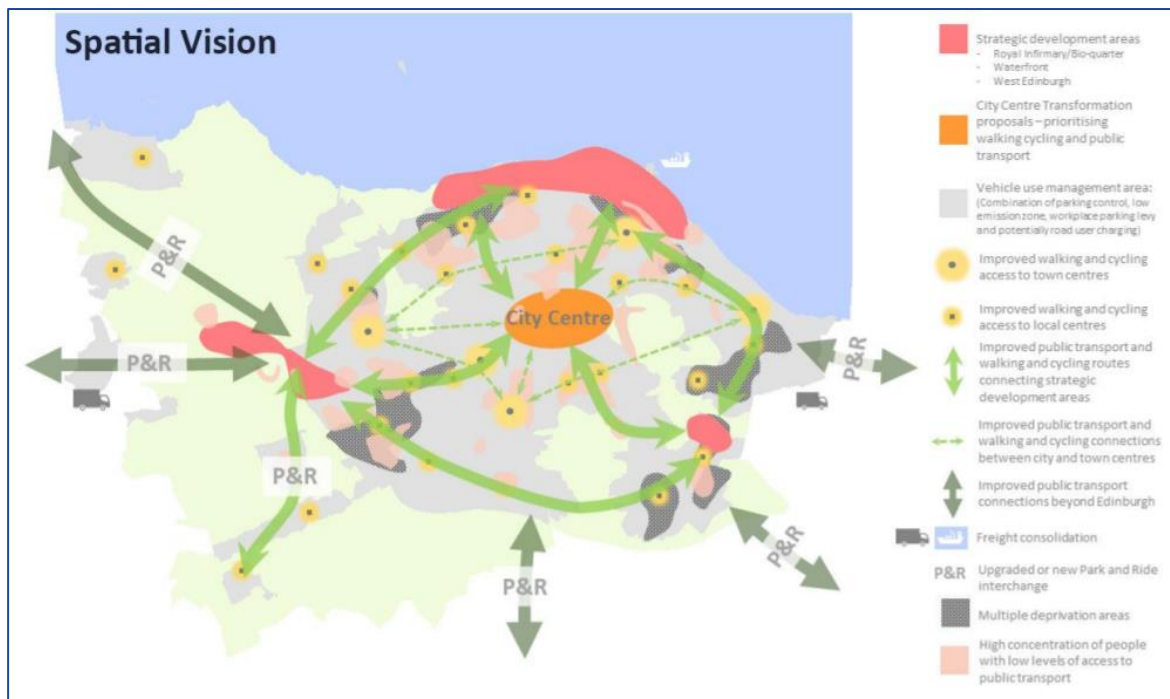


Figure 44 Edinburgh spatial vision of the Mobility Plan

City Mobility Plan Strategic Environmental Assessment also interestingly points out consideration for landscape and cultural heritage which demonstrate the comprehensive way of analysing potential impacts of logistics hubs:

¹⁸ Edinburgh City Mobility Plan, 2020.

<https://democracy.edinburgh.gov.uk/documents/s12642/City%20Mobility%20Plan.pdf>

- ‘the location of any new freight consolidation centres, regional park and rides, logistics zones or hubs needs to be sympathetic to landscape considerations’
- ‘Dense developments could potentially affect townscape if taller buildings are part of the development. Heritage assets could also be affected by the construction of new freight consolidation centres, logistics zones or hubs and expansion of both bus and tram routes.’

Besides that, Edinburgh counts a series of policies that support the deployment of sustainable urban logistics:

Edinburgh Low Emission Zones (LEZ)

Edinburgh has made good progress in reducing levels of air pollution. There are still streets where nitrogen dioxide is at levels that exceed the legal standards, so more action needs to be taken. Road traffic is the main source of nitrogen dioxide. Only the cleanest vehicles can travel in a LEZ. Penalty charges will apply to vehicles entering a LEZ that do not meet these standards. The Scottish Government is working with Edinburgh, Glasgow, Dundee, Aberdeen to put LEZs in place.¹⁹

Edinburgh’s Low Emission Zone Proposal

The Scottish Environmental Protection Agency (SEPA) produced a report on the air quality evidence for Edinburgh (PDF).²⁰ Working with the Scottish Environment Protection Agency (SEPA) and Transport Scotland, we developed LEZ proposals for Edinburgh. We sought views on these proposals and presented [feedback to the Transport and Environment Committee \(PDF\)](#) in October 2019. This feedback, alongside further technical work and information from groups who may be affected by the changes are being considered in order to finalise a Low emission zone for Edinburgh.

7.2.4 SUMP and SUDP at a glance

Table 16: Edinburgh SUMP and SUDP at a glance

City	EDINBURGH
Type of strategy	City Mobility Plan (draft for consultation 2020, in line with SUMP)
Goals	<ul style="list-style-type: none"> • Be carbon neutral by 2030 • People objectives to improve health, wellbeing, equality and inclusion: improve travel choices for all travelling into, out of and across the city; improve the safety for all travelling within the city; increase the proportion of trips people make by healthy and sustainable travel modes. • Place objectives to protect and enhance our environment and respond to climate change: reduce emissions from road transport; reduce the need to travel and distances travelled; reduce vehicular dominance and improve the quality of our streets.

