

SCALE-UP D5.1 Intermediate Report on Implementation of accessible and affordable innovative clean and safe mobility solutions

Version 1.0

Disclaimer

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User-Centric & Data Driven Solutions for Connected Urban Poles

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SCALE-UP

User-Centric & Data Driven Solutions for Connected Urban Poles

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D5.1 Intermediate Report on Implementation of accessible and affordable innovative clean and safe mobility solutions



List of Acronyms	
Acronym	Meaning
ATR	Antwerp Transport Region
EC	European Commission
OSM	Open Street Map
PV	Photovoltaic
Q	Quartile
SFR	Safe Freight Route
SULP	Sustainable Urban Logistic Plan
WP	Work Package

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This deliverable is a draft document subject to revision until formal approval by the European Commission.

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1. Executive Summary

Scale Up User-Centric and Data-Driven Solutions for Connected Urban Poles (SCALE-UP) is a four-year Horizon 2020 Innovation Action that started in June 2021. It brings together 23 partners from five different European countries. As part of SCALE-UP, three advanced urban nodes – Antwerp, Madrid, and Turku – team up around one main goal: developing data-driven and user-centric strategies to accelerate the take-up of smart, clean, and inclusive mobility, by means of well-connected and multi-usage urban nodes, and to the level needed to meet EU climate and transport objectives.

The three advanced urban nodes implemented several measures grouped into the five pillars of interventions: (i) governance, (ii) multimodality, (iii) digitalization of the data, (iv) clean, safe and inclusive transport system and (v) behavioural change. This deliverable aims to describe the current status of the measures focused in the fourth pillar to achieve a cleaner, safer and more innovative transport system in each of the three urban nodes, by focusing on the context, status, risks identified and corrective actions, preliminary results, and next steps.

In addition to the implementation of the measures themselves, knowledge exchange webinars were held among the 3 cities with the aim to learn from each other's experiences and build up capacity towards a more user-centric transport system.

2. Introduction

The objectives of the Work Package of Clean, safe and inclusive mobility solutions in which this deliverable is framed include:

- Design and demonstrate innovative clean and zero emission mobility solutions, with a special focus on shared e-mobility services scaled at the level of urban areas (vital in multimodal networks), and added value services (e.g. charging infrastructure management system).
- Promote the use of renewable energy and make use of solutions based on efficient smart grid use.
- Evaluate the safety implications that the new mobility solutions have in several scenarios, with a special focus on vulnerable users and safe freight routes for cities and regions.

2.1. Content and aim of the deliverable

This deliverable aims to show the advance in the clean mobility project by the three cities, Antwerp, Turku and Madrid. These three cities have very different challenges, but common goals for their efforts in promoting sustainable urban mobility.

The measures specifically considered in SCALE-UP related to Clean, Safe and more inclusive mobility solutions and that will be analyzed in the following sections are:

- A6. The Ring road as a highway for green energy
- A7. Electric bike sharing scheme for the Antwerp Transport Region
- A8. Safe routing for freight transport including collection of freight data
- M5. Scaling up shared (and active) e-mobility services
- M6. Promoting clean mobility (zero emissions) with supply/storage solutions
- M7. Promoting active mobility by deploying car-free areas
- T6. Speeding up inclusive Cycling in Turku
- T7. Carbon free city logistics and construction sites

For this intermediate report, the status briefing includes the context and background of the measure, the current status itself followed by a description of the risks and challenges found in its implementation, some preliminary results if available, and finally which are the planned and expected activities in relation to the measure until its full implementation.

2.2. Relation with other Work Packages & project activities

WP5, similarly to WP2, WP3, WP4 and WP6, are Work Packages focused on the implementation of the different measures proposed within the different pillars of intervention at each urban node. However, these measures will have to be upscaled beyond boundaries and governance level (vertical axe) but also considering all the layers of the multi-layered mobility system, actions directly linked to the WP1 of vertical and horizontal upscaling.

In addition, since WP7 evaluates and monitors the implementation and the impact of the SCALE-UP measures, there is also a continuous exchange between the



implementation Work Packages (WPs 2-6) and WP7 which also provides a baseline to serve as a starting point and a methodology for process of evaluation.

Moreover, another WP with bidirectional relation with WP5 is the WP8. The dedicated knowledge exchange webinars in which partners share their expertise and point of view with regard to a particular topic/measure give other partners/urban nodes the opportunity to exchange common challenges and experiences on how they have overcome them.

The work carried out in this deliverable is linked to the fourth objective of the project: “Provide access to clean, safe and inclusive mobility solutions”.

2.3. Thematic cooperation

Several workshops are being organized to share knowledge and experiences related to the work that is being done within this work package, and to build capacity around the topic of clean, safe and more inclusive modes of transport. Such exchanges result in new expertise, new insights and best practices, that can be of use for further developing, implementing and improving the different measures.

One of the elements noted during thematic cooperation is that the three urban nodes highlight the importance of focusing on the promotion of less pollutant and more active modes of transport like the walking or cycling. To reach this objective, not only the implementation of measures is important, but also behavioural change is necessary. This means a close relation exists between WP5 en WP6. This relation can be further explored in following thematic cooperation opportunities.

3. Context & status of the interventions

3.1. A6 – The Ring Road as a highway for green energy

3.1.1. Context

In this measure Antwerp is investigating how the Ring road can function as a carrier for sustainable energy, in line with the city’s Climate plan and the European Green Deal. The new Ring Road is situated around the city to make a better distribution of the traffic and avoid congestion inside. The energy demand for the ring road infrastructure is high. The aim of this measure is to produce all the energy needed for the new Ring Road infrastructure, so that it does not contribute to extra CO2



emissions.



Figure 1 Ring road location

This ambitious plan requires a lot of study work before actual implementation can take place. The ring road has been divided into different zones. For each zone, the potential in terms of energy and water generation is carefully calculated based on available technologies.

The solutions analyzed by the 'Water & Energy study' are not easy to adopt. Green energy production takes in a lot of space, that is also needed for other important fields.

Antwerp also wants to use the Ring Road infrastructural works to implement heat pipes or reservation lanes for the city-wide district heating network from the port. The combination of these works will save money and time and are much needed to contribute to a climate neutral city.

3.1.2. Status

The work carried out in this measure consist of several steps, both in terms of study work as implementation.

