# 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 They have been replaced by the ring road around the city.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

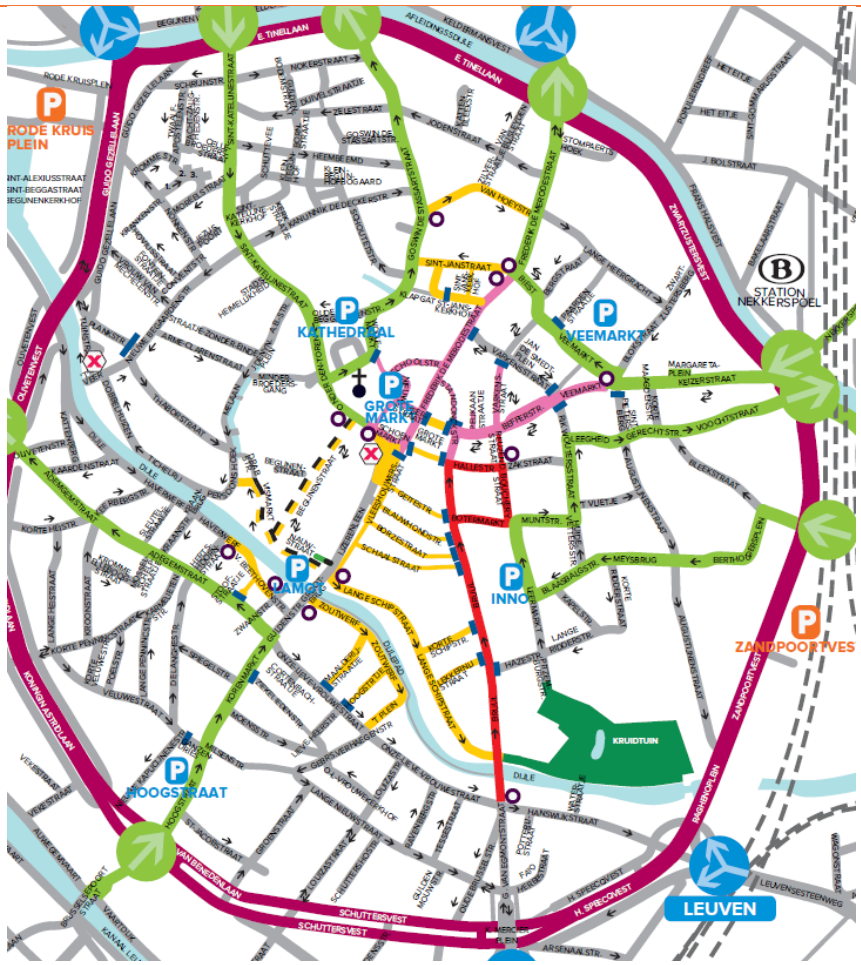
**Area:** 65,8 km$^2$

**Density:** 1345 inhab/km$^2$

**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.




| | |
|---|---|
| | Area with limited car access between 11:00 and 18:00 |
| | Area with limited car access Mon-Sat 11:30 – 18:00<br>Sunday 13:30 – 18:00 |
| | Area with limited car access Mon-Fri & Sun 11:00 – 18:00<br>Saturday 07:30 – 18:00 |
| | Car free area Mon-Sat 11:00 – 18:00<br>Saturday 07:30 – 18:00 |
| stadsring R12 | camera |

**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.

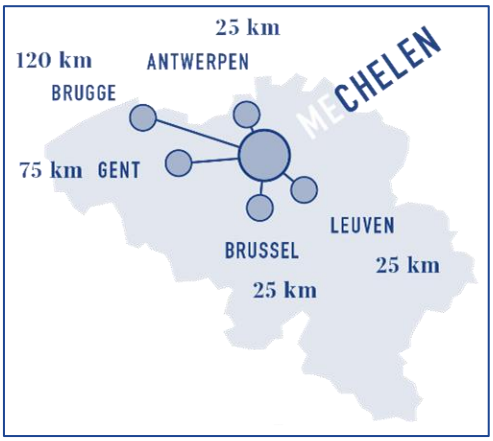



**Figure 2** Mechelen's distance from main Belgian urban agglomerations

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.