¹⁹ Scottish LEZs plans including vehicle emission standards. <https://www.lowemissionzones.scot/>

²⁰ Report on the air quality evidence for Edinburgh, Scottish Environmental Protection Agency (SEPA), 2018. <https://www.edinburgh.gov.uk/downloads/file/27886/cleaner-air-for-scotland-national-modelling-framework>

	<ul style="list-style-type: none"> • Movement objectives to support inclusive and sustainable economic growth: maximise the efficiency of our streets to better move people and goods
<p>Transport measures (with potential impacts on logistics)</p> <p>Authority level specified in brackets (L = local, R = regional, N = national)</p>	<ul style="list-style-type: none"> • Create a simplified and integrated payment system to cover multiple journeys across the public transport operators (including city car club) and ensure smart, flexible tickets can be purchased via contactless payment (L) • Expand the tram/mass rapid transport network to the north and south of the city as well as to Newhaven, and explore the potential to develop or extend mass rapid transit routes into Fife, West, Mid and East Lothian (L, R) • Develop public transport interchanges at key locations in the city to enable better connections between services and modes. Support the integration of taxi ranks with interchanges (L) • Invest in technology to ease traffic congestion and improve safety (L, R, N) • Invest in electric vehicle charging infrastructure (a combination of rapid, fast and slow on-street charging points by 2023) (L, R, N) • Expand the park and ride network (L, R) • Manage the amount of general traffic in the city centre and town centres (largely car free city centre by 2030) (L) • Charge a levy on businesses in the city providing free parking spaces for employees (following consultation) (L) • Restrict access for the most polluting vehicles to the city centre and the wider city – implement low emission zone by 2022 (L) • Improve the quality of routes and spaces for active travel. Design fully accessible paths and route for all abilities. Further develop bike hire offer and continue integrating the cycle hire scheme with other modes of public transport (L, R, N)
<p>Logistics measures</p> <p>Authority level specified in brackets (L = local, R = regional, N = national)</p>	<ul style="list-style-type: none"> • Seek to rationalise, coordinate and integrate freight and goods vehicles and deliveries in the city, including edge of town goods consolidation centres, micro distribution centres in the city, click and collect hubs in communities to support walking and cycling deliveries and access restrictions and emissions standards to control vehicle types. (L, R) <ul style="list-style-type: none"> ○ Invest in freight depots around (city logistics hubs by 2025) and within the city (neighbourhood delivery hubs by 2030) ○ Support delivery within the city by smaller, cleaner vehicles by 2030 ○ Introduce and enforce controls to manage access for large delivery vehicles by size, weight and time • Apply and enforce parking, waiting and loading restrictions whilst allowing effective access for businesses and people with mobility difficulties (L)

7.2.5 Regional or National Frameworks/ Partnerships

The South East of Scotland Transport Partnership (SEStran) is the statutory Regional Transport Partnership for the South East of Scotland. SEStran encompasses eight local authorities: City of Edinburgh, Clackmannanshire, East Lothian, Falkirk, Fife, Midlothian, Scottish Borders and West Lothian. Within the partnership area there is a huge diversity of transportation issues, from urban congestion to rural public transport and from ferry ports to airports. SEStran aims to address these issues and work towards a more sustainable and efficient transport network. SEStran is involved in PriMaaS, an EU project that aims to promote Mobility as a Service (MaaS) through policy development. The South East of Scotland Transport Partnership is also launching a regional e-bike

program; GO e-Bike with the aim of increasing usage and awareness of power-assisted cycling across the South East of Scotland and beyond.

7.3 Relevant Projects

Edinburgh's **City Centre Transformation (ECCT)**²¹ will contribute to the wider aim of this Council for Edinburgh to become carbon neutral by 2030. The Council's approach to transport and mobility will be at the heart of delivering this challenging target. The city must be easier and more attractive for those who can incorporate healthy and pollution free walking and cycling into their daily routine. Alongside the proposed Low Emission Zone (LEZ), ECCT must help to tackle some of the highest concentrations of NO₂ in Edinburgh, improving air quality and increasing the associated environmental and health benefits. Crucially, it will also ensure that the city is well placed to respond to the future challenges of demographic and other growth indicators.

Through the South East of Scotland Transport Partnership (SEStran), Edinburgh is also part of the **Surflogh Project**. The focus of the project is the optimization of the interaction between the hub and the urban logistics system, promoting both efficient and sustainable logistics in urban areas in smaller and medium-sized cities, city regions and networks. SEStran wants to make progress in developing and promoting more sustainable freight transport logistics through the development of logistics hubs to facilitate the introduction of more sustainable urban modes. SEStran are leading on the work package Mapping of Freight Flows. Together with Napier Transport Research Institute (TRI) they will develop business models for urban freight hubs.