- The studying and analysing of road infrastructure energy neutrality and district heating has been done, including an analysis of Water & Energy, an analysis of potential district heating reservation lanes and the testing of scenarios.
- The report of the Water & Energy study is finished. This report analyses which ambitions of the water, energy and heating corridor are implemented in the different plans of the ring road parts.

- The implementation of the windmill in Ringpark Noordkasteel is not yet executed and is placed on hold.
- The analysis of photovoltaic (PV)-panels in sound barriers and on buildings is ongoing with Lantis.
- The Energy Hub Noordkasteel will be located at the other side of the Royerssluis. The renovation of the Royerssluis will take longer than planned. If the Hub is located at the other side of the Royerssluis (at the city side instead of at the Noordkasteel side), the connection to the buildings can be done sooner.

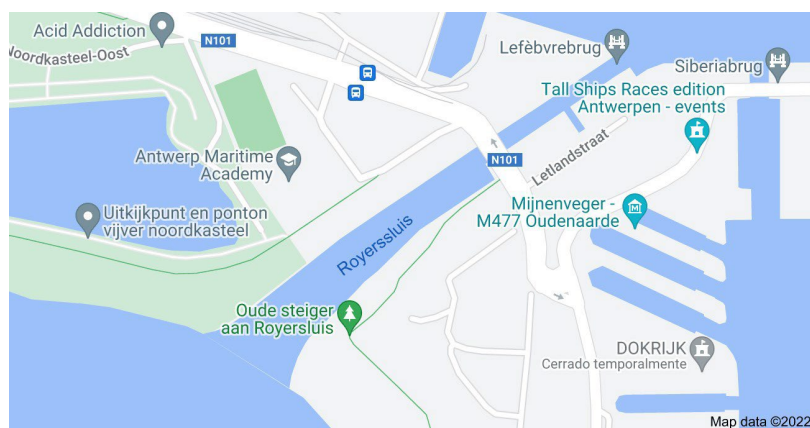


Figure 2 Energy Hub Noordkasteel location

- The detailed engineering of the heat pipes in the design of Lantis at Noordkasteel is ready.

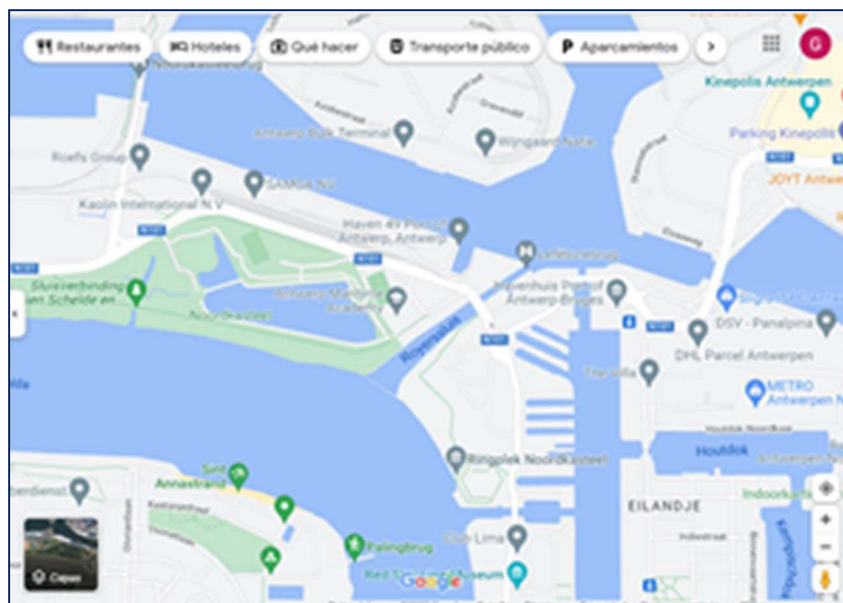


Figure 3 Head pipes in the design of Lantis at Noordkasteel

- The engineering of heat pipes at Ringpark West is ongoing with Lantis & Fluvius.
- The implementation of reservation lanes in the SRA-Antwerp plan is ongoing.

3.1.3. Risks found and corrective actions performed

With regard to energy production it is no surprise that windmills take up a lot of time to get organized. The city was looking at a parcel next to Noordkasteel to place the windmill, but the concessionary is leaving. The Port of Antwerp – Bruges does not know yet which new party will come there and whether it is possible to combine it with a windmill. That is why this project is now on hold until more is known about this. The city is working together with Lantis and VLEEMO to get the technical data in order, so that the project can move forward once the new concessionary is known.

3.1.4. Preliminary results

The implementation of the heat pipes for the district heating in the design of Lantis in Noordkasteel and Royerssluis has been achieved.

The study and analysis of road infrastructure energy neutrality and district heating has been done, including an analysis of Water & Energy, an analysis of potential district heating reservation lanes and the testing of scenarios. The report of the Water & Energy study is finished. This report analyses which ambitions of the water, energy and heating corridor are implemented in the different plans of the ring road parts.

3.1.5. Next steps

A lot of different steps are included in and related to the topic of this measure. Some specific next steps include looking at the specific reservation lanes on the East side of the Ring Road and the difficult crossings. The aim is to provide detail and is possible pre financing where it's needed. Next to that, technical data is needed related to windmill & PV panels in sound barriers. We will have to keep working on this direction to achieve the goals in the next months.

3.2. A7 – Electric bike sharing scheme for the Antwerp Transport Region

3.2.1. Context

The Antwerp Transport Region (ATR) is working towards a modal split of 50% for sustainable transport modes (Roadmap 2030). Next to improvements of the public transport, other sustainable alternatives are developed to increase the number of mobility options. The more options available, the bigger the chance to find an alternative close by or suited for your situation. The city of Antwerp already has a lot of shared mobility solutions among which the very popular velo-system (a pedal bike sharing system in the city of Antwerp and the districts). Because of the scale of the ATR (1.207 km²), a bike sharing system for the region needed to be electric to be useful. The e-bike has become a valid transport alternative to avoid congestion on the roads or as a combination with public transport for the first or last mile.

Lantis and the ATR are setting up an e-bike sharing system with the Danish company Donkey Republic. This project will make e-bikes accessible for everybody in the region and even beyond. This e-bike sharing system is very valuable for making the connection with regions or municipalities where the public transport is limited or where sustainable transport alternatives are underrepresented. An e-bike sharing system implemented on this scale (city of Antwerp plus 32 municipalities) and with this diversity in characteristics (metropolitan vs urban vs rural) is definitely a first.

