Activity Deliverable

22193 Multi-Sustainable Digital Loading and Delivery Zones for City Logistics

DEL-01 “Living Lab Model Plan for Sustainable Loading and Delivery Zones per pilot city”

EIT Urban Mobility - Mobility for more liveable urban spaces

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List of Abbreviations

KPI	Key Performance Indicator/s
LDZ	Loading and/or Delivery Zone/s
LEZ	Low Emissions Zone
MGP	Métropole du Grand Paris
SaaS	Software as a Service
S+LOADZ	Sustainable / Smart Loading and Delivery Zones
TBC	To Be Confirmed
TBD	To Be Defined
WHO	World Health Organisation
Z-DUMA	Zone for Distribution of Urban Goods and Authorised vehicles

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1. Executive Summary

The first deliverable of the S+LOADZ project presents the analysis and definition of the living lab model plans for each pilot city, which are aligned with both the sustainable urban mobility and parking policies of each city to enable sustainable city logistics. WP 2 started in January 2022 and aimed to initialise the information exchange between project partners in order to identify key framework conditions such as pilot scope, technical and organisational implementation as well as regularity and sustainability requirements. To gather all the necessary information in the most efficient way, regular bilateral meetings between the technical and city partners took place, two consortium meetings were held and a city-based online survey was conducted. Thereby each city evaluated the legal framework according to current parking bylaws and experimental traffic orders for limited area were considered.

Furthermore, the deliverable comprises an operational plan (development and deployment plan) to install, regulate, control and monitor the loading zones. A communication plan, training plan as well as a quality assurance plan were set up. Finally, all partners collected KPI, including the management of expectations and end user's perspectives. In the process, this document will provide both scientific and practical information that were used to develop the city-specific model plans. The results in the form of living lab model plans are the groundwork for the subsequent working packages of the project, which makes this deliverable highly relevant for the success of the KAVA. Furthermore, it represents a practical guide targeting the comprehensive framework needed when implementing digital loading zones, as it articulates the problems with city logistics and how cities intend to address these problems via deployment plans taking into account the tools available / being developed in the S+LOADZ consortium. There are synergies with other work packages of the S+LOADZ project. The main output is to coordinate the city pilot preparations and to detect and manifest the key points of progress or issues that may require revision to the workplan.

From the report it is clear that three of the cities have made good progress in this process of articulation whilst the remaining two are now identified after the call-for-interest realised by Grand Paris. Also, the work task assigned to partner KEITA has been defined in line with the living lab models. Recognising that the consortium contains very different cities, at different stages of SLZ deployment several top-down actions have been developed such as survey questionnaire, deployment and communication plans, sharing of big data progress from WP3, etc to arrive at a coordinated perspective on what the living lab model should be. The work suggests that more than one living lab model is needed – primarily to reflect the different needs of the big - and small/medium cities segments.

Big city deployment: if City of Paris can consolidate / extend its deployment and achieve an operational system this will be a first result for the big city market. If the Ankara pilot is successful and is made operational, then it will have a new market segment ("markets") within the big city market.

Small/Medium City sustainable zones "bundle": if City of Vic can successfully demonstrate the proposed 10-minute limit for any vehicle in a configuration bundle aimed at eco-logistics then this will provide a new reference benchmark for Parkunload's most active market segment.

The highly successful call-for-interest managed by Métropole Grand Paris and Parkunload needs to be highlighted (almost 20 municipal authorities participated) at the same time as it is explained that the 2 selected cities will require an additional month time to configure their pilot plans, and for the consortium to assimilate this input into the living lab model plans.

2. Objectives of the Project

S+LOADZ adapts, deploys and pilots a mature TRL7/8 digital platform to control, regulate, monitor, and analyse "Multi-Sustainable Digital Loading and Delivery Zones in urban areas" in European capitals (Paris, Ankara), two large cities within Metropole du Grand Paris and the city of Vic near Barcelona, and develop a sound methodology towards market launch and analysis of key factors aimed at replication in many more cities.

The project aims to provide both operational and environmental KPI to accelerate the shift to Sustainable and Digital City Logistics, with the following project objectives:

- Demonstrate state-of-the art innovation and impacts of Digital Loading and Delivery Zones including novel features aimed at increasing sustainability and decarbonisation, advancing an already high TRL product with a strong go-to-market mindset.
- Design, deploy and pilot different types of Digital Loading and Delivery Zones in diverse countries, cities, and areas, which are subject to different legislation, operational scenarios, and on-street culture.
- Integrate vehicle emissions databases to develop advanced, data-driven policies to optimise urban freight aligned with air quality strategies in cities, which also include electric vehicle fleets, cargo bike hubs and night-time deliveries.
- Define and pilot novel nudge and reward strategies to promote shared use of the public parking space in a digitised, more efficiently managed kerbside.
- Collect and analyse Big Data from real logistics activity in each type of loading zone per city.
- Evaluate impacts and measure KPI per scenario, including the assessment of possible tax strategies to align City Logistics with Climate objectives.
- Publish recommendations to adapt parking bylaws at local, National, and European level to enable the digital transformation of sustainable Loading and Delivery Zones at large scale in Europe.

As an industrial partner, Parkunload leverages and operates its Smart Loading Zones platform, based on mobile apps and Bluetooth, incorporating additional features to align with Sustainable Urban Mobility Plans of cities in Europe.

2.1. Outcome and Impact of the Pilots

Significant environmental impacts are achieved when loading zones are digitalised. Achieving operational KPIs will result in positive environmental outcomes, such as (referred indicators are based on actual Parkunload implementations):

- + 30 % increase of parking rotation and available free spaces: less circling, less double-parking.
- + 50 % of reduction of illegal parking: vehicles with no permit or overstaying removed: less km driven per delivery.

The benefits for couriers concern the improved prospect of finding a free space to park at the first attempt, which initiates a virtuous circle of improvements for cities and citizens: less traffic congestion, increased road safety, decreased CO2 and air pollutants emissions and noise, and therefore improvements in the health of residents, ultimately enabling more liveable urban spaces aligned with EIT Urban Mobility's strategic priorities. Furthermore, more agile deliveries enabled by digitalisation contribute to the optimisation of operations by couriers, which ultimately generates a positive economic effect.

When pilots are linked to national vehicle emissions databases a sustainability baseline can be obtained, based on which KPIs will be defined, and monitored: indeed, new sustainability baselines will be obtained for Paris and Ankara, and baseline for Vic (Barcelona) will be updated. Further environmental impacts will be achieved by new zone types S+LOADZ 1, 2, 3 and 4. As per some indicative reference (which will be developed in detail in WP5) Deloitte estimated for digital loading zones: 17 % kg CO2/package, -30 % urban congestion, -5 % €/parcel.

Parkunload's platform Big Data will provide measurable evidence of the impacts sought at different levels, and the efficiencies unlocked through the digitalisation of loading zones, and by demonstrating dynamically managed kerbsides in pilots across 5 cities (target management of 500 + Sustainable LDZ) will contribute to the digitised economy in Europe.

3. Living Lab · City of Vic

The city of Vic is located in the NE of Spain (Figure 1), 70 km north of Barcelona, in the Catalan region with a population over 50,000 inhabitants in a total urban surface of 31 km^2 in a zone outside the metropolitan area of Barcelona.

Figure 1. Infrastructure map of Vic and nearby cities

Its long history, present in the neighbourhoods and places of the historic centre, coexists with the new urban growth, which shows the dynamism of a cosmopolitan city, expressed through the resurgence markets, the consolidation of the University of Vic and the growth of industrial areas.

The numerous businesses established in the city centre of Vic are highly specialised and attractive, including a number of bars and restaurants. In addition, the industrial sector is diversifying, and the traditional leather industry has left behind metallurgy and agri-food, which is now the dominant industry. As a service centre, it has a varied range of infrastructure and administrative, health, educational and social services.

3.1. City Logistics Overview

According to city officials, the city has faced several problems in the most centric located loading and delivery zones of the city, which are surrounding the city centre and main commercial streets:

- Increase in parking demand for deliveries.
- Low parking rotation in loading and delivery zones.
- Misuse of parking spaces: overtime, lack of permit, etc.
- Traffic congestion due to double line parking.
- Inefficient parking control methods.
- Road safety that reduces the liveability of residents.
- Lack of mobility data related to urban freight vehicles.

As a measure to face these problems, in June 2018 the city of Vic started the deployment of the **digital loading and delivery zones** called Z-DUMA (Zona de Distribució Urbana de Mercaderies i Altres Vehicles Autoritzats) that stands for “Parking zone for distribution of goods and other vehicles. (Ajuntament de Vic (ed.), 2021)

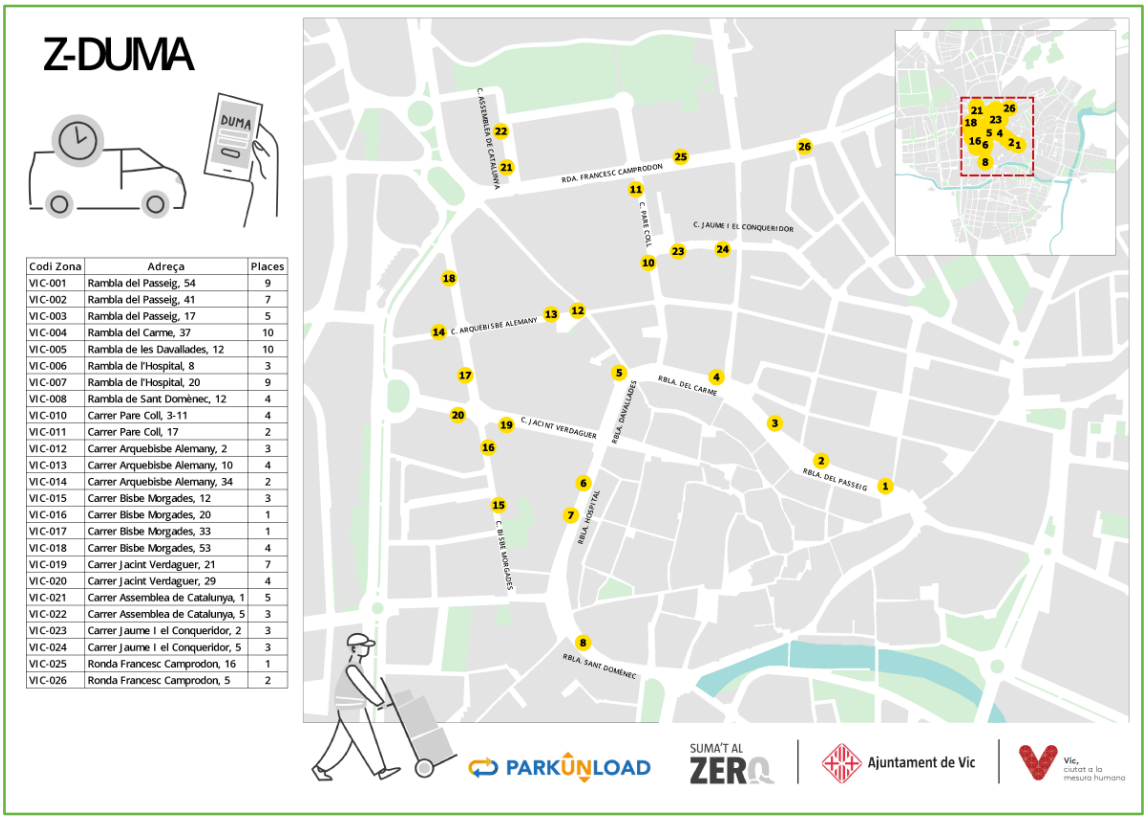
Figure 2. Parkunload sign example in Vic

These zones are regulated, controlled, and monitored with the signs and mobile applications provided by Parkunload, which are mandatory to use for drivers (Figure 2). These are free-of-charge loading zones with the following parking permit and time limit:

- Vans, trucks and commercial vehicles: 30'.
- Vehicles of nearby residents: 10'.
- Reduced Mobility: Unlimited.
- Other private vehicles: Prohibited.

Regulations fall on the main operating hours of logistic delivery, spanning from 8 am.– 8 pm. on weekdays Monday – Friday and 8 am. – 2 pm. on Saturdays.

The city council of Vic has already digitised 25% (Zona-DUMA) out of the available loading zones, starting in June 2018 with 46 loading spaces near the city centre (see Figure 3) and expanding them with 61 additional loading spaces in 2021 (Ajuntament de Vic (ed.), 2021).