Additionally, to the above-mentioned projects, Edinburgh also launched a series of initiatives and projects which impact on sustainable urban logistics.

Edinburgh Cycle Hire Scheme was launched in 2018 and in their second-year recorded growth of 119% and over 221,000 trips. There are just under 100 hire points across the city centre and outlying areas and the scheme is comprised of a mixture of traditional bikes and e-bikes to encourage users of all abilities to hire a bike instead of making shorter journeys by car. In year 2 new users to Edinburgh Cycle Hire totalled more than 34,000 bringing the overall to 57,000 customers cycling in and around the city. In 2020, the popular scheme was extended into South Queensferry with start/end journeys totally nearly 4,500 in the first six months and 1,500 new customers joining the scheme. Proving that cycle hire can function as a public transport service, as well as improving inner city connectivity.

Edinburgh was the first city in Scotland to implement a **20mph network**, which aims to create calmer, more welcoming and people-friendly streets, encouraging healthy, active travel. It saw a 20mph speed limit implemented across residential roads, shopping streets and the city centre, with many other cities in the UK and Europe following suit. Calmer speeds help to reduce the risk and severity of collisions, encourage people to walk and cycle and to spend more time in an area. The reduced

²¹ Edinburgh's City Centre Transformation Plan, 2019.
<https://democracy.edinburgh.gov.uk/documents/s6001/Item%207.1%20-%20ECCT%20Final%20Strategy%20with%20all%20appendices.pdf>

speed also makes it easier to crossroads, particularly for children, older people and those with mobility issues.

Edinburgh has committed a continued drive toward **segregated cycle lanes**. When the city took the decision to extend the tramline there was a consultation to ensure suitable provision for cycling within the construction designs. Throughout construction the project team has been working with local cycle interest groups to develop alternative routes to keep cyclists moving around the area safely and conveniently. As a result of this further funding has been secured from the **Sustrans Community Links programme** to help progress design work to improve cycling options from the foot of Leith Walk. We will continue to work closely with the cycling community and active travel partners in the coming months to develop a solution that provides safe and convenient onward cycling options for the north of the city.

The **City Centre West to East Link project** will develop a new cycle route linking the Roseburn path to Leith Walk via the city centre. The route will form part of the National Cycle Network (NCN) route 1. The route will be part of Edinburgh's quiet routes network. The aim is to provide a cycle route which is designed for less confident cyclists and those who may be concerned about cycling in busy traffic. The route will be separate from traffic and will link planned cycle facilities on Leith Walk with the off-road path network at Roseburn.

In response to the COVID pandemic the City of Edinburgh Council has created temporary segregated cycle lanes in the routes towards the city's two hospitals in order that key NHS workers can travel by bike to their place of work. There are also temporary segregated cycle lanes within the city centre to support travel flow and improve cycle safety.

During the COVID pandemic City of Edinburgh Council was also granted £5M of funding from Sustrans to create more spaces for people to travel safely on the streets until the restrictions have been lifted. These are changes to pavements, pathways and roads to allow for more space for exercise and for key workers to travel safely.²²

7.4 Success Factors and Enabling Conditions

- Working with organisations with similar aspirations e.g. Sustrans, SEStran
- Ensuring that when working with contractors these aspirations are communicated at an early stage and bought into
- Consultation with the public and regular updated communications to reassure of any concerns and promote progress
- Understanding other ongoing successful initiatives:
 - Sustrans Cargo Bike Library – established in 2017 enabling organisations and business to trial the use of cargo bike logistics in their business model. In the

²² Edinburgh Space for People – COVID19 Response measures, 2020-2021.
<https://www.edinburgh.gov.uk/spaces-people-1>

2018-2019 report, 75% of users were either buying or adopting cargo bikes within their business model with 1 in 5 buying. (monitoring and evaluation report, Sustrans Scotland)

7.5 Challenges and Barriers

Behavioural Change – people will change and adapt their behaviour to their surroundings. To encourage a change in behaviour the city must make their changes ‘doable’ to the public, a better option than what is currently available and create an awareness of the change.

Political Appetite – A change in leadership at both a local and government level can impact the priorities of a city and policy going forward.

8. Rome



8.1 Local context

8.1.1 City size and context

Rome is the capital city of Italy, of the homonymous metropolitan area, and of the Lazio region.

With 2.9 million residents, it is also the country's largest and most populated municipality and the fourth most populous city in the European Union by population within city limits. The municipality of Rome is composed of 15 boroughs, each of them with more than 100 thousand inhabitants, while its metropolitan area is composed of 120 municipalities and counts 4.4 million inhabitants.

In Rome, the road network is typically radio-centric, still recalling the classic radial pattern that dates to the times of ancient Rome: a set of roads which originally ensured the connection with every corner of the empire and that today constitute the backbone of the road network in Rome's metropolitan area.