3.2.2. Status

After Donkey Republic won the procurement process, the first step was to determine the locations of the hubs. The Hoppinpoints (the Flemish brand name for multimodal mobility hubs with connection to public transport) formed the base for this. Together with Donkey Republic an extensive trajectory was set up to inform the municipalities about the e-bikes, to discuss the location of the hubs and to have a look at the infrastructural needs for the bikes.

The network is divided in a base network (subsidised by Lantis) and an extended network in which municipalities and companies can opt for extra hubs and bikes. The roll out of the bike system started with the base network, which consists of 1.650 e-bikes spread over 204 hubs. By the end of the year every hub should be active, by the end of January 2023 every e-bike should be rolled out. The roll out is done in zones and started with the city centre (see figure). As of the end of October 2022, most of

zones 1, 2 and 3 have been provided with bikes.

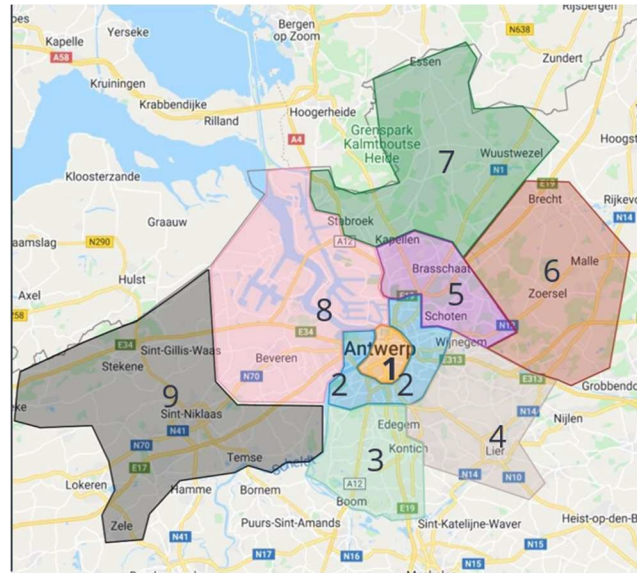


Figure 4 Zone roll out plan

The success of the system depends highly on having a bike available in the immediate surroundings. Every extra hub increases the chance of finding a hub nearby, increasing the chance of usage of the shared e-bike. Therefore, the project also relies on the extended network: e-bikes and/or pedal bikes subsidies by municipalities, businesses, business parks, universities, hospitals, At this moment 17 municipalities and 2 business parks have invested in this extended network, counting for 96 extra hubs with 305 pedal bikes and 96 e-bikes. Bringing the total of shared (e-)bikes on 2.051 bikes spread out over 300 hubs (see figure). For the users, there is no difference between a hub in de base or extended network.

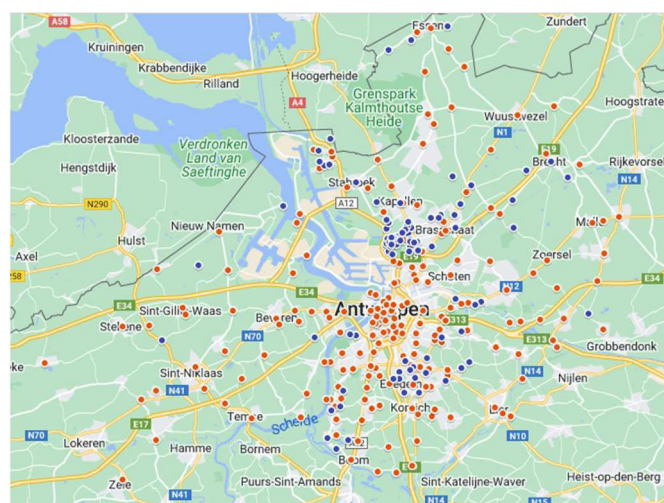


Figure 5 Red = base network, blue = extended network

The e-bike system is integrated in the “Smart Ways to Antwerp”-app and will be live in the next update (before the end of the year). From that moment, the shared e-bike will be a valuable option in the planned journey. Besides that, also with the Skipr-creditcard it is now possible to book a Donkey bike.

Besides informing the municipalities and determining where the hubs need to be, Lantis also set up a communication campaign. The pre-roll out campaign focused on introducing people to the e-bike system and Donkey Republic. A tagline was created “Alles binnen trapbereik” (everything within pedal reach) to focus on the possibilities of electric biking. A video was made, we made sure imagery was available and a press moment was organised. The municipalities are also involved in the campaign. Every stakeholder received an extensive communication package with a timeline for communication (teasing, introducing the system, feedback, follow-up), pictures, video, press material, social media material, facts and figures and the option to have a graffiti tagging in the run-up to the roll out.



Figure 6 Campaign poster and graffiti tagging

The first bikes are on the terrain, so we are also focusing on the reporting and evaluation and reporting of the system. Lantis has access to a city dashboard where different parameters can be seen and KPI's can be followed. By the end of the year, Donkey Republic must deliver his first quarterly report and plan for the upcoming year

3.2.3. Risks found and corrective actions performed

The main risk of the project is the timely and steady delivery of e-bikes. Some key components are heavily impacted by closed factories due to Corona. Overall, the e-bike market knows a big boom where demand for components and bikes is high, resulting in a scarcity. To mitigate this risk, we continuously apply the lessons learned. A complete analysis of the production process, extra quality controls, reducing of loss during transportation, eliminate bugs in the software, ... all to reduce the lead time of production and delivery.

As stated before, the denser a network is, the higher the chance of success. One of the most important tasks ahead is the continuous extension of the network. Once the network is rolled out, a second round of the municipalities will be held to convince them to invest in the network and further expansion. Besides that, Donkey Republic is actively contacting companies to open a hub (when close to the network) or to invest in business subscriptions for their employees (when more remote e.g. the port of Antwerp-Bruges). Both actions will support the goal of reaching 2.500 bikes in de ATR.

The MaaS-market in Belgium is still undeveloped. With being a solid alternative in the Smart Ways to Antwerp app and the possibility to book a bike via Skipr, a good start is made. The further follow-up of this market and the possibility for cooperation is ongoing.

As mentioned, it will be the first time that a shared bike system is roll out on this scale. Therefore, it will be important to continuous learn, adapt and improve to a new environment and matching the bike supply with the demands of very various regions (metropolitan vs urban vs rural). The interaction with other (bike)sharing systems also needs to be studied.

The system operates on a virtual hub basis with battery swap, so there is the advantage that there is no need to build any infrastructure for the bikes. However, we insist that municipalities provide as much as possible the possibility of bike racks to prevent falling and to keep the impact on public domain limited.