Codi Zona	Adreça	Places
VIC-001	Rambla del Passeig, 54	9
VIC-002	Rambla del Passeig, 41	7
VIC-003	Rambla del Passeig, 17	5
VIC-004	Rambla del Carme, 37	10
VIC-005	Rambla de les Davallades, 12	10
VIC-006	Rambla de l'Hospital, 8	3
VIC-007	Rambla de l'Hospital, 20	9
VIC-008	Rambla de Sant Domènec, 12	4
VIC-010	Carrer Pare Coll, 3-11	4
VIC-011	Carrer Pare Coll, 17	2
VIC-012	Carrer Arquebisbe Alemany, 2	3
VIC-013	Carrer Arquebisbe Alemany, 10	4
VIC-014	Carrer Arquebisbe Alemany, 34	2
VIC-015	Carrer Bisbe Morgades, 12	3
VIC-016	Carrer Bisbe Morgades, 20	1
VIC-017	Carrer Bisbe Morgades, 33	1
VIC-018	Carrer Bisbe Morgades, 53	4
VIC-019	Carrer Jacint Verdaguer, 21	7
VIC-020	Carrer Jacint Verdaguer, 29	4
VIC-021	Carrer Assemblea de Catalunya, 1	5
VIC-022	Carrer Assemblea de Catalunya, 5	3
VIC-023	Carrer Jaume I el Conqueridor, 2	3
VIC-024	Carrer Jaume I el Conqueridor, 5	3
VIC-025	Ronda Francesc Camprodon, 16	1
VIC-026	Ronda Francesc Camprodon, 5	2

Figure 3. Map of digitised Z-DUMA parking zones

To implement digital loading zones, the City Council amended and approved new parking bylaws, which includes a new name for the “Zona DUMA” with particular parking rules.

According to this, the local parking agents have been trained to enforce parking control on the digital loading zones and they are able to issue penalty notices in case any vehicle either overstays or parks without starting a parking session with the Parkunload app.

As a result of the implementation of digital loading zones started in June 2018, the city has already achieved measurable slightly positive operational effects:

- Higher parking rotation and available free parking spaces.
- Clear reduction in illegal parking: overstay, lack of permit, double line, etc.
- Higher productivity in parking enforcement tasks, based on digital means.
- Higher optimization of scarce public spaces.

Environmental effects can mainly be seen within the reduction of traffic congestion, as well as the reduction of km per delivery. Nonetheless, digital loading zones do obtain a high level of acceptance among stakeholders such as City Council, residents, or logistics operators. Local business or parking enforcement agents have a neutral opinion on the topic. Hence, even the current loading areas are positive for the local mobility, there is a room to improve both regarding the sustainability objectives and user acceptance.

3.2. Health Impact

In July 2019, the City Council of Vic finally approved the revised text of the POUM (Urban Development Plan) of Vic, which has been created considering the health determinants on which a plan of this nature can have an impact, in order to reduce or eliminate the negative impacts and increase the positive ones.

From this moment on, the government team establishes health as a transversal axis in all its policies and works with the will to consider the impact of health in the municipal budget.

The urban environment, in which people develop their daily lives, plays a very important role in the health of people from different factors:

- Atmospheric pollution: 51 % of atmospheric emissions come from land transport.
- This pollution has an important impact on the environment, but it is also associated with health problems such as respiratory, cardiac and arterial diseases and cognitive development problems in children, among others.
- Noise pollution: 80% of the noise in cities comes from motor vehicle traffic. Being exposed to higher levels than those recommended by the WHO throughout the day and night, is associated with risk factors for discomfort and alterations of sound, stress, hypertension, cardiovascular diseases, diabetes, etc.

- The "heat island" effect: inside the cities there are higher temperatures than in the peripheral areas of the cities. This is caused by the energy, in the form of heat that is released from energy consumption, the functioning of activities and transport itself, as well as by the type of materials used in construction and the lack of green (vegetation) and clear (water) spaces. This "heat island" effect is also associated with risk factors for premature mortality, cardiovascular and respiratory diseases, fatigue and injuries due to accidents.
- Traffic accidents: accidents are the leading cause of premature death in young adults aged 15 to 24 years. It also leads to loss of quality of life for all those who have been involved in a traffic accident. In Vic there is a high number of road traffic accidents and collisions between vehicles attributed to distractions of drivers (and the parking search is one of the circumstances where the driver is more distracted).
- Physical activity: The WHO considers that it is necessary to do 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity per week, however, there are studies that indicate that many citizens do not achieve this recommendation. The health effects of not having good levels of physical activity are many, and most of them are widely known, such as cardiovascular problems, respiratory problems, diabetes, obesity, but others may not be so well known such as increased risk of breast or colon cancer, dementia, mental health problems, among others.
- Lack of green and public spaces: according to the WHO, each person should be able to have a green space or an open space at a maximum distance of 300 linear meters from their home. Having this type of space is associated with an increase in physical activity index, reduction of stress, improvement of mental health, social interaction and cohesion, increase of biodiversity and reduction of pollution and noise levels.

The mobility model of a city has a direct or indirect impact on all these factors, and therefore, the mobility model for the distribution of goods is also a contributing element.

The fact of being able to regulate and control efficiently the parking for urban distribution of goods allows to reduce the number of vehicles that circulate looking for a parking space (eliminating or reducing indiscipline and increasing rotation) and this implies:

- Less atmospheric pollution derived from the extra kilometres of circulation that a vehicle must make to find a free parking space to park and make the loading and unloading.
- Less noise from the vehicles, and less honking horns when vehicles park in double files or in other unauthorised places.
- Less risk of accidents because the vehicles must spend less time moving to find a parking space, but also because the driver can work in a less tense environment to manage to deliver all the day's goods.
- The optimization of parking spaces can allocate road space to urban green or other road users who may need it at certain times.
- The shopkeepers of the premises that must receive the merchandise can also better assure the moment of delivery and the relationship with the delivery person can be calmer (more civilised).

3.3. Project vision and focus

The current project S+LOADZ (Multi-Sustainable Loading and Delivery Zones), which is co-funded by the EIT Urban Mobility's Innovation Call 2022, represents a great opportunity for the city to extend and expand digital loading and delivery zones with additional sustainability criteria (Figure 4).

Figure 4. Logos of Vic City Council, City of Vic and Suma't Al Zero program

Considering that the city of Vic has been experimenting with digital loading and delivery zones for almost four years, it can be considered that this is an advanced City Lab regarding Urban Logistics with 107 loading spaces distributed among 30 digital loading zones (Z-DUMA).

The S+LOADZ pilot in the city of Vic is focused on the following new subjects:

- Urban Logistics and short-term parking in pedestrian areas of the city.
- Impact of pollution episodes and Low Emissions Zones in digital loading zones (Z-DUMA).
- Short-term parking zones near primary services of the city.
- Cargo-bikes and non-motorized vehicles parking in digital loading zones (Z-DUMA).
- Data-driven optimization of scarce public parking spaces based on both operational and environmental KPIs.
- Considering Communication channels with end-users throughout the mobile app.

By developing innovative digital solutions in these areas, the city aims to facilitate sustainability with features supporting improved air quality and reduction of mileage per delivery.

3.4. Problem Statement

During the WP2, project partners and Vic's stakeholders have performed several meetings to define the scope of the pilot project in the city, according to the next problem statement:

- Inefficient parking control of urban delivery vehicles, residents and authorised visitors in the largest pedestrian area of the city. It also includes bikes and cargo-bikes.

- Management of urban mobility and parking restrictions during pollution episodes, which may be required in 2023.
- Management of urban mobility and parking restrictions in Low Emissions Zones, which may be required in 2023.
- Cargo-bikes and other non-motorized vehicles cannot park in the digital loading zones of the city.
- Low parking turnover, illegal parking and inefficient parking control in short-stay parking zones near primary services, such as chemistries.
- Further reduce misuse of parking spaces for loading and delivery tasks in the city.
- Further optimisation of the scarce short-term public parking spaces in the city.

3.5. Pilot Scope and Objectives

In order to solve the current problem statement in the city of Vic, the S+LOADZ project plans to execute the following tasks in order to achieve the sustainability goals related to City Logistics:

- **Create new digital loading and delivery zones in large pedestrian areas of the city,** for deliveries and authorised visitors, which is complementary to an existing access control system based on cameras.
- **Allow cargo-bikes and other non-motorized vehicles parking in Z-DUMA,** based on a new local licence plate method for cargo-bikes and by applying specific parking regulations for this type of vehicles.
- **Pilot and analyse impact of additional parking restrictions during pollution episodes in Z-DUMA,** based on vehicles' environmental badge to further restrict either parking permit or time limit.
- **Pilot and analyse impact of additional parking restriction in Low Emission Zones (LEZ),** based on vehicles' environmental badge to further restrict either parking permit or time limit.
- **Implement restricted short-stay zones near primary services,** such as chemists.
- **Further analyse parking data considering several scenarios** to optimise and promote sustainable city logistics, considering a shared-use of the public parking spaces.
- **Create a communication channel** between the city and frequent end-users to send notifications regarding the city context, such as during pollution episodes, within Low Emissions Zones or due to the update of parking regulations in the Z-DUMA.

According to this, the S+LOADZ project scope planned for the city of Vic is as follows (Table 1):

	Covered area	Local infrastructure	Admin & Legal
Digital loading zones in pedestrian areas	Pedestrian areas in city centre (3)	Additional signs. 28 Bluetooth sensors	Current city parking by-laws
Cargo-bikes parking in Z-DUMA	Current Z-DUMA	As it is	Local licence plates for cargo-bikes, inc. GDPR amendment
Pollution Episodes in Z-DUMA	Current Z-DUMA	As it is	As it is
Low Emission Zones in Z-DUMA	Current Z-DUMA	As it is	National legislation
Short-term parking near primary services	Chemists in the city (12)	Additional signs with 12 Bluetooth sensors	Current city parking by-laws
Advanced Big Data analytics reports	City	N/A	GDPR. Anonymized and aggregated data
Addition comms channel for cities	City	N/A	Probably GDPR amendment

Table 1. Planned project scopes for Vic's S+LOADZ deployment

3.6. Parking Regulation and Control

According to the city official of Vic, the parking rules in the digital loading and delivery zones planned to be deployed during the S+LOADZ project is as follows (Table 2):

	Z-DUMA Loading zones	Primary Services Short-stay zones	Pedestrian Areas Delivery zones
Trucks, vans and light commercial vehicles	30'	10'	10' (pre-authorized)
Cargo-bikes / non-motorized vehicles	30'	10'	10'
Vehicles of nearby residents per area	10'	10'	10' (pre-authorized)
Vehicles of people with reduced mobility	Unlimited (due to national legislation)	TBD	TBD
High polluting vehicles during pollution episode	Prohibited	N/A	Prohibited
High polluting vehicles in Low Emissions Zone	Prohibited	N/A	Prohibited
Other private vehicles	Prohibited	10'	10' (pre-authorized)
Regulation hours	Mo-Fri 8am to 8pm Sat 8am to 2pm	TBD	TBD

Table 2. Planned parking restrictions for S+LOADZ zones in Vic

Vic is currently analysing with their legal services if the city's parking bylaws would need to be amended to properly regulate both short-stay zones near primary services or in pedestrian areas.

In the city of Vic, local parking enforcement agents have been trained to control parking conditions in the digital loading and delivery zones of the city (Z-DUMA), since September 2018.

Figure 5. Parking control mock-up

Highlight that those are not police agents but are employed by a private parking operator that also enforces the parking regulations in paid on-street parking zones of the city (Blue and Green zones, see Figure 5).

Parking enforcement agents are using Parkunload's control app to check the parking status of vehicles in real-time.

According to the Communication plan of the city, civic agents are also responsible for leaving informative leaflets in the windscreen of the cars with additional information related to digital loading and delivery zones, as well as precise instructions to download and use the Parkunload app.

3.7. Development Plan

According to the requirements for the city of Vic, the S+LOADZ project plans to develop the next technical features during the pilot:

- **Integrate cargo-bikes (Electric Pedal-Assisted Cycles: EPACs) in the delivery zone solution**
    - Requires a revision of the Driver APP (new type of vehicle) and development of a municipal EPAC registration system.
- **Administration of parking conditions during pollution episodes, as well as in Low Emissions Zones (LEZ)** at Parkunload platform.
    - Requires gathering vehicles' environmental badge data from official vehicles' database in Spain from DGT (Dirección General de Tráfico).
    - Requires managing communication channels to end-users such as SMS or similar.
- **Design and develop variable and dynamic parking conditions based on vehicles emissions category** at Parkunload platform.
    - Define emission-based parking rules per zone, group of zones and cities.
- **Create a new type of Loading and Delivery Zones in pedestrian areas** at Parkunload platform.

- Requires new zone types, vehicle types and additional authorised vehicles.
- Requires integration with camera-based systems located at the entries of the pedestrian areas in the city of Vic.

- **Create a new type of short-stay zone for primary services** at Parkunload platform.
  - Requires new zone types, signage and additional communication features.
- **Create advanced Big Data Analytics reports for the city** to further analyse sustainable city logistics strategies based on historical parking data before, during and after the pilot.
  - Requires transference of large amounts of data between the two cloud-based platforms used by Parkunload.
- **Integrate big data sources from Parkunload to KEITA's micro-subsidies platform**.
  - Requires transference of large amounts of data between cloud-based platforms.

Highlight that additional features to be developed in Parkunload impacts several components of the platform, such as mobile app for drivers, mobile app for parking enforcement agents, web-based Back Office application, central services and Big data reports (see Figure 6).