Economic background:

Retail, tourism and professional activities characterise the city's economic sector.

The employees of the main economic sectors amount to just over 800,000: Rome, in addition to its administrative functions, has many people

KEY FIGURES

Population: 2,900,000 (city);
4,400,000 (metropolitan area)

Area: 1,285 km²

Density: 2,256.8 people/km²

NUTS level: NUT-3

TEN-T corridor(s): Rome is an urban node of the TEN-T Scandinavian-Mediterranean corridor.

ULaaDS role: satellite city

working in trade (156,000), transport and communication (107,000, including employees in handling of goods, warehousing and storage) and services (256,000).

8.1.2 Geography

The city is in the central-western portion of the Italian peninsula, within the Lazio region, along the shores of the river Tiber. Vatican City is an independent country within the city boundaries of Rome, the only existing example of a country within a city: for this reason, Rome has been often defined as the capital of two states.

Rome is located along the Scandinavian-Mediterranean Corridor of the TEN-T network and is an urban node of this corridor. Rome has also been granted financing as an urban node of the core network by the Connecting Europe Facility. Due to the city being the most populated in Italy and visited each year by millions of tourists, the logistics organisation has an enormous impact on the liveability of the urban environment.

Rome has played a pioneering role since 1998 in applying **automatic control of access to the Limited Traffic Zones (LTZ)**. Presently the most internal zone of the city is composed of different LTZs based on ANPR (Automated Number Plate Recognition) with different time schedules, preserving the cultural heritage of one of the world's most important historic city centres.

All LTZs existing in Rome in the two most internal General Urban Traffic Plan (PGTU) Zones of the city are controlled by electronic access gates, including the AF1 - VAM zones, which has partial integration of the electronic gate system since 2020.

8.1.3 Population

Population: 2,900,000 (city); 4,400,000 (metropolitan area)

Area: 1,285 km²

Density: 2,256.8 people/km²

8.1.4 Area (km²)

The PGTU (Urban Traffic Masterplan 2015) has split the area of the municipality of Rome into six zones, each of which has homogeneous territorial characteristics (urban texture, transport) within itself. The division into several areas is necessary because of the different characteristics of density and mobility and the different urban textures that require different traffic regulations and organisations from area to area. Targets and projects and actions for mobility refer to these areas:

- Zone 1: The historic core city centre, the baroque city, archaeological main sites, where public transport is privileged, and access is limited to private vehicles;
- Zone 2: The compact city built in the nineteenth century, where public transport is available and of good quality. Private mobility is permitted but restricted for most polluting categories;

- Zone 3: The Green Belt: zone composed of large urban parks and newest building built after II world war and where P&R public structures are located. PT begins to be of poorer quality;
- Zone 4: Limited by External Ring Road: urban areas built recently and where the public transport of good quality is limited and served mainly by bus;
- Zone 5: Rest of Municipality not including attraction centres. Served only by bus;
- Zone 6: Main centres outside the city including the city along the sea (Ostia) with specific mobility issues to be evaluated on single basis.