For a lot of municipalities, a bike sharing system is a new thing, so it is key that Donkey Republic keeps communicating towards the public through different kind of campaigns (offline and online).

3.2.4. Preliminary results

At this moment, 518 bikes divided over 88 hubs are rolled out in the region.



Figure 7 Rolled out hubs

From day one, we see a steady use of the e-bikes. However, with being only active in the city centre (with an abundance of mobility solutions) these results are not representative for the success. The full roll out of system needs to be awaited to draw conclusions.



Figure 8 Number of rental developments in Dnonkey Antwerp

3.2.5. Next steps

The first and most important next step is the successful roll out of the entire system in the different municipalities and business parks. Lantis will support Donkey Republic in this process.

At the end of the year a first quarterly report is expected, and the first results can be discussed.

After the roll out is completed, a big spring campaign is needed for potential users to learn about the system and how to use it. We will make advantage of the improving weather to promote cycling with the Donkey e-bike.

With the first data rolling in, the first user cases, the first feedback and lessons learned, ATR will keep adjusting and improving the system for the best user value.

3.3. A8 – Safe routing for freight transport including collection of freight data

3.3.1. Context

Destination or last mile freight transport with (large) trucks evokes risks on traffic safety and is one of the more taxing modes of transport, especially with a destination in urban areas. At the same time, with trucks being the most efficient way to bring large volumes to a destination, there is currently no viable alternative to supply essential businesses in urban areas (e.g., supermarkets) or trade hubs (e.g., Port of Antwerp-Bruges). Using a freight route with a minimal travel time in the centre would reduce the stress of truck drivers as well as the number of situations where trucks enter a vulnerable location (e.g., near schools), consequently reducing traffic safety risks.

The city of Antwerp, together with Be-Mobile and the ATR, is developing a freight route planner that aims to provide truck drivers with safer routes for their last miles in urban areas. With the help of this objective route planner, detailed information can be shared with concerned citizens, and citizen support base can be increased by motivating why a certain freight route goes through their street. Figure 9 shows the city centre of Antwerp, with the primary and secondary schools indicated (data from GeoPunt Vlaanderen¹).

Six parameters are used to generate safer (or less unsafe) routes:

¹ <https://www.geopunt.be/>



- **Road category.** Trucks are to stay on highest category roads for as long as possible.
- **Bridges / tunnels.** Bridges and tunnels most often avoid crossings and intersections, keeping freight traffic away from direct conflicts with other road users. This parameter is also included to make sure that vehicles do not use bridges or tunnels with height or weight restrictions.
- **Pedestrian areas and limited traffic zones.**
- **School areas.** Trucks should avoid school areas as much as possible. A school area is defined as a certain perimeter (buffer) around the school. It is clear that not all schools can be avoided, but the safest freight route should pass the least amount of vulnerable road user (VRU) areas.
- **School streets.** A school street is a street that closes during the beginning and end of school. During these time windows, trucks cannot access the street.
- **Sharp turns.** The route planner avoids sharp turns.

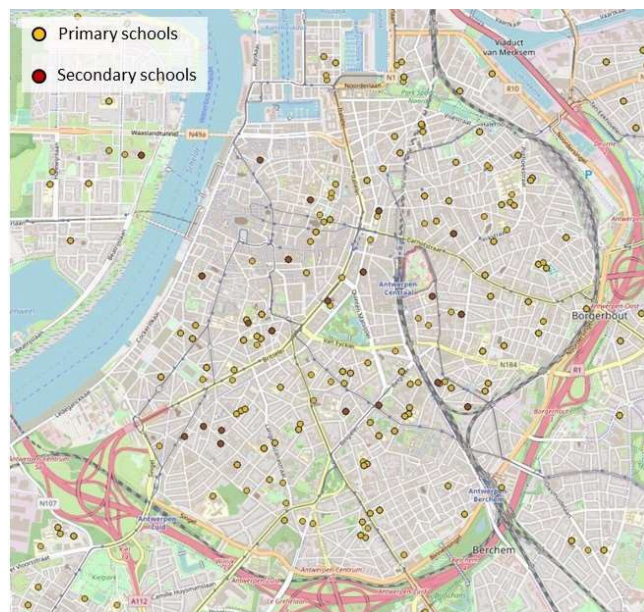


Figure 9: Primary and secondary schools in the city centre of Antwerp

Ultimately, the safe freight route should reduce stress for the freight drivers trying to minimize the unsafe situations, busy streets which are not fit for their truck, sharp turns, etc.

Be-Mobile develops the API and the route planner. City of Antwerp and Antwerp Transport Region provide Be-Mobile with the required data sets and policy requirements from the city and the region. City of Antwerp is measure leader.

3.3.2. Status

The first version of the Safe Freight Route (SFR) service has been rolled out and tested in the field during Q2 of 2022. This consisted of a specially developed route calculation algorithm coupled to the route guidance app Truckmeister. Outcome and feedback of the tests were carefully evaluated and are currently being used to further improve the service. This second version will be tested during Q1 of 2023.

Furthermore, first steps are being taken in the development of an interactive logistic map covering the Antwerp Transport Region. Both city of Antwerp and Antwerp Transport Region have identified key elements of this map and prioritized them. Be-Mobile will evaluate which of these elements can be integrated in the map regarding the available man months.

3.3.3. Risks found and corrective actions performed

While some of the data used for the parameters of the route planner are Open Street Map (OSM) based, many of the data (e.g. school streets) had to be manually collected. There is no direct link between the original data and the route planner, meaning that, should these data be altered, they are not automatically altered in the route planner. Keeping the data up-to-date is a risk encountered during the route planner development and will also be a risk for the interactive map development. A corrective action on this issue is somewhat out of scope for SCALE-UP. City of Antwerp and Antwerp Transport Region have addressed the Flemish Government for corrective actions, as SCALE-UP is not the only project where this risk occurs and as this risk occurs as well in municipalities outside of the Antwerp Transport Region. A solution could be found in a Flanders-wide platform or AI, for example.

It was difficult to find parties to participate in the first test. In Q2, the first on-the-field test was performed on a small scale, both with trips from private companies as with trips performed by operational departments of the city of Antwerp. In the months before, companies were contacted through different channels. Few of them were willing to participate. In Q1 2023, a second test will be performed. To cope with the abovementioned risk, recruitment has already started. City of Antwerp has attended a number of network events and presented the freight route planner project. Interested businesses could sign up through a form. They will be contacted later on. The Antwerp Transport Region and certain umbrella organizations will be activated too to search for interested parties.