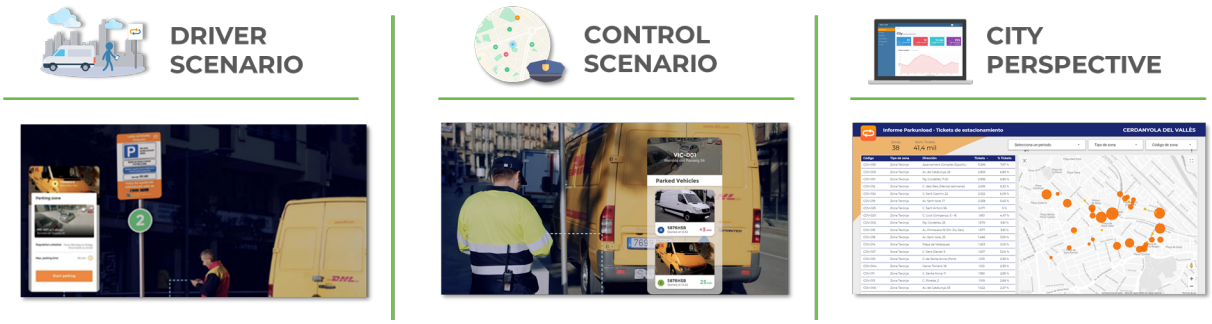


Figure 6. Parkunload usage mock-up for drivers, control agents and data aggregation

3.8. Deployment Plan

According to the requirements for the city of Vic, the S+LOADZ project plans to execute the following tasks during the deployment plan:

- **Legal requirements in parking bylaws** (if required, several months). If required, amendment of the current city parking bylaws according to the legal advice services on public policies. In addition, a legal framework for municipal registration of EPACs / cargo-bikes has been identified.

- **Design, development, test, homologation and launch** of the upgraded version of Parkunload platform including the "multi-sustainable pack" (up to 4 months). As described in the "Development plan" section per city.

- **Design, manufacturing and installation of road signs** per digital loading and delivery zone (up to 3 weeks).

- **Execution of the communication plan** before, during and after launching the pilot. As described in the "Communication plan" section of the document.

- **Execution of the training plan** before, during and after launching the pilot. As described in the "Training plan and customer support" section.

- **Execution of the Quality Assessment plan** before, during and after launching the pilot. As described in the "Training plan and customer support" section.

- **Execution of the operational stage of the pilot**, including SaaS, customer support and parking control tasks.

  Currently the deployment plan for the city of Vic covers the following short-stay zones for primary services (Green star) and three largest pedestrian areas of the city (see Figure 7):

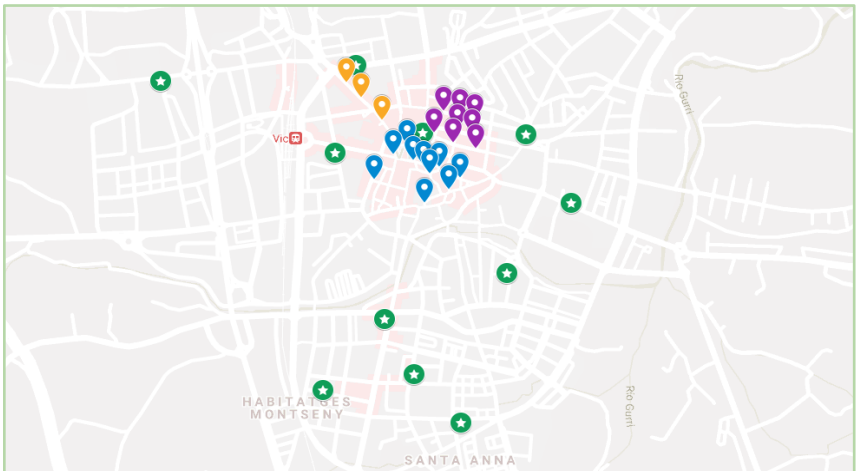


Figure 7. Planned S+LOADZ zones in Vic

4. Living Lab · City of Paris

The Ville of Paris is the capital of France and home to about 2.2M residents across an area of 105.35km², whereas the metropolitan area hosts around 12.5M residents across 17,174 km² as of 2015. As such, Paris is the most densely populated city in the European Union (Institute national de la statisque et des études économiques (ed.), 2018).

Figure 8. Picture of the Arc de Triomphe de l'Étoile in Paris

The City of Paris is the centre and seat of government of the region and province of Île-de-France with about 18 %of the population of France (Préfecture de la région d'Île-de-France, préfecture de Paris (ed.), 2018).

The City of Paris aims to offer its users efficient structures and networks that allow the movement of people and goods. The dynamism and economic prosperity of the city are closely linked to the exchange of goods that meet the needs of the population and businesses.

However, the inhabitants and users of these territories aspire to a healthy and peaceful living environment which is difficult to live with the nuisances and inconveniences generated today by the transport and delivery of goods.

4.1. City Logistics Overview

In the city of Paris, deliveries are increasingly frequent and demanding (tight flows, new ways of consuming, etc.), and take place at unusual times in residential neighbourhoods where they were not previously known. Logistics therefore has a huge impact on the road network (congestion, pollution, occupation of public space, etc.).

The delivery area is, in fact, the only urban logistics and distribution tool on public space in Paris. The delivery area is part of the fine scale of the street and has a real impact on maintaining commercial dynamism. Its primary function is to allow a vehicle to stop to load or unload goods, for a maximum of 30 minutes in Paris.

However, there is a lot of abuse of delivery areas, parking of private individuals and tradesmen for several hours at a time. Deliveries are then made in double file. The Urban Goods Transport Surveys have shown that 75% of deliveries are made outside delivery areas: areas occupied (legally or illegally), poorly sized, poorly positioned, non-existent. The fact that delivery operations are carried out in the middle of the road is both a factor of urban congestion and an accident hazard.

According to city officials, the city is facing several problems in the loading and delivery zones:

- Low parking rotation in loading and delivery zones.
- Misuse of parking spaces: overtime, lack of permit, etc.
- Traffic congestion due to double line parking.
- Inefficient parking control methods for loading or delivery zones.
- Road safety that reduces the liveability of residents.
- Lack of mobility data related to urban freight vehicles.
- Delivery vans/trucks occupying cycle paths or pedestrian curbs.

Approximately 6.000 delivery areas (9,700 delivery parking spaces) are marked in Paris, 1/3 of which are allowed exclusively for delivery vehicles 24H/7 and 2/3 are "shared", i.e.; open to private parking at night. The markings on the ground are differentiated: a solid double line for exclusive areas, dotted lines for shared areas (see Figure 9).

Figure 9. Information about different parking zones for non-commercial usage

A delivery area is a stopping zone and not a parking area. It is intended for the loading and unloading of goods or people, with the driver remaining close to his vehicle to move it if necessary, according to article R. 110-2 of the Code de la Route.

Since 2007 a regulation on the transport and delivery of goods has been in force in Paris. Traffic and delivery rules have been simplified to limit the circulation of the most cumbersome and polluting vehicles. Stops in delivery areas are limited to 30 minutes, a period controlled with a goods delivery disc, or the European parking disc.

Within France, it is mandatory for car holders to display the cars emission category using an environmental badge (Crit'Air (Ministère de la Transition Écologique, 2022)). Highlight that according to the Low Emission Zones program, in the city of Paris there already exists parking restrictions based on vehicle emissions and for instance, the higher pollutant vehicles are not authorised from driving or parking in the capital.

In June 2020, the Ville of Paris and Île de France launched an innovative City Logistics innovative project in the delivery zones (aires de livraison) located in the fourth district of Paris, which also belongs to Paris Centre (see Figure 10).

The experimental project aimed to evaluate several components and technologies to improve the regulation, control, and monitoring of the delivery zones, based on both a declarative mobile application, like Parkunload with Bluetooth technology, and two types of parking availability sensors, like magnetometers and camera-based sensors.

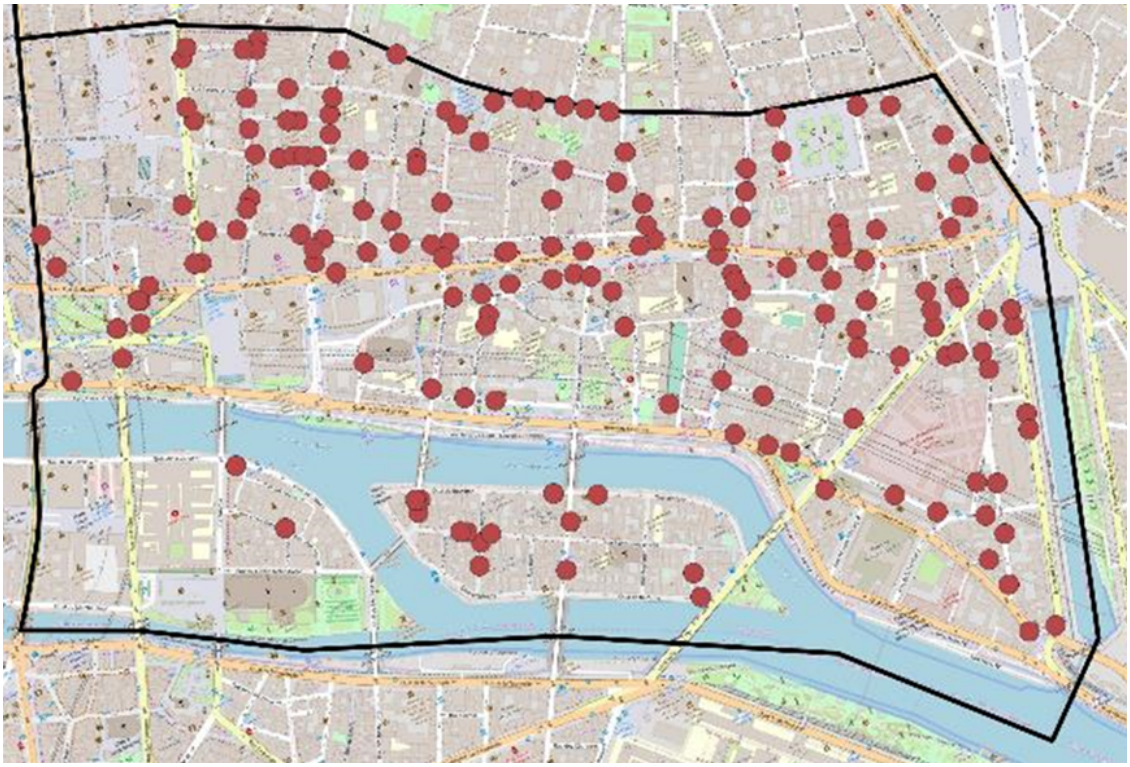


Figure 10. Map of digitized delivery zones in Paris

The scope of the project “Aires de Livraison connectées” has been as follows:

- All the delivery zones (138) are regulated and controlled with the mobile app Parkunload, which is not mandatory to be used by drivers, just optional.
- 22 delivery zones are also equipped with a camera-based parking sensor to detect parking availability per zone, managed by ParkingMap.
- 33 delivery zones are also equipped with a magnetometer parking sensor to detect parking availability per space (5 metres), managed by ParkingMap.

ParkingMap centralised data collected from Parkunload and parking sensors in real-time to display parking availability information to the police officers, who are the parking control agents in the delivery areas of Paris.

Since there is only a small amount of loading zones, no direct positive effects considering operational measures such as an increase in parking rotation or the reduction of illegal parking can be concluded.

The same accounts for KPIs connected to the environment such as the reduction of traffic congestion or the reduction of total vehicle emissions. Although there is no obligation, many logistic vehicles do use the Parkunload platform for loading activities, making the solution highly accepted among this group of stakeholders.

The solution does also support the workflow of parking enforcement agents, which can be seen in their high acceptance. Local businesses and nearby residents have a neutral opinion on digital loading zones.

4.2. Project vision and focus

The current project S+LOADZ (Multi-Sustainable Loading and Delivery Zones), which is co-funded by the EIT Urban Mobility's Innovation Call 2022, represents a great opportunity for the city to extend and expand digital loading and delivery zones with additional sustainability criteria (Figure 11).

Figure 11. A Parkunload sign in Paris

Considering that the Ville of Paris has been already experimenting with digital loading and delivery zones, it is considered as an advanced City Lab regarding Urban Logistics with two districts involved:

- In the 4th district of Paris, it is planned to perform a project extension over 140 "Aires de Livraison connectès" with additional Sustainability features in Parkunload platform, including gathering parking availability data from available sensors to provide accurate data to drivers and agents.

- In the 10th district of Paris, it is planned to deploy 160 new digital loading zones related to Urban Distribution of Goods to be regulated and control with Parkunload Apps, including the additional sustainability features for the French market.

According to this, the S+LOADZ pilot in the city of Paris is focused on the following subjects:

- Analyse additional sustainability rules in the current deployment of digital delivery zones, such as impact of additional restrictions during pollution episodes and within Low Emissions Zones.

- Define, deploy, and pilot digital loading and delivery zones for professional services, such as installers or maintenance services. Analyse feasibility to book these loading zones.

- Define, deploy, and pilot digital loading and delivery zones for specific freight services for local business, such as (super)markets, restaurants, cafes, and hotels. Analyse other short-term parking zones near primary services; zones for trucks of supermarkets; nightshift or silent deliveries.

- Demonstrate the advantages to amend local or national parking bylaws towards the digital transformation of loading and delivery zones in Paris and Métropole du Grand Paris.

- Reduction of illegal parking in loading and delivery zones. Higher productivity of parking enforcement agents. Increase parking turnover and parking availability in loading zones.