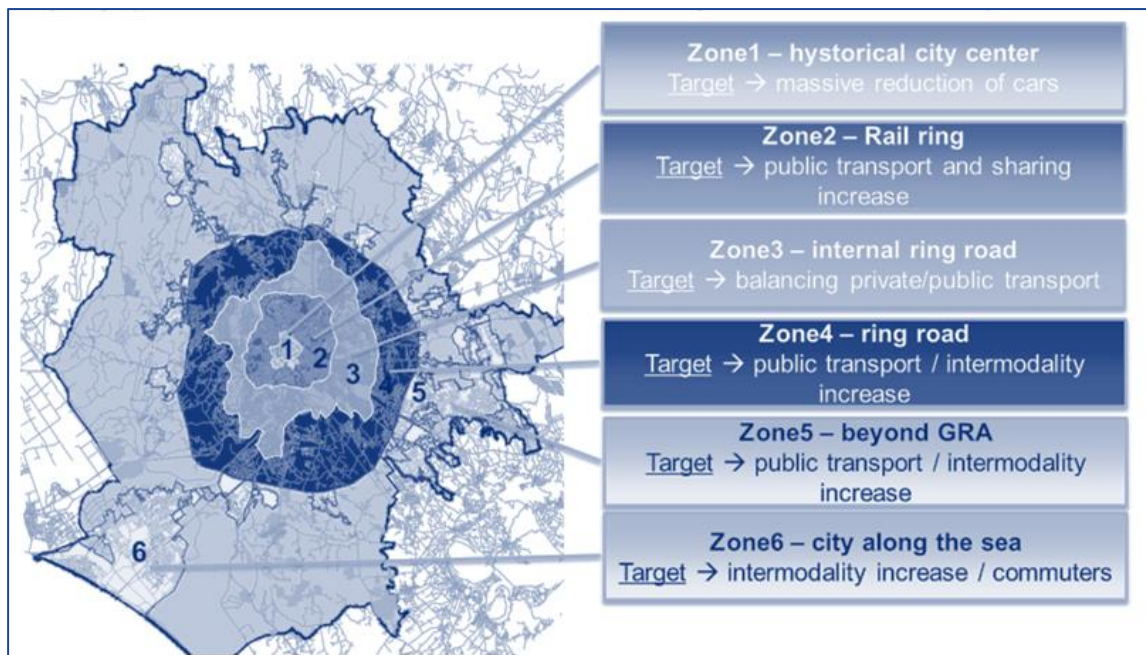


Figure 45 Rome six zones and mobility targets

8.1.5 Modal split

The available modal split data refers to the latest SUMP of Rome and is summarised in Figure 27. The weekday mobility of Rome's residents is equal to 6.1 million journeys. 59% of people use private vehicles - car and/or motorbike (3.75 million trips total); 1.3 million journeys, or 21.5% of the total- are made by public transport (also in combination with other means); 1.1 million (18%) are the estimated journeys on foot, and around 90,000 journeys are made by bicycle (1.4% of total trips). Finally, 55% of the trips are short (less than 30 minutes); the two peak morning hours (7.30-9.30) count for almost 20% of the mobility during the whole day.

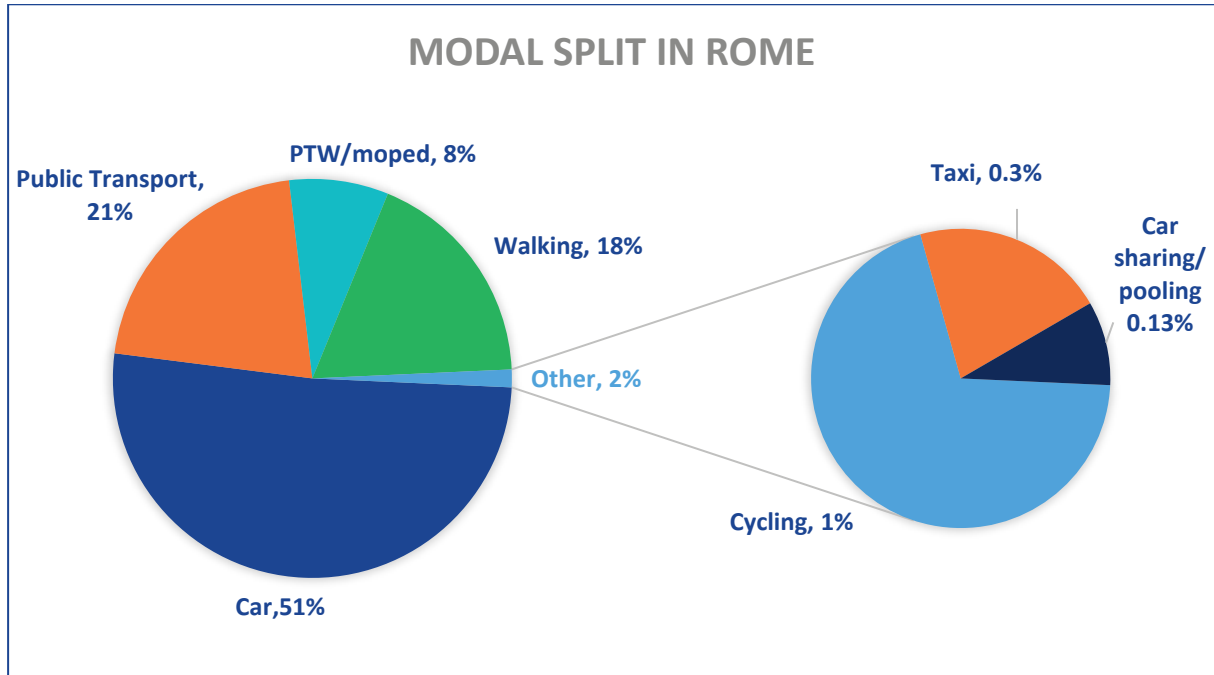


Figure 46 Modal split in Rome.