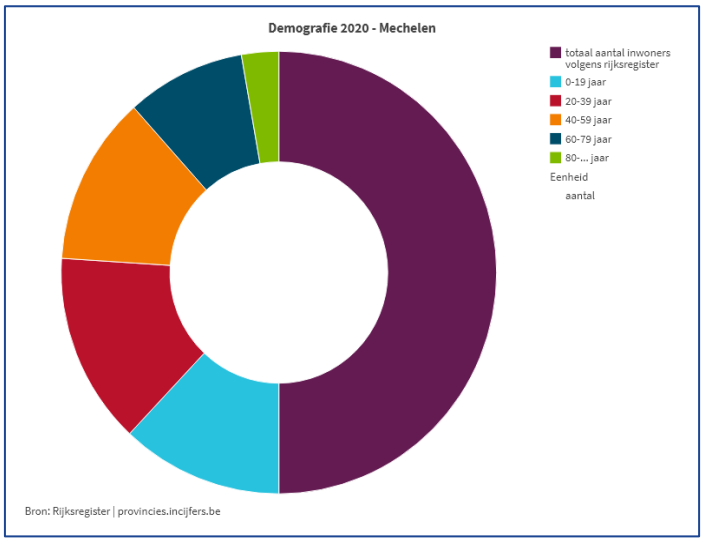



**Figure 3** Mechelen's demographic split in 2020.

*Source:* provincies.incijfers.be

## 2.1.4 Area (km2)

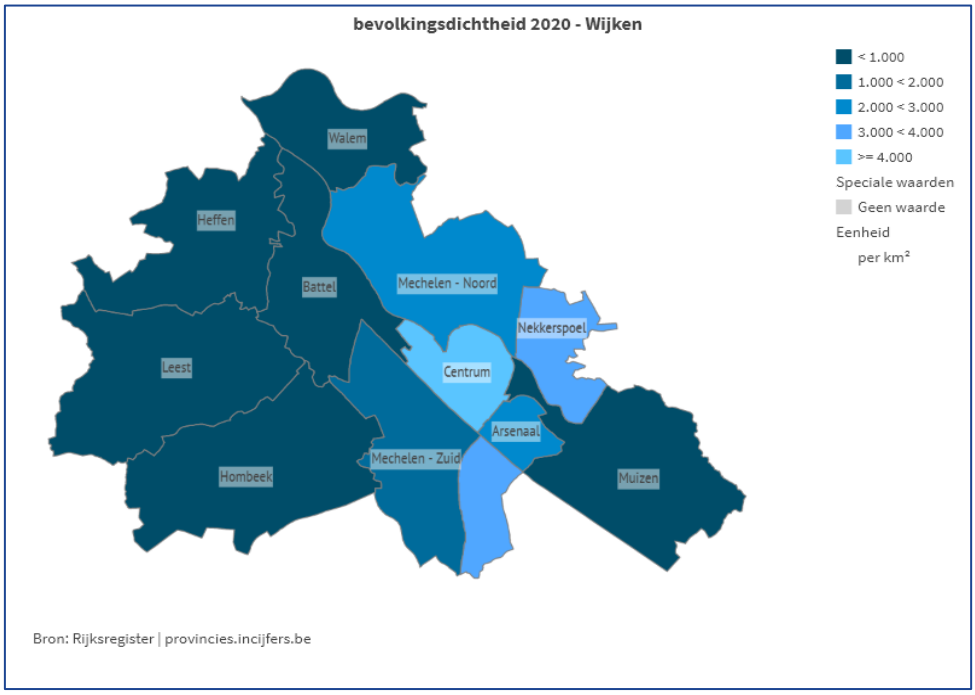



**Figure 4** Population density in Mechelen in 2020

*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

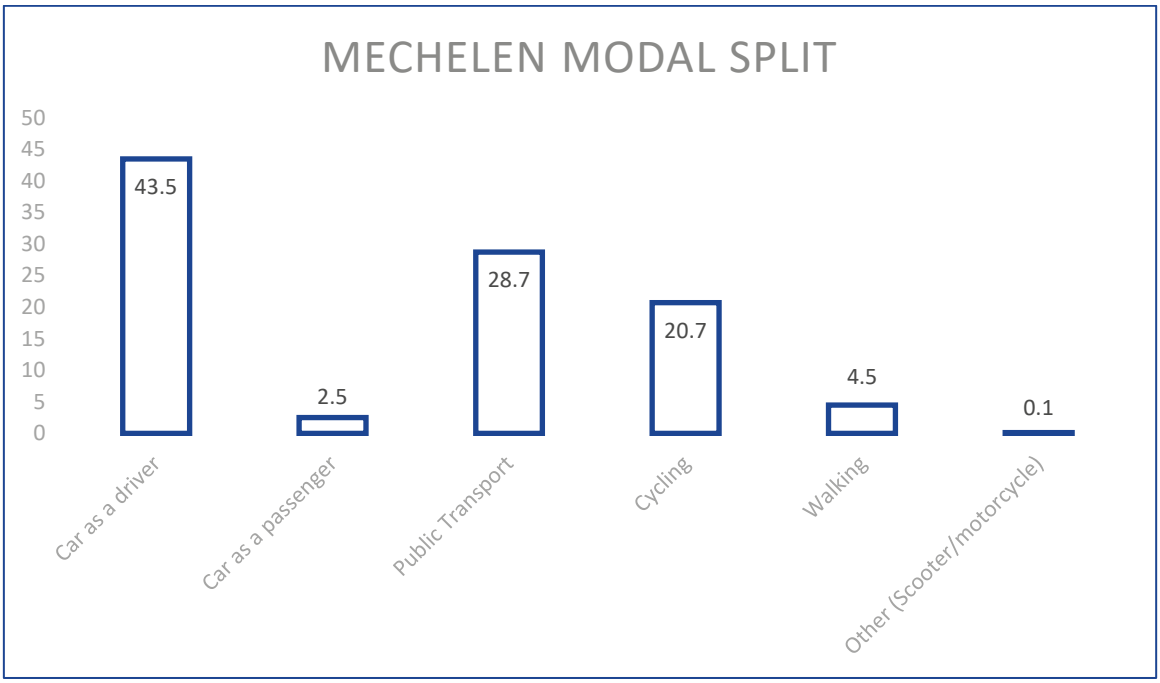



**Figure 5** Mechelen modal split

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 | - 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)<br>- bpost has fully implemented a fleet of more than 30 bike trailers plus other electrical vehicles to perform daily deliveries of mail and parcels<br>- 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 | - 55 small lockers that operate autonomously and can both function as a first mile and a last mile hub.<br>- 3 bigger lockers that are directly connected to the power system<br>- During the end of year period and the upcoming sales for retailers, the city approved adding 11 additional small lockers<br>All lockers are operated by Bpost. |

*Source: Mechelen*

## 2.2.4 Supporting policies for sustainable urban logistics

The city has a SUMP[1] 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 $CO^2$ emission.

The City of Mechelen is also one of the 76 partners that signed the first Green Deal[3] 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<br><br>Sustainable and Efficient City Logistics Covenant in Mechelen 2020 |
| Goals | • Become a pleasant, sustainable and accessible city<br>• Become a zero-emission city by 2030<br>• Work towards a more sustainable and efficient freight transport, with a primary focus on the city centre and the station environment:<br>  ○ a reduction in the number of transport movements & km driven<br>  ○ better air quality and reduction in $CO^2$ emissions by 40% by 2030<br>  ○ 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

| | |
|---|---|