- Enhanced data-driven reports to optimise the scarce public shared-use parking spaces.

- Set up additional communication channels with end-users throughout the mobile app.

By developing innovative digital solutions in these areas, the city aims to facilitate sustainability with features supporting improved air quality and reduction of mileage per delivery.

4.3. Problem Statement

During the WP2, project partners and Paris' stakeholders have performed some meetings to define the scope of the pilot project in the city, according to the next problem statement:

- Misuse of parking spaces and inefficient parking control of urban delivery vehicles in the delivery areas (aires de livraison) located in the city centre, which means low parking turnover.
- More traffic congestion due to double parking of commercial vehicles, sometimes in very narrow streets.
- Inefficient parking control method used by police officers performing parking enforcement tasks.
- Needs to increase feasibility of parking availability information in some digital loading zones.
- Management of urban mobility and further parking restrictions during pollution episodes.
- Management of urban mobility and further parking restrictions in Low Emissions Zone and Limited Traffic Zones (Zones à trafic limité).
- Low parking turnover, illegal parking, and inefficient parking control in short-stay parking zones near primary services or supermarkets.
- Lack of limited parking spaces for professional service vehicles, such as installers, maintainers, and other professional groups. Analyse feasibility to book these loading zones for specific vehicles.
- Further optimisation of the scarce short-term public parking spaces in the city.
- Needs to enhance knowledge on deliveries in Paris and more specifically data-driven reports to optimise the scarce public shared-use parking spaces.
- Road safety issues/accidents black spots in the proximity of the loading delivery zones.
- Additional communication channels with end-users throughout the mobile app, to send them notifications or ask for filing up surveys from the city.
- Delivery vans/trucks occupying cycle paths or pedestrian curbs.

4.4. Pilot Scope and Objectives

To solve the current problem statement in the city of Vic, the S+LOADZ project plans to execute the following tasks in order to achieve the sustainability goals related to City Logistics:

- **Extend digital delivery zones in the central districts of the city,** including sustainability rules based on vehicle emissions badge from vehicles' national database if available.
- **Define, deploy, and pilot digital loading and delivery zones for professional services**, such as installers or maintenance services, in some districts of Paris like 10th, 11th and 12th. Analyse feasibility to book these loading zones
- **Define, deploy, and pilot digital loading and delivery zones for specific freight services for local business, such as (super)markets, restaurants, cafes, and hotels.** Analyse other short-term parking zones near primary services; zones for trucks of supermarkets; nightshift or silent deliveries. Analyse feasibility to book these loading zones
- **Increase the productivity of parking enforcement tasks**, to reduce illegal parking in loading zones: overstay, lack of permit or double line parking.
- **Increase parking turnover in loading zones** to create more free parking spaces for deliveries during peak-hours.
- **Reduce traffic congestion and kilometres per delivery.**
- **Analyse impact of additional parking restrictions during pollution episodes,** based on vehicles' environmental badge to further restrict parking permit or time limit.
- **Analyse impact of additional parking restriction in Low Emission Zones (LEZ) and Limited Trafic Zones,** based on vehicles' environmental badge to further restrict parking permit or time limit.
- Compile benefits resulting from digital transformation of delivery zones to **move forward amending local or national parking bylaws for the "aires de livraison numériques"** in Paris and Métropole du Grand Paris.
- **Reduce road safety issues/accidents** black spots in the proximity of the delivery zones.
- **Promote innovative methods to collect delivery data, further analyse parking data considering several scenarios** to optimise and promote sustainable city logistics, considering a shared use of the public parking spaces.
- **Create additional communication channels** between the city and frequent end-users to send notifications regarding the city context, such as during pollution episodes, within Low Emissions Zones or due to the update of parking regulations.

According to this, the S+LOADZ project scope planned for the City of Paris s as follows (Table 3):

	Covered area	Local infrastructure	Admin & Legal
New digital loading or delivery zones (Urban Distribution of Goods)	Paris 10th district	+160 Additional signs with Bluetooth	Current city parking by-laws 24h deliveries.
Add-on features on "Aires de livraison connectées"	Paris 4th district	Existent 140 digital delivery zones	Add-on features to enhances parking availability based on AI sensors
Parking enforcement productivity	Paris 4th and 10th district	Mobile app for parking agents	Current city parking by-laws
Analysis of Pollution Episodes	Central districts of Paris	Up to 240 delivery zones	Data-driven analysis
Low Emission Zones layer	Central districts of Paris	Up to 240 delivery zones	Data-driven analysis
Advanced Big Data analytics reports	Central districts of Paris	Cloud-based	GDPR. Anonymized and aggregated data
Parking legislation towards digital loading zones	Métropole du Grand Paris	Argenteuil, Paris IV and Paris X.	Legal services to move forward parking bylaws in France
Addition comms channel for cities	Central districts of Paris	Communication via app / phone	Probably amendment of the privacy policy

Table 3. Planned project scopes for City of Paris' S+LOADZ deployment

According to urban freight city managers of Paris, the S+LOADZ should help to achieve the following operational and environmental KPIs in the areas surrounding the digital loading zones:

- Operational KPI and environmental KPI with high priority:
    - Reduction of illegal parking: overstay, lack of permit, double line.
    - Higher productivity of parking enforcement tasks, based on digital means.
    - Parking space optimization based on big data.
    - Collection of delivery data.
- Operational KPI and environmental KPI with medium priority:
    - Higher parking rotation to increment available parking spaces.
    - Reduction of traffic congestion.
    - Reduction of km per delivery.
    - Reduction of air pollutants.
    - Regulation based on vehicle types.

- Regulation based on vehicle activities.
- Organisation of scarce public parking spaces, considering a shared-use policy.

- Low priority:
  - Regulation based on vehicle emissions.

4.5. Parking Regulation and Control

According to the city officials of Paris, the parking rules in the digital loading and delivery zones planned to be deployed during the S+LOADZ project is as follows (Table 4):

	Aire de livraison exclusive 24H (4th and 10th district)	Aires de livraison shared use (4th district)
Trucks, vans and light commercial vehicles	30'	30'
Vehicles from registered professional services	30'	30'
Vehicles for deliveries to local business	30'	30'
Cargo-bikes / non-motorized vehicles	N/A	N/A
Vehicles of nearby residents per area	Prohibited	30'
Vehicles of people with reduced mobility	N/A	N/A
High polluting vehicles during pollution episode	Prohibited	Prohibited
High polluting vehicles in Low Emissions Zone	Prohibited	Prohibited
Other private vehicles	Prohibited	30'
Regulation hours	24h / 7 days	Mon-Sat 7AM to 8PM

Table 4. Planned parking restrictions for S+LOADZ zones in City of Paris

The city of Paris is currently analysing with their legal services if the parking bylaws at local, metropolitan, and national level would need to be amended to properly regulate digital loading and delivery zones.

Due to the current legislation at national level applying to the "aires de livraison", the police officers of Paris are also responsible to perform parking enforcement in the loading zones.

The police agents are not currently using Parkunload's control app to check the parking status of vehicles in real-time. The S+LOADZ project aims to pilot Parkunload's control application enhanced with parking availability data from camera-based sensors.

4.6. Development Plan

According to the requirements for the city of Paris, the S+LOADZ project plans to develop the next technical features during the pilot:

- **Extend and expand two types of digital delivery zones** in the districts of Paris 4th and 10th.
- **Design, develop, launch, and pilot 24h digital delivery zones for vehicles of commercial drivers to Distribute Urban Goods (DUM),** in the district 10th of Paris.
- **Enable parking enforcement tasks based on Parkunload control App**, in the 10th district of Paris.
- **Upgrade Parkunload control mobile app and web-based central dashboard for parking enforcement agents.**
- **Administration of parking conditions during pollution episodes, as well as Low Emissions Zones (LEZ) and Limited Traffic Zones (LTZ)** in Parkunload.
    - If available, requires gathering vehicles' environmental badge data from official vehicles' databases in France.
    - Requires managing communication channels to end-users such as SMS or similar.
- **Design and develop variable and dynamic parking conditions based on vehicles emissions category** in Parkunload.
    - Define emission-based parking rules per zone, group of zones and cities.
- **Create advanced Big Data Analytics reports for the city** to further analyse sustainable city logistics strategies based on historical parking data before, during and after the pilot.
    - Requires transferring large amounts of data between the two cloud-based platforms used by Parkunload.
- **Integrate big data sources from Parkunload to KEITA's micro-incentives platform**.
    - Requires transference of large amounts of data between cloud-based platforms.
- **Create additional communication channels via app** to send official notifications regarding the city context in real-time. Including sending surveys.

Highlight that these additional features to be developed in Parkunload impacts several components of the platform, such as mobile app for drivers, mobile app for parking enforcement agents, web-based Back Office application, central services and Big data reports (Figure 12).

Figure 12. Parkunload usage mock-up for drivers, control agents and data aggregation

4.7. Deployment Plan

According to the requirements for the city of Paris, the S+LOADZ project plans to execute the following tasks during the deployment plan:

- **Legal analysis of requirements in city's parking bylaws** (progressive).
    - Both Métropole and the city of Paris are currently evaluating with their legal services how parking bylaws need to be amended at local, metropolitan, and national levels to enable regulating, enforcing and monitoring loading and delivery zones with digital means.
- **Design, development, test, homologation and launch** of the upgraded version of Parkunload platform including the "multi-sustainable pack". (Up to 4 months).
    - As described in the "Development plan" section per city.
- **Design, manufacturing, and installation of road signs** per digital loading and delivery zone (up to 4 weeks).
- **Execution of the communication plan** before, during and after launching the pilot.
    - As described in the "Communication plan" section of the document.
- **Execution of the training plan** before, during and after launching the pilot.
    - As described in the "Training plan and customer support" section.
- **Execution of the Quality Assessment plan** before, during and after launching the pilot.
    - As described in the "Training plan and customer support" section.
- **Execution of the operational stage of the pilot**, including SaaS, customer support and parking control tasks.

5. Living Lab · City of Ankara

Figure 13. View of Ankara's skyline

Ankara is the capital of Turkey and is in the central part of Anatolia. (Central Intelligence Agency (ed.), 2022)

Ankara is the second largest city in the country after Istanbul.

- Population: 5,100,000 inhabitants
- Surface: 25,000 Km^2
- Urban density: 1,863/Km^2

The local project is led by BELKA (BELKA Inc. (ed.), 2022), the municipal agency whose responsibilities include parking management. BELKA also manages the municipal markets, including the Metropolitan Wholesale Market of Ankara.

The current focus of the project is to develop the pilot and assess the technology at this site, whilst following the on-street pilots at the more advanced cities; the scope for a wider deployment including on-street locations will thus be considered at a later stage in the project.

5.1. City Logistics Overview

According to the city officials, a capital with this size must deal with critical problems considering city logistics such as follows:

- Low parking turnover in loading and delivery zones.
- Misuse of parking spaces: overtime, lack of permit, etc.
- Traffic congestion due to double line parking.
- Inefficient parking control methods.

In the city, there are delivery and loading zones with a total amount of approx. 1,600 parking slots available to logistic vehicles such as trucks, vans, and light commercial vehicles. Contrary to the other model cities, there is no concept of digital loading zones yet.

However, in Turkey there is an environmental badge in place for vehicles according to the national legislation. Recently, the city council of Ankara has approved the 2030 Master Development Plan targeting the following goals (T.C. Ankara Buyukşehir Belediyesi (ed.), 2017):

- It aims to establish the balance of protection and use by providing socio-economic and cultural development, in a way that will not harm the existence and continuity of natural and human resources and potentials and allow optimum utilisation.
- It aims to create liveable, healthy, urban, semi-rural and rural living environments with increased quality of life.
- It considers the habitability principle and the bearing capacity of the city and natural structure.
- It determines the spatial decisions and strategies regarding the site selection, size and distribution of the uses, and the population distribution and density decisions on the macro scale, in a way that guides the sub-scale development plans and applications.
- It aims to protect natural, cultural, and environmental values, historical assets, water resources, agricultural and forest areas, to eliminate/reduce disaster risks, and to take precautions against disasters.
- It ensures that the cooperation and coordination principles between the institutions and organisations related to the implementation of the plan are revealed and the investments are carried out in a coordinated manner.

This plan is compatible with sustainable development policies based on Ankara's global structure, place and potential in the country and the region.

The participation of Ankara / BELKA in this EIT project serves the purposes of the 2030 Master Development Plan. The current focus of the S+LOADZ project is to develop a pilot to assess the technology at the Metropolitan wholesale market of Ankara, which is being managed by BELKA.