Source: ROME SUMP

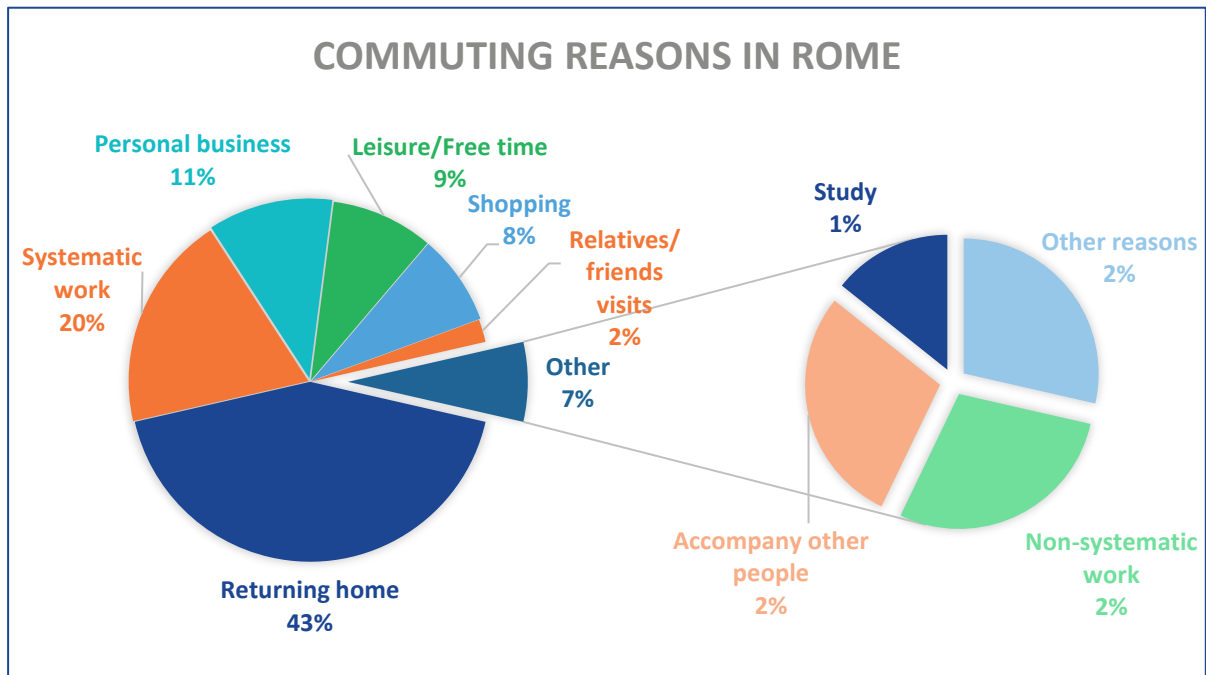


Figure 47 Commuting reasons in Rome.

Source: ROME SUMP

8.2 Sustainable Urban Logistics Strategies and Initiatives

8.2.1 Logistics ecosystem

The logistics system of the metropolitan area reflects a situation of dispersion and fragmentation of the structures dedicated to handling and storage: the system is characterised by many small nodes spread over the territory.

The port of Civitavecchia is the most important node, with a traffic of goods equal to 9.5 million tonnes, of which almost 39% are petroleum products.

Air cargo represents an additional significant component: the ‘cargo city’ in Fiumicino is equipped with a customs area, cold rooms, forwarders building and has a capacity of 200,000 tons per year. It is thus an authentic “city dedicated to cargo services” situated inside the Leonardo da Vinci airport hub.

8.2.2 Decentralised warehouse(s) / distribution centre(s) description

A specific survey on the number freight terminals is not available. Though the main centres are the following:

- the air cargo structure in Fiumicino,
- the railway freight terminal of Pomezia, located in the south of the urban area,
- road freight terminal located in the semi peripheral urban area, serving the city centre with bimodal vehicles; similar structure is located close to urban railway system, serving the city centre with electrical vehicles.

8.2.3 Existing urban logistics solutions

Table 17: Existing urban logistics solutions in Rome

	Total	Description
Cargo bike schemes		Distribution system in the city centre guaranteed only by private operators The topic will be addressed in the SUMP/SULP through the logistic living lab
Electric cargo bikes		The topic will be addressed in the SUMP/SULP through the logistic living lab
Mobility Hubs		Freight terminals belong to private companies The topic will be addressed in the SUMP/SULP through the logistic living lab
E-vans	1 vehicle	Rome Mobility Service (Sharing electric vans on booking) Italian Postal Service (vehicles number, including also electric three-wheeled motorbikes, is not available)
Smart Lockers	3 operators	Amazon, Italian Postal Service, InPost

8.2.4 Supporting policies for sustainable urban logistics

In 2019, the Municipality of Rome adopted the Sustainable Urban Mobility Plan (SUMP), which includes the implementation of the Sulp. Currently, the City Administration is addressing specific issues concerning urban logistics, in order to follow up on the SUMP, through the 'Living Lab' approach, such as:

- experimentation with mini hubs for loading/unloading goods
- deployment of parcel lockers, at the main interchange car parks and metro stops
- other living labs could be proposed, such as cargo-bike promotion and technological parking spaces for freight vehicles

For the long term (within 10 years), as described in the SUMP, the following measures will be implemented, according to criteria of relevance (both collective and for the different stakeholders) and feasibility (both technical and contextual, i.e. with a different degree of acceptability):

- incentives for the purchase of low environmental impact vehicles
- regulation of entering permits in view of with the extension of the Freight Zone
- increasing the number of parking spaces for loading and unloading goods
- PT lanes use for freight vehicles

The SUMP also tackles cycling by creating new cycle routes (300 km), 2,000 new bicycle racks, two hubs located at main attraction points, including railway junctions, 10 Mini HUBs/Bike Parking (with charging stations and/or car-sharing spaces). Also charging points for cargo bikes are provided. In synergy with the SUMP, further infrastructural interventions are foreseen (e.g. cycle ring named GRAB).