3.3.4. Preliminary results

From the live tests of the first version of the SFR service, useful feedback was collected for further improvement. These tests were performed by truck drivers connected to the city of Antwerp, as well as drivers from the large retailing company Colruyt. Some examples of feedback (collected both through online surveys and interviews):

- School areas were successfully avoided as much as possible.
- Preferential roads for freight transport (e.g. the ring road) were successfully promoted by the SFR routes.
- Some routes contained sharp turns into narrow streets, which in practice were not possible for large trucks.
- Colruyt stressed how important it is to incorporate delivery windows (time windows where deliveries are allowed, different for each municipality).

Overall, companies and businesses are positive about the measure when presented to them. They are happy local and regional governments make efforts and provide them with additional information for their last mile in an urban area.

3.3.5. Next steps

The feedback was processed, and correspondent improvements are currently being implemented to the route planning algorithm. The new version of the SFR service will be tested during Q1 of 2023. After that, a new iteration of feedback collection and evaluation follows.

Interactive logistic map development will start in the next months.

3.4. **M5 – Scaling up shared (and active) e-mobility services**

3.4.1. Context

This measure is mainly to be able to have a mobile BiciMad service in order to attend different events around the city. The system is a portable electric bike docking station that you can move in order to attend the necessities you have in different places.

This measure includes 3 different actions:

- Creation of a portable electric bike docking station with its own power source and optional external AC power.
- Enlargement of BiciMAD system by adding bike stations out of the first ring road of the city, linking them with two Park & Ride facilities.
- Installing locks at the BiciMAD e-bikes to allow the freefloating operation of the system while increasing at the same time its resilience towards vandalism.

3.4.2. Status

The three actions have been accomplished and finished, except the physical deployment of the BiciMAD stations out of the first ring road, which will start in January 2023, due to its complexity.



Figure 10: Detail of the docks of the mobile BiciMAD station



Figure 11: Other detail of the docking positions of the mobile BiciMAD station, once the docks are removed when the mobile station needs to be moved



Figure 12: AVANZA BIKE and EMT Madrid team in front of the mobile BiciMAD station last November 3rd ,2022 (presentation day)



Figure 13: View of the new locks installed at BiciMAD e-bikes to allow freefloating operation



Figure 14: Madrid Mayor Mr. Martínez Almeida presenting the enlargement of the BiciMAD system last September 20th, 2022

3.4.3. Risks found and corrective actions performed

In the case of the BiciMAD mobile station, the access ramp was initially planned to be made out of wood but after it was designed, it could be seen it was going to be very heavy. From wood to aluminium was changed, making it much lighter in order to be deployed by only one person.

Having the access ramp made out of aluminium, the floor was very slippery when wet. Anti-slip bands had to be added to all the ramp in order to keep good traction and be stable when going up or down.

Some of the bolts could be reached from the exterior. They were replaced with theft-proof fixings in order to secure all the items.

For the other two actions, no risks have been found.

3.4.4. Preliminary results

In the case of the BiciMAD mobile station, every item has been tested in order to validate the correct operation of the complete unit.

All the locking docks work correctly, firmly securing each bike.

A driving test was performed in order to see if every part of the complete assembly kept in place and had no issues.

In the case of the enlargement of the BiciMAD system, the expansion plan will be distributed as follows in the six districts out of the first ring road (exceeding the scope of the SCALE-UP action):

- In Barajas, 15 new stations will be located to reach four of its neighbourhoods: Corralejos, Timón, Casco histórico and Alameda de Osuna.
- In Hortaleza, the 30 new stations will cover the six neighbourhoods that make up the district: Piovera, Valdefuentes, Canillas, Palomas, Apóstol Santiago and Pinar del Rey.
- In San Blas-Canillejas, the district will have 27 stations, spread over the neighbourhoods of Rejas, Simancas, Hellín, Arcos, Rosas, Canillejas and Salvador.
- In Vicálvaro, the 14 new stations will be located in the neighbourhoods of Valdebernardo, Casco histórico de Vicálvaro and Valderribas.
- In Villa de Vallecas, 18 stations will cover the three neighbourhoods of the district: Casco histórico de Vallecas, Santa Eugenia and Ensanche de Vallecas.
- In Villaverde, the 18 new stations will serve the neighbourhoods of Butarque, Los Ángeles, Los Rosales and Casco histórico de Villaverde.

The deployment of these new bike stations will start next January 2023.

Last, but not least, in the case of the locks installed in the BiciMAD system, a total number of 3.167 locks in BiciMAD e-bikes.

3.4.5. Next steps

The committed actions within the measure are all accomplished, being now under the monitoring phase.

3.5. M6 – Promoting clean mobility (zero emissions) with supply/storage solutions

3.5.1. Context

Reducing pollution in the centre of big cities is very necessary in the current context, to reduce not only emissions but also to improve the quality of life of the inhabitants.



Likewise, the need to replace conventional energy sources with renewables is almost mandatory given the current climate and geopolitical crises. The current measure aims to help in both contexts, promoting the use of public transport to reach cities, the use of electric vehicles and the intelligent use of energy.

The measure includes three actions:

- Developing a V2G pilot in a Park & Ride facility (AYESA - EMT)
- Upgrading “Electro-EMT” (EMT service App for the management of public fast charging infrastructure) by developing and integration API (ETRA - EMT)
- Installing EV chargers in at least three 3 of 7 BiciPARK secure underground cycling parking facilities managed by EMT (EMT)

3.5.2. Status

Regarding the first action, it aims to take advantage of V2G technology to improve the energy efficiency of buildings and the network. The electric vehicle user who decides to park his vehicle in a parking lot and continue by public transport to enter the city, will lend his battery while the vehicle is not in use. The user will benefit from certain economic measures both in the price of recharging his vehicle and in the municipal transport ticket used. On the other hand, the system operator will benefit from having the vehicle's battery to optimize the use of energy, being able to offer energy services based on mathematical optimization and predictive models based on Machine Learning.

Currently, the software platform that will connect with the charging points is in the development phase. The connection with the charging points has been tested in the laboratory with the manufacturer. Energy services are in the design phase and the software infrastructure that will support them is already in the implementation phase.

The charging point model has been chosen, being the Quasar model from the manufacturer Wallbox, with a load/discharge capacity of 7.4kW and CHAdeMO connection.