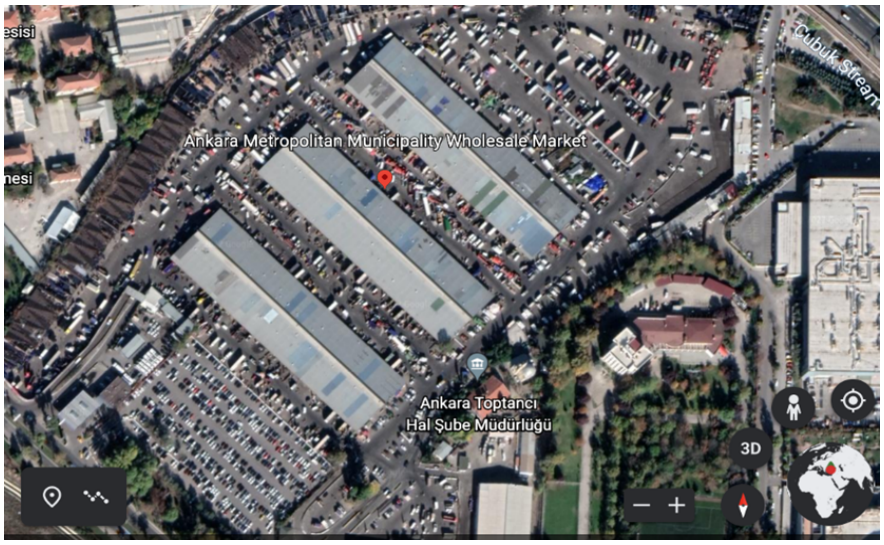


Figure 14. Aerial view of Ankara's Metropolitan Market

The large scale of the Metropolitan Market can be estimated from the Google Earth image above, and the average daily count of vehicles entering during 2021; 8,109 (see Figure 14 and Figure 15).

Number of Vehicles entering

Months	Quantities	
	2020	2021
January	5880	5227
February	5220	4894
March	6222	5915
April	5038	5732
May	8519	7306
June	11791	11914
July	13571	12141
August	13030	12614
September	11803	10753
October	8986	7921
November	7980	6681
December	6531	6213
TOTAL	104571	97311

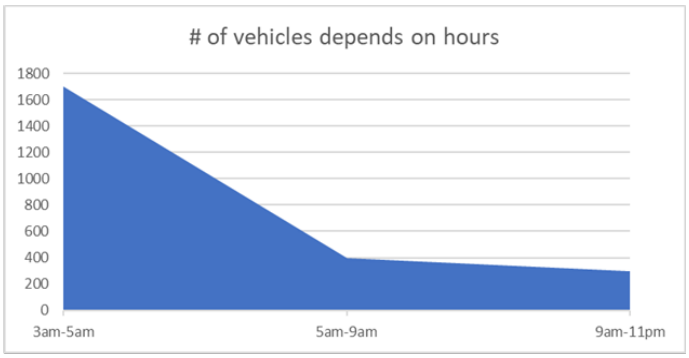


Figure 15.Table of vehicles entering Ankara's Metropolitan Market by month in 2020 and 2021, and a graph cumulating entering vehicles by hourly intervals

5.2. Project vision and focus

The current project S+LOADZ (Multi-Sustainable Loading and Delivery Zones), represents a great opportunity for BELKA to pilot a digital platform to regulate, control and monitor logistic vehicles parked in the parking facilities of the largest wholesale marketplace of Ankara.

Figure 16. A section of Ankara's wholesale market

The current focus of the project is to develop the pilot and assess the technology at the Metropolitan wholesale Market of Ankara, focusing on the following subjects:

- Reorganisation of parking areas based on the vehicle's professional sector.
- Short stay loading and unloading zones with higher priority.
- Vehicle orientation signage, as well as traffic flow signs and rules.
- Control illegal parking per area: overstaying, lack of permit, etc.
- Increase parking rotation during peak-hours.
- Decrease vehicle emissions related to logistics vehicles.

- Data-driven optimization of scarce public parking spaces.
- Improving urban environment and citizen awareness about emissions from one of the major sources of pollution

By developing innovative digital solutions in these areas, BELKA aims to rationalise and optimise crowded parking areas surrounding the largest wholesale market in Ankara.

5.3. Problem Statement

During the WP2, project partners and Ankara's stakeholders have performed several meetings to define the scope of the pilot project in the city, according to the next problem statement:

- Parking lot capacities are clearly exceeded during peak-hours.
- Low parking rotation of logistics vehicles, such as trucks, vans and commercial vehicles.
- Inefficient parking control of logistic vehicles in the Metropolitan wholesale market.
- Incorrect use of the parking sectors that aim to organise logistics vehicles according to its commercial segment. Drivers used to park anywhere regardless of either vehicle type or professional use.
- No parking turnover in the nearest loading and unloading areas to the market, including drivers that sell goods from vehicles parked.
- Current parking system infrastructure is not well established or misfunctioning.
- Inability to track vehicles on arrival, during stay, and on departure.
- Lack of parking and vehicle data to optimise scarce parking spaces in the market.
- Ongoing efforts are lack of providing a solid and comprehensive solution.

5.4. Pilot Scope and Objectives

In order to solve the current problem statement in the Metropolitan Wholesale Market, the S+LOADZ project plans to execute the following tasks in order to achieve City Logistics goals:

- **Deploy and pilot parking sectors according to both vehicle types and commercial profiles,** including time-limited parking conditions during regulation hours per parking sector.

- **Plan and deploy supportive traffic signs for parking zones classifications and loading & unloading zone diversification parking** for vehicles entering the parking area and unloading area
- **Pilot high priority short-term loading and delivery zones located near the market buildings,** only for vehicles performing loading and unloading activities.
- **Deploy restricted short-term parking zones for authorised vehicles**, such as primary services, garbage collectors, etc.
- **Forbid drivers to sell goods from vehicles parked** in the priority loading and unloading zones closer to the market buildings.
- **Analyse impact of additional parking restriction in Low Emission Zones (LEZ),** based on vehicles' environmental badge to further restrict either parking permit or time limit.
- **Analyse impact of additional parking restrictions during pollution episodes,** based on vehicles' environmental badge to further restrict either parking permit or time limit.
- **Further analyse parking data considering several scenarios** to optimise and promote sustainable city logistics, considering a shared use of the public parking spaces.

According to this, the S+LOADZ project scope planned for the city of Ankara (BELKA) is as follows (Table 5):

	Covered area	Local infrastructure	Admin & Legal
Parking sectors per vehicle type / profile	Several parking areas in the market	Additional signs and painting	Market parking bylaws
Priority loading zones near buildings	Near the market buildings	Additional signs and painting	Market parking bylaws
Impact of pollution episodes	Market data	N/A	Data-driven analytics
Impact of Low Emission Zones	Market data	N/A	Data-driven analytics
Short-term parking near primary services	Near the market buildings	Additional signs and painting	Market parking bylaws
Advanced Big Data analytics reports	Market data	N/A	GDPR. Anonymized and aggregated data

Table 5. Planned project scopes for Ankara's S+LOADZ deployment

Furthermore, BELKA has used CCTV surveillance to illustrate some of the problems arising from the variety of loading operations; some vehicle drivers also sell the goods they unload (they do not move their vehicle until the goods are sold). This kind of practice needs to be controlled (and ideally minimised) in the new scheme. During meetings it was noted that Parkunload's solution does not currently handle payment transactions. BELKA's own parking payment software system which is under development phase for the moment will be integrated with Parkunload's capabilities in an iterative pilot version demonstration.

5.5. Parking Regulation and Control

According to BELKA's officials, the parking rules in the digital loading and delivery zones planned to be deployed during the S+LOADZ project is as follows (Table 6):

	Parking sectors per commercial category	Priority loading and unloading zones	Primary Services Short-stay zones
Heavy trucks	According to commercial category	Time limit TBD	Unlimited (pre-authorized)
Mid-size trucks	According to commercial category	Time limit TBD	Unlimited (pre-authorized)
Vans and light commercial vehicles	According to commercial category	Time limit TBD	Unlimited (pre-authorized)
Vehicles of people with reduced mobility	N/A	N/A	Unlimited (pre-authorized)
High polluting vehicles during pollution episode	N/A	Prohibited	Prohibited
High polluting vehicles in Low Emissions Zone	N/A	Prohibited	Prohibited
Other private vehicles	Prohibited	Prohibited	Prohibited
Regulation hours	According to commercial category	Peak-hours	24H/7

Table 6. Planned parking restrictions for S+LOADZ zones in Ankara

The parking areas of the Market are grouped according to the professional segment and their timetable to serve goods to the marketplace (see Figure 17).

Figure 17. Map and table of available parking spaces at Ankara's wholesale Market, colour-coordinated by user profile

One possibility is to create more parking space in the white coloured area (2,2595 m^2) that is currently being used as a depot area. There are users who park their vehicles for several days; one possibility would

be to assign the new space for Long-Stay (24+h) parking. The requirements for the S+LOADZ project in Ankara's wholesale market based on vehicles/customer type needs and parking area are summarised in the following table (Table 7).

User type	Area	Capacity	Vehicles per day	Peak Stay Limit (min)	Regulation hours	Off-Peak Stay Limit (min)	Regulation hours
Trucks	12000	70	300	120	0h – 11h	360	11h – 24h
District Bazaar vehicle	9000	150	1000	60	0h – 11h	180	11h – 24h
Supermarket vehicle	9000	150	200	90	0h – 11h	270	11h – 24h
Cars	11000	385	250	all day	all day	N/A	N/A

Table 7. Ankara Market Parking Problems and Criteria for the Solution

Regarding the priority loading and unloading zones, BELKA points out next considerations (Figure 18):

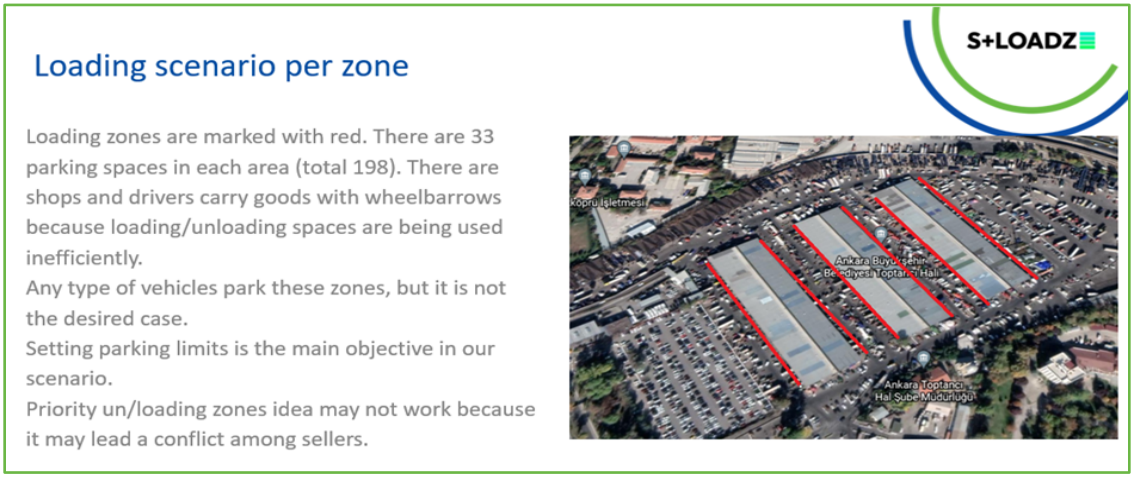


Figure 18. Ankara Loading Scenario per Zone

BELKA is currently analysing with their legal services if the market's parking bylaws would need to be amended to properly regulate the digital loading and delivery zones planned in the S+LOADZ project.

Highlight also other important challenges that S+LOADZ project will need to face during the pilot:

- People resistance in the market (i.e.; if we select a prior un/loading area application).
- Broken machines, inadequate infrastructure.
- Lack of data (vehicle numbers entering the market…).
- Lack of a body of rules.
- Minor group of people who don't have smartphones.

BELKA is also planning to train parking enforcement agents which are already in use in the city centre parking operations to control parking conditions in the digital loading and delivery zones of the Metropolitan wholesale market for the transition period.

According to the Communication plan described by BELKA, civic agents may be responsible for leaving informative leaflets in the windscreen of the logistics vehicles with additional information related to digital loading and delivery zones, as well as precise instructions to download and use the Parkunload app.

5.6. Development Plan

According to the requirements for the city of Ankara (BELKA), the S+LOADZ project plans to develop the next technical features during the pilot:

- **Create new types of parking sectors according to vehicle type and its commercial profile** in Parkunload platform.
    - Requires new types of commercial profiles and parking rules per parking sector.
- **Software localization to Turkish** in the main screens of the Parkunload app for logistics drivers.
- **Administration of parking conditions during pollution episodes** in Parkunload.
    - Requires gathering vehicles' environmental badge data from the official vehicles' database in Turkey if it is finally available as open data.
- **Administration of parking conditions in Low Emissions Zones (LEZ)** in Parkunload.
    - Requires gathering vehicles' environmental badge data from the official vehicles' database in Turkey if it is finally available as open data.
- **Create a new type of priority loading and delivery zones** in Parkunload.
    - Requires new zone types, vehicle types and additional authorised vehicles.
- **Create advanced Big Data Analytics reports for the city** to further analyse sustainable city logistics strategies based on historical parking data before, during and after the pilot.
    - Requires transference of large amounts of data between the two cloud-based platforms used by Parkunload.
- **Integrate big data sources from Parkunload to KEITA's micro-subsidies platform**.
    - Requires transference of large amounts of data between cloud-based platforms.

Highlighted those additional features to be developed in Parkunload impact several components of the platform, such as mobile app for drivers, mobile app for parking enforcement agents, web-based Back Office application, central services, and big data reports (Figure 19).