Furthermore, the local authority is currently carrying out the Electric Mobility Plan (EMP), issued in 2018, which outlines the rules for implementing charging points in public areas. The plan identifies 340 areas where any energy supplier can propose the installation of an electric charging station.

Rome also started environmental policies by encouraging the use of sustainable vehicles through the adoption of Low Traffic Zones (LTZ) access fee discounts for the lowest emission vehicles. In the last few years, Rome Municipality, through the drafting of specific provisions, has defined the following guidelines concerning the freight distribution:

- identification of a central area (LTZ freight) where the circulation and parking of authorized vehicles has to comply with specific rules for the loading and unloading of goods
- establishment of binding delivery times for freight operators
- phasing out of the most polluting vehicles through new charges
- roadmap: Rome Administration, according to the indications contained in the SUMP, will have to outline with a specific Roadmap actions to restrict the circulation of cars, motorbikes and Local Public Transport (LPT) in the urban area and the subsequent

integration into other Plans such as the SULP, the Touristic Coaches Plan and the Electric Mobility Plan; these actions will be conducive to the achievement of the objectives assumed with the adhesion to the *FOSSIL FUEL FREE STREETS* (FFFS) Declaration

- diesel vehicles ban in the city centre

Finally, the General Urban Traffic Plan (PGTU) aims for the impact reduction of freight vehicles in the urban area through the adoption of measures which will be implemented by the SULP, while the EMP provides for the installation of dedicated electric charging points for freight vehicles.

8.2.5 SUMP and SULP at a glance

Table 18: Rome SUMP and SULP at a glance

City	ROME
Type of strategy	SUMP 2018/2019 (includes SULP implementation)
Goals	<ul style="list-style-type: none"> • Overcome the current ‘traffic approach’ and progress towards ‘planning for people’, providing all citizens multimodal transport options to access key destinations & services • Increase public transport capacity & integrate mobility resources (including soft & sharing mobility options) • Increase road safety levels • Reduce atmospheric and noise pollution, greenhouse gas emissions and energy consumption • Increase efficiency and cost-effectiveness of the transport of people & goods • Contribute to the attractiveness of the territory and the urban quality
Transport measures (with potential impacts on logistics)	<ul style="list-style-type: none"> • Expand the public transport network and increase the mass rapid transit system (L, R) • Regulate mobility demand by introducing fossil fuel free streets, a zero-emission area, acquiring only zero-emission buses from 2025, creating P&R facilities, and introducing a congestion charge (L, R) • Improve walking and cycling conditions (compared to reference scenario) (L): <ul style="list-style-type: none"> ○ Expand bike network by 82% (km) ○ Extend pedestrian areas (sqm) by 32% ○ Increase services for cyclists (number of bike spaces) by 245% ○ Increase n° of walked/cycled home-school trips (% of total school trips) by 800% ○ Increase promotion & awareness actions (% population reached) by 150%
Authority level specified in brackets (L = local, R = regional, N = national)	
Logistics measures	<ul style="list-style-type: none"> • Develop new governance models for efficient, effective and sustainable urban logistics that allow optimising the process of collection and distribution of goods (development of working group using a living lab approach) (L, R) • Regulate the circulation of goods in the historic centre and in the suburbs (L) • Increase the number of loading / unloading stands for goods throughout the Metropolitan Area (L) • Rationalise areas for loading and unloading goods, promoting and ensuring compliance (including through IT tools) (L) • Offer economic incentives for low-emission logistics vehicles (e.g., rewards for small vehicles, van sharing, cargo bikes, etc.) (L, R) • Use public transport lanes for freight (L) • Mid-term (L):
Authority level specified in brackets (L = local, R = regional, N = national)	

- Develop vehicle accreditation systems
- Create mini-platforms (mini-hubs)
- Introduce parcel lockers
- Introduce electric charging points
- Promote crowd shipping
- Promote cargo bike delivery systems
- Encourage out of hours delivery systems
- Long term:
 - Create urban distribution centres **(L, R)**
 - Reverse logistics **(L)**
 - Promote electric van-sharing **(L)**

8.2.6 Regional or national frameworks

At the national level, the PUMs (Urban Mobility Plans) are to be understood as "projects of the mobility system including the comprehensive set of interventions on public transport and road infrastructures, interchange car parking, technologies, vehicle fleet, transport demand management through the mobility manager structure, traffic control and regulation systems, user information, logistics and technologies for the reorganisation of goods distribution in cities".

Decree of 4 August 2017, 'Identification of guidelines for urban sustainable mobility plans': these national guidelines are to promote the homogeneous and coordinated application of guidelines for the drafting of sustainable urban mobility plans throughout the country. The strategies to be adopted for the Rome SUMP comply with the indications of the PUMS guidelines issued by the Ministry of Infrastructure and Transport (MIT) and also regard freight distribution.