The installation requirements have been provided to proceed with the choice of the location where they will be installed.

Regarding the API integration for “Electro-EMT” action, due to the imminent new procurement that EMT is launching for the selection of the new provider of the managing software for its charging infrastructure, this work is going slow due to the



uncertainty of the tendering process. ETRA is starting to develop an integration for “ElectroEMT” to connect to MPass (EMT platform), including MPass single identity management, MPass charging model.

Regarding the EV chargers installation, EMT has already selected the three locations and will carry out the works by using own resources.

3.5.3. Risks found and corrective actions performed

For the V2G pilot in a Park & Ride facility action, the main risk encountered is related to the choice of charging point technology. Currently there are different technologies in terms of communication protocol between the electric vehicle and the charging point. The only one currently fully developed and defined for V2G, and with commercial technology for both electric vehicles and charging points, is the Asian standard CHAdeMO. The risk lies in the possible short/medium term requirement of the European Union to use European regulations at charging points. However, today it does not exist as such and there is no known date of market availability of these devices. The risk of being left waiting is considered greater, therefore it is decided to approach the project with the existing technology today.

Another risk would be trying to convince people to use the parking and lending their battery

For the API integration for “Electro-EMT” action, the main risk has been the timing itself, as due to the internal plans of EMT for the renewal of the charging infrastructure management software, the development of an integration API does not have sense anymore. The corrective measure has been taken, adapting the scope of the measure to the new one.

For the EV chargers installation, there is no risk detected, but the possibility of carrying out the measure by using own resources, which implies not using the equipment budget forecasted in purpose. Therefore, EMT has officially asked for the transfer of this budget to the measure M5.

3.5.4. Preliminary results

The main preliminary results have been achieved for the V2G pilot in a Park & Ride facility action:

- Choice of charging point model and technology
- Successful real connection between the software platform in cloud and the charging point through the OCPP 1.6 communications protocol.

3.5.5. Next steps

For the V2G pilot in a Park & Ride facility action:

- Acquisition of charging points
- Choice of location and installation of charging points
- Software development to implement energy services

For the API integration for “Electro-EMT” action:

- Starting the developments

For the EV charger's installation :

- Starting the installation of the EV chargers

3.6. M7 – Promoting active mobility by deploying car-free areas

3.6.1. Context

Assessment and implementation of car free areas not only in city centres but also at outer districts to enhance active mobility and increase liveability of dense city areas promoting active mobility.

3.6.2. Status

15 (out of 21) pedestrian zones have been already implemented throughout the city. MADRID is working on the communication of the measure to reduce opposition from the citizens.

So far, “light” pedestrianization has been done (signage). MADRID will start with infrastructure works soon (continuous pavement). Puerta del Sol will be the first fully pedestrianized.

- MADRID promotes the pedestrianizations. The measure is planned and executed by Madrid City Council.
- EMT cooperates in reorganizing its public mobility services affected by the pedestrianisation (bus service, BiciMAD, etc.)
- Residents, shopkeepers' associations and other affected groups are simply informed, but do not have an active role.

The latest status can be summarised in the following table.

Table 1 – Status of the pedestrian areas in Madrid

District	Street	Pedestrian Area (m2)	Street Area (m2)	Length (m)	Stablished (√)	
1	Centro	Puerta del Sol	18,488	9,702	1,447	√
2	Arganzuela	Guillermo de Osma Market - Alonso Carbonell	2,326	1,676	185	√
3	Retiro	Angel Gavinet - Averroes and Homero	2,325	2,343	238	√
4	Salamanca	Recoletos Street	2,307	2,316	218	√
5	Chamartín	Emilio Campion - Gómez Ortega	2,029	2,651	222	√
6	Tetuán	Tenerife	1,741	1,226	240	√
7	Chamberí	Olavide Square	26,766	14,036	631	√
8	Fuencarral-El Pardo	Historical Centre	1,412	1,153	136	√
9	Moncloa-Aravaca	Historical Centre	4,716	3,485	488	
10	Latina	Tirso de Molina Market - Doña Urraca and Laín Calvo	6,601	2,708	343	√
11	Carabanchel	Laguna St, Arévalo St, Albatros and Sabanero	4,586	6,271	351	√
12	Usera	Dolores Barranco Street	8,080	8,611	859	
13	Puente de Vallecas	Hermanos Carpi - Puerto de Tarancón	1,276	1,106	135	√
14	Moratalaz	Oberón Steet	3,039	3,036	146	√
15	Ciudad Lineal	Ministerios Street	14,058	8,443	640	√
16	Hortaleza	Historical Centre	2,762	2,445	355	√
17	Villaverde	Historical Centre	1,483	1,125	171	√
18	Villa de Vallecas	Agustín García Malla St.	1,946	1,946	133	
19	Vicálvaro	Historical Centre	2,205	2,205	217	
20	San Blas - Canillejas	Boltaña St.	3,373	2,832	207	
21	Barajas	Historical Centre	68,491	16,771	1,103	
	TOTAL		180,010	96,087	8,465	15



3.6.3. Risks found and corrective actions performed

Table 2 – Risk and corrective actions in M7

Potential barriers	Potential Drivers	Activities to be taken to achieve the goals	Risk level
Legal and institutional.			
Regulations by city council.	New accessibility ordinance.	New Accessibility ordinance.	Low
Coordination between involved entities	Madrid 360	Long forewarning for all stake holders	
Financial			
Construction phases in line with Council's budget constrains	Public and private collaboration	Budget planning.	Low
Political and cultural.			
Local acceptance	Life improvement and better accessibility for local business	Consultation among affected neighbourhood Consensus among the governing body for the approval of the pedestrianisation plan.	Low

Practical and technological			
Coordination between stakeholders and interested parties.	Accessibility to public transport.	Reorganisation of mobility flows around these areas, including affected public transport.	Low
Parking and last mile logistics	Accessibility to local shops. Improved mobility and accessibility for persons with reduced mobility.	Ensuring mobility and accessibility of residents, shop owners and businesses, and urban services. Schedules for loading areas and last mile delivery. Accessibility studies (people with reduced mobility).	

3.6.4. Preliminary results

So far 6.8 km of streets that account to 72,333 m² have barred to traffic. This has made possible an area of 103,995 m² to become car free and claimed back for the pedestrian.

This accounts to 58% of the pedestrian area, 75% of the street area and 80% of the street length.

3.6.5. Next steps

The next car free areas are to be implemented.