Figure 19. Parkunload usage mock-up for drivers, control agents and data aggregation

5.7. Deployment Plan

According to the requirements for the city of Ankara (BELKA), the S+LOADZ project plans to execute the following tasks during the deployment plan:

- **Legal requirements in parking bylaws for the market** (if required, few months).
    - If required, amendment of the current metropolitan wholesale market parking bylaws according to the legal advice services on public policies.
- **Design, development, test, homologation and launch** of the upgraded version of Parkunload platform including the "Multi-sustainable pack" (up to 4 months).
    - As described in the "Development plan" section per city.
- **Add new vehicle categorization for trucks, vans and light commercial vehicles** at Parkunload platform.
    - Requires new parking rules based on vehicle categorization.
- **Design, manufacturing, and installation of road signs** per digital loading and delivery zone (up to 4 weeks).
- **Execution of the Communication plan** before, during and after launching the pilot.

    - As described in the “Communication plan” section of the document.

- **Execution of the Training plan** before, during and after launching the pilot.
    - As described in the “Training plan and customer support” section.

- **Execution of the Quality Assessment plan** before, during and after launching the pilot.
    - As described in the “Training plan and customer support” section.

- **Execution of the operational stage of the pilot**, including SaaS, customer support and parking control tasks.

6. Living Lab · Métropole du Grand Paris

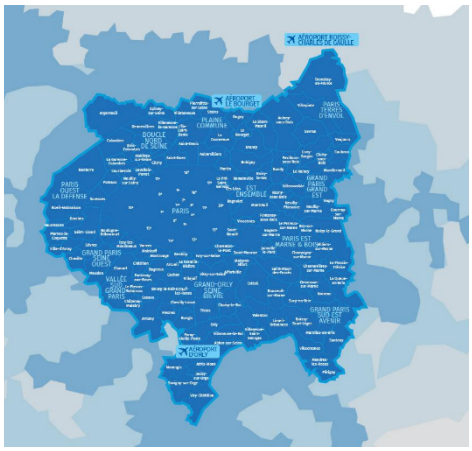


Figure 20. Overview of the Métropole du Grand Paris

The Métropole du Grand Paris is a dense, urban inter-municipality that includes the city of Paris, 123 municipalities in the three departments of Hauts-de-Seine, Seine-Saint-Denis and Val-de-Marne and 7 municipalities in Essonne and Val d'Oise (Métropole du Grand Paris (ed.), 2022).

Since its creation, the Métropole du Grand Paris has taken concrete steps to benefit its 7.2M residents. The particular role of the Metropolis has become undeniable, as it takes up the challenges of economic, social and cultural development, working to protect the environment and enhancing its international attractiveness. Its action is focused on employment, investment and innovation.

As a public body of intermunicipal cooperation with its own taxation revenue and specific status, the Greater Paris Metropolis exercises powers in five mandatory areas, as defined in the metropolitan program:

- Economic, social and cultural development and planning.
- Environmental protection and enhancement and living environment policy.
- Development of the metropolitan space.
- Local housing policy.
- Management of aquatic environments and flood prevention.

Initiatives by Métropole du Grand Paris aim to improve the living environment for residents, reduce inequalities between territories, and develop a sustainable social and economic urban model that ensures attractiveness and greater competitiveness for the benefit of the entire country.

In addition to this, the municipalities manage the roads network and have the power to enforce the law on their territory.

6.1. City Logistics Overview

Urban logistics is a major axis of metropolitan action and must contribute to the emergence of an innovative and resilient metropolis. innovative and resilient metropolis. The Métropole du Grand Paris has therefore drawn up a Pact for Metropolitan Logistics adopted in June 2018. Comprising twelve actions to be implemented progressively, the Pact currently has nearly 80 signatories, municipalities, territories, and urban logistics operators (Métropole du Grand Paris (ed.), 2018).

The Sustainable Urban Logistics project carries out the actions defined in the Pact for Metropolitan Logistics: optimising flows and deliveries, encouraging the transition of fleets to low-emission and silent vehicles, enhancing the value of and silent vehicles, promoting the integration of logistics functions in urban planning documents and development projects, and development projects, and making the consumer a facilitating link in the logistics chain.

Every week, the flow of goods by road generates 4.4 million movements in Ile-de-France (deliveries and/or collections), 62% of which are within the Greater Paris area. Manufactured goods constitute most movements, since 54.4 % of these are generated by trade (retail, wholesale, mass distribution) and the pure tertiary sector. It is in the heart of the conurbation that the movement of goods is most intense. It is in this area that both the economic activities and the regional population that generate movements are concentrated. In addition, it is in the dense area that movements linked to last-mile deliveries are concentrated, which more frequently take the form of rounds than direct traces and therefore generate more movements. LCVs (< 3.5 t) account for more than half of delivery movements in Paris and more than 45 % in the suburbs. In 2012, most deliveries were made in the morning, between 9 and 11 am.

This new stage in the evolution of logistics is driven in particular by digital technologies, intelligent transport systems, changing consumption patterns and locations. A series of of innovations concern:

- Real estate and furniture with increasing modularity. New concepts are appearing on several levels or vertical. New concepts are emerging multi-level or vertical.
- Data" to anticipate the supply chain: real-time traceability to optimise and pool vehicles, barges and trains vehicles, barges and trains, logistics spaces, roads, delivery areas, etc.
- Movement: autonomous/semi-autonomous solutions, collaborative platforms. Digital tools are simplified to optimise routes, vehicle filling, etc., or to develop collaborative solutions, which can have a positive impact on the collaborative solutions, which can have a positive environmental impact.
- The indoor process of logistics locations, in order to meet ever shorter deadlines, the multiplication of references and distribution references and distribution methods (omnichannel).

Contributing to the optimisation of deliveries involves 5 measures in connection with road, waterway, rail and space sharing:

- Harmonise road and delivery regulations in the city.
- Optimise the use of public spaces (traffic lanes, bus lanes, delivery areas, etc.) by improving access and sharing uses.

- Integrate freight transport into station and public transport line projects.
- Contribute to the development of river transport and to the improvement of access conditions to it.
- Test mixed solutions that share the use of space.

The 131 municipalities in the Greater Paris region account for 62 % of the region's freight movements and each has its own traffic and freight delivery regulations. The goods regulations vary from one municipality to another in terms of timetables, size and even authorised engines.

The City of Paris, which alone handles 26 % of the region's goods movements, has had goods regulations in place since 2007, based in particular on differentiated access times according to the size of the vehicles (surface area less than or greater than 29 m²) and their environmental performance. This last condition has been reinforced by the implementation of the first restricted traffic zone (ZCR) in the entire area inside the ring road, which bans the most polluting vehicles (beyond Crit'air 5 stickers, since 1 July 2017) from 8am to 8pm.

Many professionals whose fleets transport goods within the Greater Paris territory would like these provisions to be clarified, both in terms of the authorised size (for Paris, this is a floor area, a criterion that has been (for Paris it is a floor area, a criterion that has been the subject of a consensus with the professionals, for other communes it is criteria of GVW) and environmental standards.

Harmonisation of road and delivery regulations should aim at better sharing of the road, considering road safety aspects (cohabitation of soft modes), optimisation of the use of delivery areas (sanctuary/sharing with other functions, etc.) and their accessibility. Harmonisation would make it possible to clarify the rules of access for vehicles to the municipalities located within the Greater Paris Metropolis perimeter according to their size (floor area vs. gross vehicle weight), their environmental standards in terms of GHG emissions, atmospheric pollutants (CRIT'AIR stickers) and noise pollution (Piek standards).

Apart from the road aspect, the question of the use of delivery areas is a source of strategic optimisation. Indeed, their use is not optimal insofar as supply and demand do not meet or do not meet well (at the right place/at the right time: delivery area absent, unsuitable, and/or occupied...). Facilities can be very costly and counterproductive as some can reduce the possibility of delivering the economic fabric. This is one of the reasons why some actors proposed to start by This is one of the reasons why some actors proposed to start by testing innovative solutions, evaluating them, and then progressively extending the solutions according to the needs.

Finally, the evolution of the economic and commercial fabric influences delivery practices and consequently the use and need for delivery areas. need for delivery areas. Mobile delivery areas could respond to these changes. All this requires the ability to control their use, which raises the question of resources (human, technological and financial) This raises the question of resources (human, technological and financial) and certain rules (data protection law and remote surveillance).

6.2. Low Emissions Zones

The Métropole du Grand Parisis the authority that implements a Low Emission Zone in the intra A86 area. The purpose of a Low Emissions Zone is to protect populations in the most polluted, high-density areas. This concept has already been adopted by 230 European cities and has been recognised as particularly effective. The Greater Paris Metropolis must address a climate and health emergency. According to the March 2018 Airparif report, airborne pollutants regularly exceed regulatory thresholds and WHO recommendations for air quality. The French Public Health Agency estimates that 6,600 premature deaths that occur each year in the Metropolitan area could have been avoided. Considering this situation, the European Commission has put France on formal notice for exceeding the limit values for nitrogen dioxide and fine particles. The Council of State has urged the government to take all necessary steps to improve the air quality.

The Greater Paris Metropolis approved the Climate Air Energy Plan, a strategy officially adopted by the Metropolitan Council on 12 November 2018. Restoring air quality is a key priority. To achieve this goal, the introduction of Low Emission Zones (LEZ) in the metropolis was assessed in the framework of the Île-de-France Atmosphere Protection Plan. This solution was found to have the most significant impacts, producing rapid improvements in air quality. The assessment was confirmed in 2018 by the Regional Health Observatory (ORS-IdF). The benefits of this initiative go beyond air quality. It will also make the territory more attractive, improve quality of life, and reduce noise levels (see Figure 21).

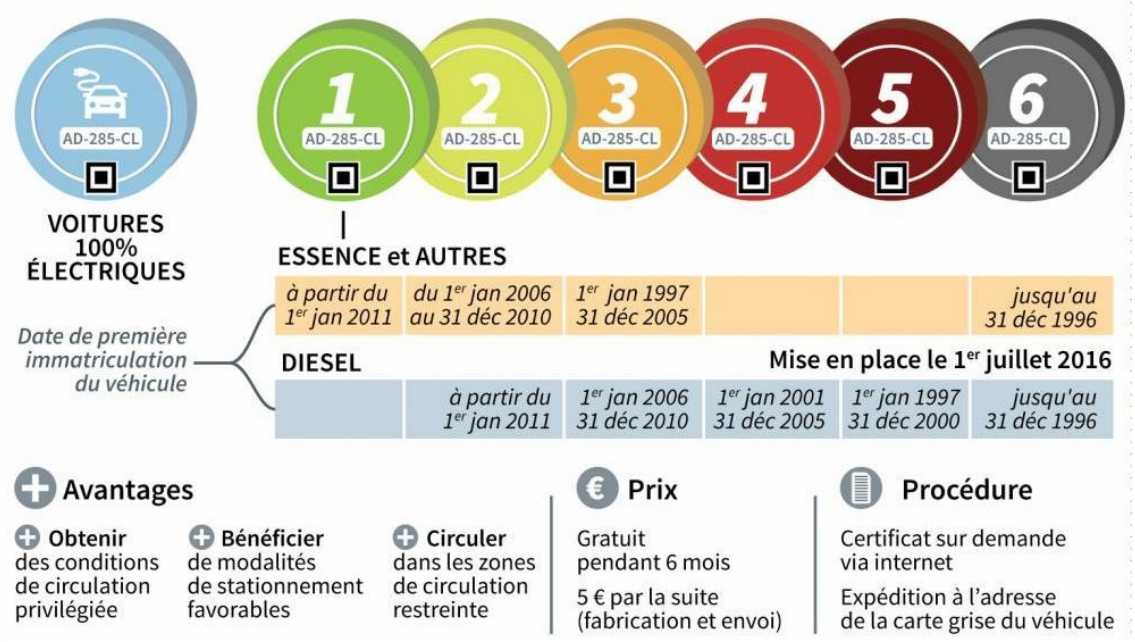


Figure 21. Different environmental badges in France and their classification

The goal of an LEZ is to protect those living in densely populated areas with the highest pollution. This initiative has been adopted by 231 European cities and metropolises. It has been recognized as an effective means of reducing emissions from road traffic, which is one of the main sources of pollution in the city.

On 8 October 2018, the State and 15 metropolises, including the Greater Paris Metropolis, signed a commitment to develop Low Emission Zones by the end of 2020. The principle is to encourage the use of cleaner vehicles. To drive through an LEZ, vehicles must have a Crit'Air sticker on their windscreen. This system makes it possible to identify vehicles based on their air pollutant emission levels. The most polluting and "unclassified" vehicles will not be allowed to drive through LEZs during certain time slots.

A new ZFE-m measure now aims to improve air quality by restricting road traffic of vehicles carrying the emission standard certificate Crit'Air 4 as from 1st June 2021. This is in addition to the restrictions already in place for Crit'Air 5 and non-classified vehicles. Apur has followed this issue since 2011 and is assisting Grand Paris Metropolis by analysing the social and economic impact of this ZFE-m.

In order to support and encourage transporters and last-mile delivery operators to acquire a fleet of clean and quiet vehicles, the public authorities offer a certain amount of aid, particularly for the purchase of electric, hydrogen or CNG vans.