| **Transport measures (with potential impacts on logistics)**<br><br>**Authority level specified in brackets (L = local, R = regional, N = national)** | **SUMP**<br>• Coordinate infrastructure projects with spatial projects (supra-municipality mobility projects) **(L)**<br>• 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)**<br>• Create a wide spread bicycle network **(L, R)**<br>• Establish a coherent and hierarchical road structure **(L, R)**<br>• Regulate heavy traffic routes to minimise the negative impact of road traffic on liveability in residential areas **(L, R)**<br>• Improve road safety through an improved accident policy **(L, R, N)**<br>• Improve public transport **(R)** |
| **Logistics measures**<br><br>**Authority level specified in brackets (L = local, R = regional, N = national)** | **SUMP**<br>• Create a freight route network coordinated at regional (Flanders) level **(R)**<br><br>**Covenant:**<br>*Period 2021-2022:*<br>• Experiment: define and roll out collaborative POCs (proof of concepts) to test new solutions **(L)**<br>• Draw up an investment plan to determine how the fleet can be adapted to zero-emission vehicles **(L)**<br>• Research and shape up the corresponding policy **(L)**<br><br>*Period 2023 - 2024:*<br>• Provide a legal framework that offers stakeholders legal certainty in the long term **(L)**<br>• Implement concrete policy with gradual transition towards a zero-emission fleet **(L)**<br>• Ensure transition to zero-emission taking into account technical innovation and availability of zero emission vehicles **(L)**:<br>  ○ 2023: 20% of deliveries with zero-emission vehicles<br>  ○ 2027: 50% of deliveries with zero-emission vehicles<br>  ○ 2030: 100% of deliveries with zero-emission vehicles<br>• Horizon 2030: zero-emission urban logistics **(L)**<br>  ○ 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 Logistics[5] 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 $CO^2$ 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 ODTH 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<br>2. Logistical network integration of crowdsourced bike couriers<br>**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<br>**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 ODTH. 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 cit. 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.