3.7. T6 – Speeding up inclusive Cycling in Turku

3.7.1. Context

The city of Turku has a bicycle development plan for 2029 (2016) that highlights the need for cycling coordination and targeted actions. Currently the only actions are carried out by the regional public transportation authority that arranges a school tour for first graders annually. For cycling or walking, however, there is no sustainable mobility activation available for kindergartens or schools. This has been recognized as a weakness that needs to be addressed holistically, focusing on inclusiveness and availability of services.

The city of Turku has had a bike sharing system operating since 2018, but no e-bikes are yet available for sharing. The need for e-bikes is indicated in the Climate Plan/SECAP 2029. Moreover, there is a lack of bicycle services that answer the needs of families, groups of children and regular cyclists.

In this measure an inclusive sustainable mobility activation model is designed and tested in two kindergartens and in three schools and then scaled up. The model aims to increase the skill sets of children and families on sustainable transport modes. In addition, the physical conditions are mapped and improved in the test units to support the activation. A specific focus is placed on targeted communication activities in the test units and on inclusive services. In the measure a minimum of three new bicycle services (e-cargobikes, children's bikes and repair stations) and e-bike sharing are designed, piloted, analysed and scaled up accordingly.

3.7.2. Status

Activation model

The fall 2021 was spent on gathering information on what has been done locally, nationally and internationally to promote active transportation to schools and kindergartens. Planning of the activation model suitable to Turku was started according to the data. Local and national networks and people around the theme were identified and contacted.

Recruiting the pilot sites (schools and day care units) started in the end of the year 2022 by identifying suitable target sites for piloting. Recruiting was harder than



expected since the personnel was very strained i.e., due to burden covid-19 has brought up. Last pilot site was recruited in the summer of 2022.

Several meetings were held with pilot sites during spring 2022 to fall 2022 to communicate about the project, to analyse the traffic environment in collaboration with traffic planners and to inform children and their parent´s about the project.

Appropriate measurements to evaluate biking skills of children was defined and created in collaboration with Turku University of Applied Science and with the help of national and international researchers. Kick bikes and children´s bikes were put out to tendering and procured during summer 2022 to enable equity of children in testing of skills and since there were strong signals that not every school aged child can cycle. Curriculum for cycling education was made accordingly.

Cycling tests were carried out at four schools during August to October 2022. Simultaneously cycling education started at schools and day-care units. First parent´s night with Scale-up theme was held at two schools in collaboration with police and Finnish road safety council.

Brochure on sustainable moving for each pilot site was made in collaboration with traffic planning. Brochure contains maps on how quickly school is reached by foot and by bicycle and map on safe routes and crossings to school. In addition, it contains information on why active school travel is important for children´s health and wellbeing as well as tips for independent school travel. Also, a biking skills task card was produced to inform parents about cycling skills of their children and to raise enthusiasm in children to practise. School materials of public transportation (Föli) have now incorporated walking and cycling into them.



Figure 15 Brochure front page

In trying to affect parent's and families habits on a broad front also a brochure on small children everyday movement was designed in the lead of Sports services of city of Turku, which will help health care personnel bring up the importance of everyday movement systematically with every family with 2 to 6 year old children.

Activation model has been introduced to several local and national target groups in webinars, meetings and at cycle fair held in Turku in August 2022 as well as few international scientists. Article on cycling skills testing will be published in a local newspaper "Turkuposti" in November 2022.

Bike services

A Turku regional bike brand was created and launched in Spring 2022. Five bike repair stations have been installed in the city with evaluation questionnaire from the project. A student work on cargo sharing was carried out in Spring 2022. Market analysis of the children bikes and e-cargo bikes has been done.

3.7.3. Risks found and corrective actions performed

Table 3 – Risk and corrective actions in T6

Risks found	Corrective actions performed
<p>Testing of cycling skills would compromise the equality of children as some of the student’s don’t own a bike, some live over 5 km away from the school, and some parents don’t let their children to cycle to school. Challenge to transport to share bikes between the pilot units.</p>	<p>Children’s bikes were put out to tendering and procured to enable participation of all willing children.</p> <p>Collaboration with employment services started regarding bike transportation and maintenance of bikes.</p>
<p>Finding new educational sites for the scaling up part, as the personnel at education sites are extremely strained.</p>	<p>The activation model must be well organized and need to take minimalistic work from the school and day care personnel.</p>
<p>How will the activating work continue after the project?</p>	<p>Cycling education during day care and school days is now piloted in collaboration with Sports services of city of Turku. Sports services will continue offering the service partly if the results are good.</p>
<p>Changing personnel inside the city of Turku with different agendas.</p>	<p>Trying to get ie. cycling teaching to guiding documents of different service areas.</p>

3.7.4. Preliminary results

Activation model has been well appreciated in the pilots schools and kindergartens. Personnel of kindergartens have gained ideas and courage to teach children cycling. Need for more systematic biking education has risen during fall 2022. Cycling skills track, task card and teaching of cycling has raised enthusiasm in children to cycle more.



Sports services, health care services and employment services of city of Turku are motivated to be part of the Scale-up-project.

Drop-off area of one school was redesigned and reconstructed during the summer 2022 now being safer for children. Multiple dangerous walking/cycling routes were identified and discussion with traffic planners continues how to address them.

As there are over 50 school units in the city of Turku there is a need develop a systematic and efficient tool to estimate unsafe infrastructure around school areas, which will help prioritize the investments timewise. Two different tools were used at pilot sites, and they showed up to be either too time consuming, difficult to use or too data-poor for scaling-up period and evaluating the state of traffic environment in every school of city of Turku.

Rotation of the procured bikes at different schools and day-care units is being done by employment services of city of Turku. They will also do the maintenance work. After the project sports services are willing to do the coordinating of bikes between different educational units. Recreational services are also willing to continue teaching of cycling skills if results are good.

National interest of the different materials produced has risen.

3.7.5. Next steps

- Next steps will be designing a sustainable mobility brochure for kindergartens in co-operation with traffic planner and participating in parents' evenings at target sites.
- Work to get more cycling activities to be included in school time curriculum, also at wintertime, continues.
- Spreading the awareness of the state of children's cycling skills amongst parents, personnel at target sites and management of the education services continues.
- Designing a campaign for target sites to motivate families using sustainable commuting also in wintertime (including cycling).
- All the data gathered by field tests (cycling) and by Webropol surveys will be analysed by the end of 2022.



- Recruiting of next five target sites for the scaling up -period will start in January 2023.
- Preparations for procurement on bike services and the launch of the procurement in the early 2023.