6.3. Project vision and focus

The current project S+LOADZ (Multi-Sustainable Loading and Delivery Zones), which is co-funded by the EIT Urban Mobility's Innovation Call 2022, represents a great opportunity for the Métropole to extend and expand digital loading and delivery zones with additional sustainability criteria.

Figure 22. Pictograms of different vehicles next to trees, a parking sign and a parking meter

The efficiency of city supply is indeed a key issue in terms of economic efficiency, environmental criteria, the well-being of inhabitants and safety. Urban logistics has been developing rapidly in recent years, driven in particular by the explosion of e-commerce and new consumer practices.

In order to complement and extend the Paris experimentation with digital delivery zones, the Metropolitan Authority selects 2 or 3 municipalities (of approx. 100.000 pop.) where the solution can be piloted and tested in several scenarios of inter-urban areas.

According to this, the S+LOADZ pilot in the city of Paris is focused on the following subjects:

- Digital delivery zones for both exclusive-use and shared-use, which are aligned with the objectives described in the Pact of Metropolitan Logistics (Métropole du Grand Paris (ed.), 2018).
- Pilot harmonised regulations established by Métropole du Grand Paris.
- Analyse additional sustainability rules in digital delivery zones.
- Demonstrate the advantages to amend local or national parking bylaws towards the digital transformation of loading and delivery zones in Paris and Métropole du Grand Paris.
- Reduction of illegal parking in loading and delivery zones. Higher productivity of parking enforcement agents. Increase parking turnover and parking availability in loading zones.
- Impact of pollution episodes and Low Emissions Zones (LEZ) in digital loading zones.
- Enhanced data-driven reports to optimise the scarce public shared-use parking spaces.
- Set up additional communication channels with end-users throughout the mobile app.
- Define and analyse new types of digital loading zones: short-term parking zones near primary services; delivery zones for trucks of supermarkets; nightshift or silent deliveries.
- Compare effectiveness of the solution according to the loading zone type.

- Integration of the solution with Grand Paris Low Emissions Zone plan.

By developing innovative digital solutions in these areas, the city aims to facilitate sustainability with features supporting improved air quality and reduction of mileage per delivery.

This initiative from the Metropolitan authority can clearly help to create a critical mass of practitioners involved in promoting a regulatory framework more conducive to an accelerated deployment of digital kerbsides in France.

6.4. Problem Statement

During the WP2, project partners and Métropole du Grand Paris' stakeholders have performed many meetings to define the scope of the S+LOADZ pilot project in metropolitan municipalities that would be willing to host the experiment.

To achieve this objective, the Métropole has organised the following events during the month of January and February:

- Preparation of S+LOADZ project proposal to cities by the Urban Logistics department of Métropole and the project management team of Parkunload.
- A call for applications webinar with Parkunload, aimed at metropolitan municipalities with more than 50,000 inhabitants, in order to present the project, the Parkunload solution, and give feedback from the City of Paris on the current experiment in the 4th district.
- Several grouped or bilateral meetings with other municipalities.

In total, 17 towns and 2 territories (community of municipalities) took part in these meetings.

During meeting the most common issues to describe the problem statement have been the next:

- Misuse of parking spaces and inefficient parking control of urban delivery vehicles in the delivery areas (aires de livraison) located in cities, which means low parking turnover.
- More traffic congestion due to double parking of commercial vehicles, which leads to higher air pollutants from vehicles.
- Inefficient parking control method used by police officers performing parking enforcement tasks.
- Harmonisation of parking conditions and tools in loading or delivery zones.
- Management of urban mobility and further parking restrictions during Pollution Episodes.
- Management of urban mobility and further parking restrictions in Low Emissions Zones.

- Further optimisation of the scarce short-term public parking spaces in the city.
- Needs to enhance data-driven reports to optimise the scarce public shared-use parking spaces.
- Road safety issues/accidents black spots in the proximity of the loading delivery zones.
- Communication channels with end-users throughout the mobile app to send them official notifications related to sustainability or urban mobility issues.
- Delivery vans/trucks occupying cycle paths or pedestrian curbs.

Their involvement in the project requires approval and political support from the city/territory. Internal validation procedures are underway. The Métropole has asked for confirmation of commitment by the end of February. In parallel, the list of data and information needed by Parkunload for the diagnostic phase has been sent to the candidates. The poll form developed by Fraunhofer will be transferred to them upon receipt of their final confirmation.

6.5. Pilot Scope and Objectives

Several cities (17) and communities of municipalities (2) belonging to Métropole du Grand Paris have attended with interest to the S+LOADZ meetings regarding the digital transformation towards sustainable loading and delivery zones. However, due to both the project scope and tight deadlines to make a decision during February, there is currently one city (20 delivery zones) and one community of municipalities (50 delivery zones) that are almost committed to participate in the S+LOADZ pilot.

Their involvement in the project requires approval and political support from the city/territory. Internal validation procedures are underway. The Métropole has asked for confirmation of commitment by the end of February or beginning of March.

In order to solve the described problem statement during meeting with Metropolitan cities, the S+LOADZ project plans to execute the following tasks in order to achieve the sustainability goals related to City Logistics:

- **Deploy and pilot digital delivery zones in different area types of the cities according to the harmonised parking conditions policy from Métropole,** including sustainability rules based on vehicle emissions badge (Crit'Air) from vehicles' national database if available.
- **Increase the productivity of communications tasks in cities**, to reduce illegal parking in loading zones: overstay, lack of permit or double line parking.
- **Increase parking turnover in loading zones** to create more free parking spaces for deliveries during peak-hours.

- **Analyse impact of additional parking restrictions during pollution episodes,** based on vehicles' environmental badge (Crit'Air) to further restrict parking permit or time limit.

- **Analyse impact of additional parking restriction in Low Emission Zones (LEZ),** based on vehicles' environmental badge (Crit'Air) to further restrict parking permit or time limit.

- **Design and analyse restricted short-stay zones near primary services or used by vehicles of professional services.**

- Compile benefits resulting from digital transformation of delivery zones to **move forward amending local or national parking bylaws for the "aires de livraison numériques"** in Paris and Métropole du Grand Paris.

- **Reduce traffic congestion and kilometres per delivery.**

- **Reduce road safety issues/accidents** black spots in the proximity of the delivery zones.

- **Further analyse parking data considering several scenarios** to optimise and promote sustainable city logistics, considering a shared-use of the public parking spaces.

- **Create additional communication channels** between the city and frequent end-users to send notifications regarding the city context, such as during pollution episodes, within Low Emissions Zones or due to the update of parking regulations.

According to this, the S+LOADZ project scope planned for the ville of Paris s as follows (Table 8):

	Covered area	Local infrastructure	Admin & Legal
Digital loading or delivery zones	1 city Argenteuil	Up to 30 signs with Bluetooth	City and Métropole parking bylaws
Sustainability rules in delivery zones			
Parking legislation towards digital loading zones	Métropole du Grand Paris	Argenteuil, Paris IV and Paris X.	Legal services to move forward parking bylaws in France
Analysis of Pollution Episodes	Métropole du Grand Paris	Delivery zones in Métropole and Paris	Data-driven analysis
Parking enforcement productivity	1 city Argenteuil	Mobile app for parking agents	Current city parking bylaws
Low Emission Zones in aires de livraison	Métropole de Grand Paris	Delivery zones in Métropole and Paris	Data-driven analysis
Short-term parking for professionals or primary services	TBC	Additional signs with Bluetooth sensors	TBC
Advanced Big Data analytics reports	Métropole de Grand Paris	Cloud-based	GDPR. Anonymized and aggregated data
Addition comms channel for cities	Métropole de Grand Paris	Communication via App / smartphone	Probably amendment of the privacy policy

Table 8. Planned project scopes for Métropole du Grand Paris's S+LOADZ deployment

The S+LOADZ should help to achieve the following operational and environmental KPIs in the areas surrounding the digital loading zones within Métropole du Grand Paris:

- Operational KPI and environmental KPI with high priority:
    - Reduction of illegal parking: overstay, lack of permit, double line.
    - Reduction of traffic congestion.
    - Reduction of km per delivery.
    - Reduction of air pollutants.
    - Higher parking rotation to increment available parking spaces.
    - Parking space optimization based on Big Data.
- Operational KPI and environmental KPI with medium priority:
    - Organisation of scarce public parking spaces, considering a shared-use policy.
    - Regulation based on vehicle emissions.
    - Regulation based on vehicle types.
    - Regulation based on vehicle activities.
    - Higher productivity of parking enforcement tasks, based on digital means.

6.6. Parking Regulation and Control

According to the city officials of Métropole du Grand Paris, the parking rules in the digital loading and delivery zones planned to be deployed during the S+LOADZ project is as follows (Table 9):

	Aire de livraison exclusive 24H	Aires de livraison shared use
Trucks, vans and light commercial vehicles	30'	30'
Vehicles from registered professional services	30'	30'
Vehicles for deliveries to local business	30'	30'

Cargo-bikes / non-motorized vehicles	N/A	N/A
Vehicles of nearby residents per area	Prohibited	30’
Vehicles of people with reduced mobility	N/A	N/A
High polluting vehicles during pollution episode	Prohibited	Prohibited
High polluting vehicles in Low Emissions Zone	Prohibited	Prohibited
Other private vehicles	Prohibited	30’
Regulation hours	24h / 7 days	Mon-Sat 7AM to 8PM

Table 9. Planned parking restrictions for S+LOADZ zones in Métropole du Grand Paris

The Métropole du Grand Paris is currently analysing with their legal services if the parking bylaws at local, metropolitan and national level would need to be amended to properly regulate digital loading and delivery zones.

The freight delivery regulations vary from one municipality to another in terms of timetables, size and even authorised engines. Many professionals whose fleets transport goods within the Greater Paris territory would like these provisions to be clarified, both in terms of the authorised size and environmental standards.

Harmonisation of road and delivery regulations should aim at better sharing of the road, taking into account road safety aspects (cohabitation of soft modes), optimisation of the use of delivery areas (sanctuary/sharing with other functions, etc.) and their accessibility.

Harmonisation would make it possible to clarify the rules of access for vehicles to the municipalities located within the Greater Paris Metropolis perimeter according to their size (floor area vs. gross vehicle weight), their environmental standards in terms of GHG emissions, atmospheric pollutants (CRIT'AIR stickers) and noise pollution (Piek standards).

Due to the current legislation at national level applying to the “Aires de livraison”, the police officers of Paris are also responsible to perform parking enforcement in the loading zones. These agents will be able to use Parkunload’s control app to check parking status of vehicles in real-time.

6.7. Development Plan

According to the requirements for the Métropole du Grand Paris, the S+LOADZ project plans to develop the next technical features during the pilot:

- **Create two types of digital delivery zones** according to the harmonised parking rules stated from Métropole du Grand Paris.
- **Administration of parking conditions during pollution episodes, as well as Low Emissions Zones (LEZ)** in Parkunload.
    - If available, requires gathering vehicles' environmental badge data from official vehicles' databases in France.
    - Requires managing communication channels to end-users such as SMS or similar.
- **Upgrade Parkunload control app for parking enforcement agents.**
    - Requires minor updates regarding French parking regulations for delivery zones.
- **Upgrades Parkunload's control centre for parking enforcement agents.**
    - Requires minor updates regarding French parking regulations for delivery zones.
- **Create a new type of short-stay zone for primary services or professional services**.
    - Requires new zone types, vehicle types and additional authorised vehicles.
    - Requires new zone types, signage and additional communication features.
- **Create advanced Big Data Analytics reports for the city** to further analyse sustainable city logistics strategies based on historical parking data before, during and after the pilot.
    - Requires transference of large amounts of data between the two cloud-based platforms used by Parkunload.
- **Integrate big data sources from Parkunload to KEITA's micro-incentives platform**.
    - Requires transference of large amounts of data between cloud-based platforms.
- **Create additional communication channels via app** to send official notifications regarding the city context in real-time, such as during pollution episodes, within Low Emissions Zones or due to the update of parking regulations
    - Including sending surveys to most frequent end-users.

Highlight that these additional features to be developed in Parkunload impacts several components of the platform, such as mobile app for drivers, mobile app for parking enforcement agents, web-based Back Office application, central services and Big data reports (Figure 23).

Figure 23. Parkunload usage mock-up for drivers, control agents and data aggregation

6.8. Deployment Plan

According to the requirements for the Métropole du Grand Paris, the S+LOADZ project plans to execute the following tasks during the deployment plan:

- **Legal analysis of requirements in city's parking bylaws from Métropole perspective** (progressive task).
    - Both Métropole and the city of Paris are currently evaluating with their legal services how parking bylaws need to be amended at local, metropolitan and national levels to enable regulating, enforcing and monitoring loading and delivery zones with digital means.
- **Design, development, test, homologation and launch** of the upgraded version of Parkunload platform including the "Multi-sustainable pack". (up to 4 months).
    - As described in the "Development plan" section per city.
- **Design, manufacturing and installation of road signs** per digital delivery zone (up to 3 weeks).
- **Execution of the communication plan** before, during and after launching the pilot.
    - As described in the "Communication plan" section of the document.
- **Execution of the training plan** before, during and after launching the pilot.
    - As described in the "Training plan and customer support" section.
- **Execution of the Quality Assessment plan** before, during and after launching the pilot.
    - As described in the "Training plan and customer support" section.
- **Execution of the operational stage of the pilot**, including SaaS, customer support and parking control tasks.