Rome joined the *FOSSIL FUEL FREE STREETS* (FFFS) Declaration of the international C40 Network in 2018. It consists, in practice, of a formal commitment to achieve two specific objectives: the purchase of zero-emission local public transport vehicles from 2025 and the creation of at least one zero-emission urban area by 2030, where the concept of "zero emissions" is intended to be limited to the transport sector.

At regional level, one of the main planning tools is the Regional Mobility, Transport and Logistics Plan (PRMTL), which has just been adopted. The latter plans transport at regional and metropolitan level and identifies the infrastructural interventions and priority actions necessary to configure a coordinated transport system that is functional for the socio-economic development and territorial rebalancing of the region. The plan outlines, alongside the specific measures to be put in place, the environmental, social, and economic sustainability increase to be reached within the regional logistic system through the reduction of road transport and the development of intermodal transport.

Cooperation and collaboration are already established with the Ministry of Transport, Rome Metropolitan Area, Region, local stakeholders, Rome Mobility Department, academia and logistics operators.

8.3 Relevant projects

Between 2013 and 2016, Rome participated in the **SMARTSET project** to develop and show how freight transport can be made more energy-efficient and sustainable through better use of freight

terminals. The project provided examples of good practice to support cities, regions and countries to achieve the European Union "20-20-20" targets, meaning the reduction in carbon dioxide emissions and improvement in energy-efficiency. In the project, Rome developed and made clear which incentives and regulations are needed to move towards an increased use of micro terminals for last mile distribution for energy efficient freight transport.

NOVELOG is a three year Horizon 2020 project that started in 2015 and finished in 2018. It focused on understanding freight distribution and service trips by providing guidance for implementing effective and sustainable policies and measures. In Rome, the chosen geographic area of the pilot was the Freight Limited Traffic Zone (LTZ) which covers about 6km². This area is of high commercial and business relevance to the city, with average daily commercial traffic of around 27,000 freight vehicles. This increased traffic creates problems for freight distribution. The pilot aimed at designing and developing a freight Decision Support System (DSS) to provide recommendations for the reorganisation of the freight delivery system, for the location of facilities, for use of innovative vehicles and for the definition of the tender process for the implementation of any Urban Consolidation Centres required. To develop this DSS, the city monitored the performance of low emission vehicles, Urban Consolidation Centres and electric van-sharing schemes, matching it against restrictions and regulations. The partners involved in the pilot were the University of Rome and the Mobility Agency of Rome.

The CityLab Horizon 2020 project, started in May 2015 and ended in April 2018.²³ In the CityLab project, the city of Rome, in collaboration with the Postal Service and academia, tested an innovative system for the integration of direct and reverse logistics flows in urban areas: the innovative idea that characterised the implementation concerned the integration of an already existing frequently used distribution system (e.g. mail delivery) with free capacity on return trips, aimed at urban recycling.

Currently Rome is experimenting with mini hubs. The idea is to allocate a part of the tourist coaches parking areas and the related management technology systems to freight functions on a transitional basis. In parallel parcel lockers are spread all over the city in the main metro stops and interchange parking areas.

8.4 Success factors and enabling conditions

Two important objectives have been achieved: the renewal of the freight fleet and the reduction of the number of permits required to enter LTZs. The logistics operators immediately adapted to the new rules in order to continue their delivery activities in the historic city centre, partially renewing their fleet of vehicles. The effective stakeholder engagement with logistics and transport operators as well as shop owners was a central enabling condition to achieve those goals.

²³ Rome CityLab case study, 2020. <https://www.eltis.org/resources/case-studies/city-logistics-living-laboratories-italian-pilot>

8.5 Challenges and barriers

The challenge for the city and its residents is to ensure sustainable mobility for all components that move every day in the urban area, freight included, decreasing the impact of freight vehicles.

The crucial point is represented by the difficult cooperation between the municipality, transport operators, shop owners and residents, each with different needs.

The freight transport suffers as a result of traffic congestion; logistic bays are not always respected and are insufficient; and there is a lack of hubs for loading/unloading freight with electric/bimodal vehicles to ensure a sustainable distribution in the urban area.

Through the SUMP's implementation, Rome will try to overcome these barriers and diseconomies.

Acronyms

Acronym	Meaning
D	Deliverable
EC	European Commission
ICT	Information and Communication Technology
LEZ	Low Emission Zone
LF	Load Factor
LPT	Local Public Transport
LSP	Logistics Service Provider
LTZ	Low Traffic Zone
P&R	Park and Ride
PTW	Powered Two Wheelers
SUMP	Sustainable Urban Mobility Plan
SULP	Sustainable Urban Logistics Plan
ULaaDS	Urban Logistics as an on-Demand Service
WP	Work Package
ZEV	Zero Emission Vehicle
ZEZ	Zero Emission Zone

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