3.8. T7 – Carbon free city logistics and construction sites

3.8.1. Context

So far, the city of Turku has had logistics pilots with companies regarding logistic hubs and light e-vehicles in last mile deliveries. These initiatives together with the development of the city center, events and large construction sites have raised the need for a Sustainable Urban Logistic Plan (SULP). This has been acknowledged as one of the key areas in Turku Climate Plan 2029 regarding larger intake of e-vehicles and improvement of safety in several areas.

This measure is divided into two sub-measures. In T7.a, the city of Turku will develop a Sustainable Urban Logistic Plan with large stakeholder involvement. This plan focuses on enhancing freight distribution processes towards carbon neutrality, i.e., electrification and use of biogas in logistics. As part of the measure, the different actions carried out by the stakeholders will be showcased through social media and communication campaigns. The measure entails a specific focus on event logistics.

The second sub-measure T7.b is the development of a roadmap for the fossil free construction sites. This links to the city of Turku's commitment to the Green Deal of construction sites. This means that by 2030, 50% of all the construction transportations and sites in the city will be done fossil free. This measure also includes testing of a measurement model for the verification of fossil free construction operations in selected sites and promotion of e-vehicles/machines and charging infra for construction purposes. The lessons learnt from it will be incorporated into the procurement criteria of the city of Turku.



3.8.2. Status

So far In T7.a the city of Turku recruited a person for the task and had it for a short while, but it has proven hard to keep the necessary knowhow on logistics in the city organization, as the demand for such is high in business sector. So far only the existing materials have been collected for Sulp process.

In T7.b the roadmap for the Green Deal of construction sites has been done and a baseline situation of it has been analyzed. There are very few case examples on the topic and this issue needs to be addressed. Currently the focus is on looking into options on which tools to use to inform and create knowledgeable contractors and subcontractors for the city's development plans. This includes the promotion of the city's e-vehicle charging plan, which is slowly taking shape in guiding future development in the charging infrastructure in the city, both by the public and private sectors.

The testing of the measurement model is behind the obstacle of a lack of e-machinery in construction in the Turku area, but by promoting the investment in green machinery for contractors and by instigating procurement negotiations for the city works it is hoped to see a shift which will enable the movement in green sites, slowly but surely.

3.8.3. Risks found and corrective actions performed

By having significant changes happen in the investment culture of the contractors and by making sure the offered incentivization tools and measures hit the intended targets, we hope to not have to face situations where the city is unable to perform planned constructions because of failed tendering.

A major risk in relation to the project and indeed the 2030 carbon neutrality goal, is that this process is too slow. The procurement structures are rigid and failed processes may cost months of manhours, which of course is costly for the city. Therefore, it is vital that the procurement criteria and plans are updated in a balanced fashion in relation to the renewal of the machinery of the subcontractors.

The solution to help big contractors in the competition will prove harmful to medium and small companies and create a potential for monopolization and unequal power balance models within the public construction works.



3.8.4. Preliminary results

Putting the Green Deal into action has proven challenging because of the procurement structures. The main contractors use subcontracting when hiring the machinery. This in turn pushes the procurement of fossil free (in best case electric) machinery to small companies and in some cases even one-man-operations, which struggle with the investment costs. This way the financial hits are taken by the last operators in the procurement chain, while any incentivizing tools used by the city, tend to end up in the pockets of the main contractors. This process, along with the lack of resources and slowdown in production on electric and other low emission construction machinery, due to the different global crises, is making it difficult for the construction companies to apply the carbon neutral agendas in construction. While this is a very tangible obstacle for the carbon neutralization of construction sites, also a lack of knowledge and negative attitudes hinder the development.

The city is highlighting carbon neutral logistics initiatives in its communication. So far, the carbon neutral webpage ([Turku.fi/hiilineutraali-turku](https://turku.fi/hiilineutraali-turku)) has listed six examples of carbon neutral logistics, two of which are related to event management. The page is still only available in Finnish and as the number of examples grow the page will also be translated. The webpage raises visibility both for the companies and the different measures taken to cut emissions in the city.

3.8.5. Next steps

- Re-recruitment of Sulp resource for the city of Turku.
- Developing Sulp stakeholder engagement process in connection with the city of Turku's Sump process.
- Continuing the mapping of fossil fuel free construction works and companies
- Promotion of e-construction sites by different communicational measures
- Designing the logistics web page under [Turku.fi](https://turku.fi)
- Collecting and promoting different examples of carbon neutral logistics in relation to events.

4. Conclusions

This deliverable describes context, status, risks identified, and corrective actions, preliminary results, and next steps of the SCALE-UP measures framed in the multimodality WP5 Clean, Safe, Inclusive: A6, A7, A8, M5, M6, M7, T6 and T7.

Related objectives are to promote sustainable urban mobility, looking for green energy, zero emissions and promoting the car-free areas.

The three cities are pushing the use of public transport and increasing the number of mobility options. The e-bike has become a valid transport alternative to avoid congestion on the roads or as a combination with public transport for the first or last mile. Scaling-up the service making e-bikes accessible for everybody in the different districts or regions depending on the city is a key point.

Antwerp in its measure A6 contributes to a climate neutral city with the Ring Road as a highway for green energy, with measure A7 promotes the e-bike and with measure A8 working on planning safer routes for freight transport.

In Madrid with M5 a mobile BiciMad service is developed to attend different events around the city and promote the clean multimodality complementing the enlargement of the BiciMAD system, the expansion plan will be distributed for the districts of Madrid with measure M6 they look for promoting clean mobility (zero emissions) with supply/storage solutions. The implementation in Madrid of car free areas not only in city centres but also at outer districts to enhance active and clean mobility and increase liveability of dense city areas is what measure M7 is about promoting active mobility by deploying car-free areas creating pedestrian zones.

Turku is involved with measure T6 Speeding up inclusive Cycling, clean and inclusive mobility. A minimum of three new bicycle services (e-cargobikes, children's bikes and repair stations) and e-bike sharing are designed, piloted, analysed and scaled up accordingly. And with measure T7 – Carbon free city logistics and construction sites, Turku is working for achieving a cleaner city and is designing a Sustainable Urban Logistic Plan (SULP).



At this point the different initiatives and measures are progressing properly and are on the way to be successful, and finally make the life in the city and region cleaner, safer, and more inclusive and their services easier to access to all users. The evolution is adequate and according to the Grant Agreement schedule.