7. Micro-Incentives Programmes rewarding Logistic Companies

A mobility micro-incentive is a granular set of rules and criteria that can be targeted to any person, company, circumstance, need and/or type of transport to maximise financial and societal goals. They differentiate from uniform subsidies which benefit everyone equally or one specific criterion.

In collaboration with partner cities, logistics operators, and other key stakeholders will conduct a study to analyse what type of micro-incentives are best suited to different cities and how these micro-incentives could be managed and evaluated. This chapter presents the rationale for the study and the structure of its contents.

7.1. Rationale of this Study

Initiatives such as Low Emission Zones (LEZ) or parking restrictions for loading and unloading are not a new topic to encourage sustainable logistics in cities. They can be part of a set of more targeted and flexible incentive programs, micro-incentives, which could help cities achieve better sustainability performance (like less congestion or improved air quality) while facilitating more efficient logistics to reduce operation costs for service providers. Mobility micro-incentives can alleviate some of the challenges in mobility, they can help optimise the current allocation of subsidies and potentially create new strategies and programs to more optimal mobility models. In order to make micro-incentives a feasible option, different tools need to be developed due to the complexity of managing large amounts of data and keeping track of the different strategies. Therefore, it is needed to clarify some of the hypotheses behind the application of micro-incentives in the framework of sustainable logistics and detect the challenges that need to be addressed to build a solution that:

- Includes the most impactful type of incentives.
- Allocates incentives in an efficient manner.
- Nudges the mobility behaviour in cities and regions to positively impact them in terms of mobility, equity and sustainability.
- Improves the efficiency in the operations of logistics service providers by encouraging consolidation and increasing the use of the vehicle's capacity.
- Allows a rigorous management of multiple and combined incentives in a flexible and targeted manner.

7.2. Study Structure

- Rationale of this study: The reason behind the study and the hypothesis to be contrasted.
- Definition of micro-incentives: Difference between uniform incentives from targeted and flexible incentives
- Analysis of current logistics incentives in the partner cities: Together with partner cities and logistics operators, learn about incentives that are already (or have been) in place and find common indicators that can help measure the impact of the incentives in terms of sustainability, equity and mobility. Benchmark and brainstorm of other incentive ideas. Together with partner cities and logistics operators, define potential use of micro-incentives or combination of micro-incentives to nudge logistics to less negative impact in cities, mainly discussing the last-mile.
- Categorization of incentives. In order to find patterns and define indicators (see Figures in Annex).
    - Incentive types
    - Incentive challenges
    - Incentive benefits
- Prioritisation of incentives. An exercise to be done together with partner cities and logistics operators to define the must impactful micro-incentives or combination of micro-incentives.
- In depth analysis of one potential use case. Define a detailed roadmap to implement one micro-incentive program in one of the partner cities. Including an exhaustive analysis of the incentive.

8. Communication Plan

One of the key aspects to success and end-users' acceptance of the digital platform to regulate and control loading and delivery zones is the definition of a well-dimensioned communication plan in the city. The communication plan for the cities is focused on all the stakeholders, in order to describe the instructions and benefits related to the digital transformation of loading and delivery zones.

The communication plan includes several marketing collateral and activities before, during and after launching the Sustainable Loading and Delivery (S+LOADZ) pilot. In particular, the chapter includes the communication objectives, key messages to target audiences, communication channels, communication roadmap, and lastly the evaluation and monitoring of the communication strategy, based on the principle of the 6 Ws (What, Why, When, Where, and Who and How) as illustrated in Figure 24.

Figure 24. Communication plan principles

This communication plan is conceived as a dynamic tool that will evolve with the development of the project´s needs, therefore the contents will be adjusted according to the progress of the project.

8.1. Communication Objectives

The strategic goals of the S+LOADZ´s communication plan which are transversal to all the cities and are described in Figure 25.

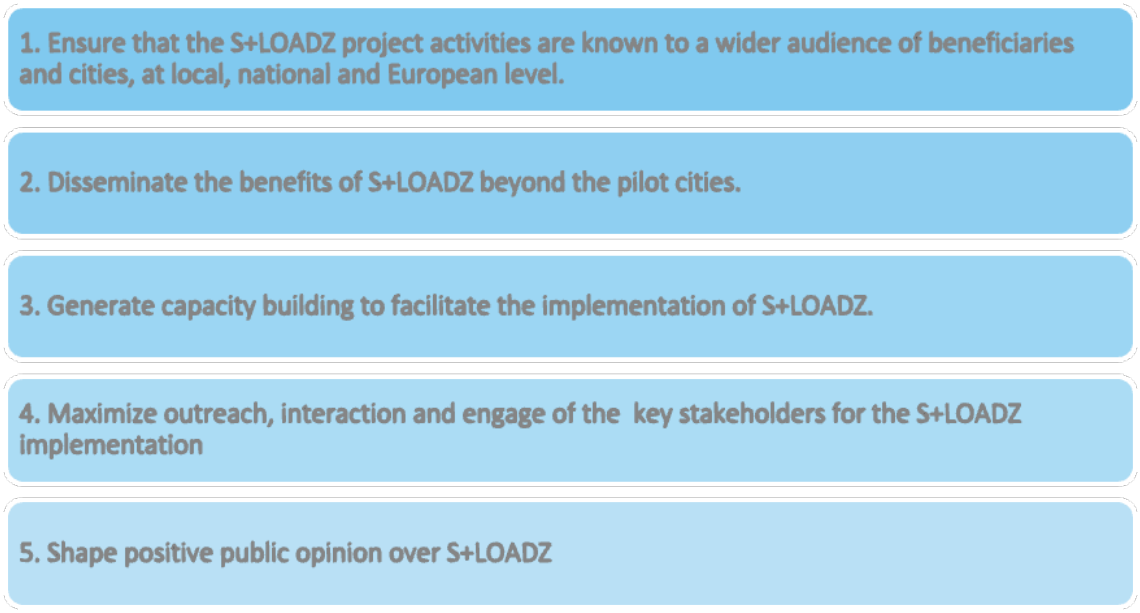


Figure 25. Communication Objectives

The specific communication objectives would be configured according to the particularities of each pilot and its living lab and deployment plan. These specific objectives should be SMART:

1. **S**pecific: explain in a clear and detailed way the result to be achieved
2. **M**easurable: describe an achievement that can be tracked in percentage, a frequency, rate or number
3. **A**chievable: there is the will and a real chance of achieving this objective, it is a realistic objective
4. **R**elevant: an important objective that is aligned with the overall purpose and strategy of the project
5. **T**ime-bound: includes a deadline that gives it a sense of urgency

8.2. Target Audiences

To properly manage the communication effort during the S+LOADZ project, the stakeholders have been classified in a matrix according to their level of influence and involvement in the project, as presented in Figure 26.

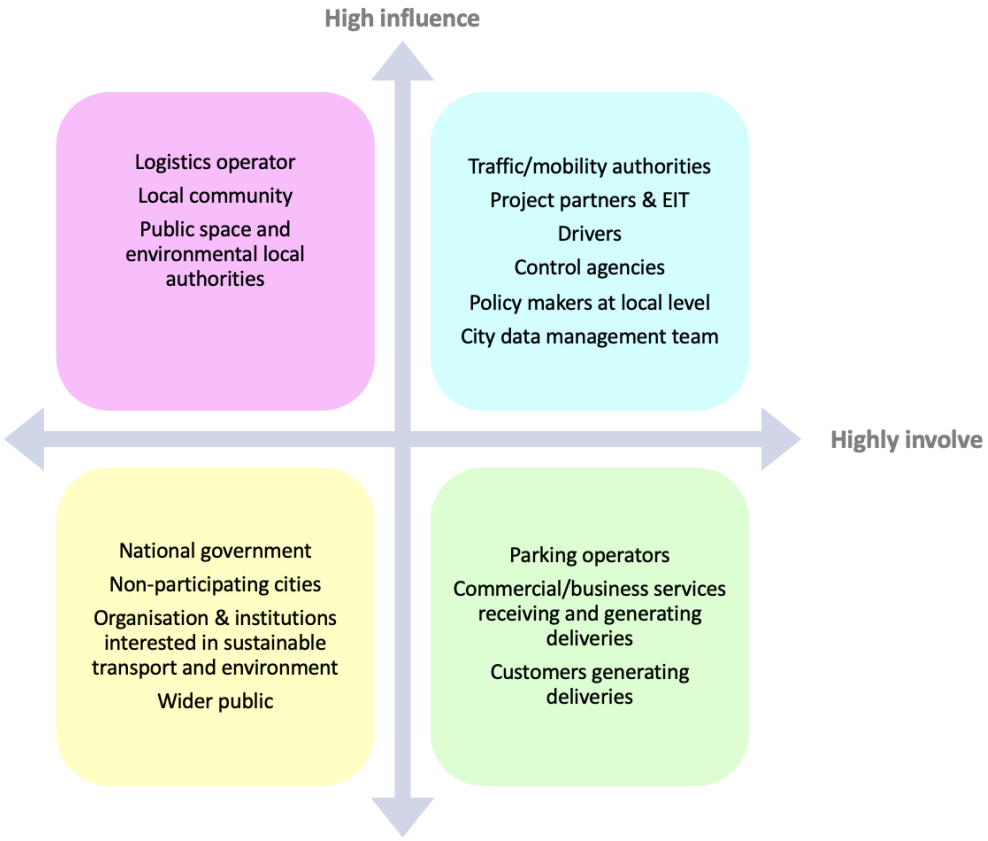


Figure 26. Stakeholders' matrix

Based on the stakeholder matrix, Figure 27 presents and explains the communication purposes for each stakeholder group.

TOP RIGHT: Highly involved and influential	Communication is used to engage, support and consult the stakeholders in a regular basis aiming to maintain a high level of satisfaction.
TOP LEFT: Highly influential, less involved	Communication is used to comprehensively inform stakeholders, monitor their needs and increase their level of participation and interest
BOTTOM LEFT: Low influence, low involvement	Communication is used to inform the generalities of the project and aim to increase their level of involvement
BOTTOM RIGHT: Low influence, high involvement	Communication is used to anticipate and monitor the needs of the stakeholders, keep them inform and involve them as needed in the project

Figure 27: Communication purposes by stakeholder category

8.3. Key Messages

The key messages of the S+LOADZ project have to be tailored to the type of stakeholders and their needs, fit the specific living lab of the pilot and take into account the context and timing of the pilot implementation. The following initial key messages can be used as a basis for the general S+LOADZ communication:

- S+LOADZ develops and validates a digital platform to control, regulate, monitor, and analyse Multi-Sustainable Digital Loading and Delivery Zones for City Logistics
- S+LOADZ accelerates the shift to Sustainable and Smart City Logistics
- S+LOADZ aims to achieve a more sustainable, flexible, dynamic and digital delivery zones management, transforming logistics, improving the liveability, quality of life and economic prosperity in cities.
- S+LOADZ generates real time data for smarter decision-making for city planning. Better data, better cities!
- S+LOADZ optimizes the use of loading/delivery parking space
- S+LOADZ improves the turnover for deliveries. Good for the business, good for the city.
- S+LOADZ helps cities manage loading zones with specific details: including type of vehicles allowed, delivery schedules, low emission zones, time periods and non-motorized logistics.
- A total of five European cities will implement together more than 250 sustainable loading zones to test and gather the benefits from S+LOADZ

The key messages of the project will grow and must be adapted to all the cities' needs through the project lifetime. For those messages to be effective is necessary they ensure these principles:

- **Concise**: clear and short messages.
- **Strategic**: aligned with S+LOADZ value proposition and its benefits.
- **Accessible & understandable**: easy for target audiences to understand, avoiding acronyms or jargon.
- **Actionable**: transmit a sense of urgency that influences action. The messages must be decisive and active rather than passive
- **Credible**: use data, facts and concrete details
- **Relevant**: important for the audience, on a rational and emotional level
- **Tailored**: to be specific to the audience
- **Be narrative**: Tell a story, do not just list facts

8.4. Communication Channels

Following the main channels of communication and activities included in this communication plan are described:

S+LOADZ visual identity and branding: A strong and coherent visual identity of the project is developed through the design of the project logo to ensure a unique identity of the project. This visual identity must be used in all communication materials with applied co-branding of EIT Urban Mobility/EU (Figure 28).

Figure 28. Project Visual Identity

Website S+LOADZ: The project website will be a dynamic channel of communication and dissemination of S+LOADZ project. The following communication activities will be carried out in this space:

- Information about the project, pilot cities and project partners
- Dissemination of the benefits and technical details of the sustainable loading and delivery zones.
- Dissemination of S+LOADZ best practices
- News and updates on the progress of the living labs

Printed/digital material: For drivers training purposes and local community awareness printed and digital material will be developed before and during the implementation of the pilot.

- **Information leaflets** must be design and distributed to be posted to citizens. They would need to be distributed by either civic or parking agents to vehicles parked in smart loading or delivery zones (see Figure 29).

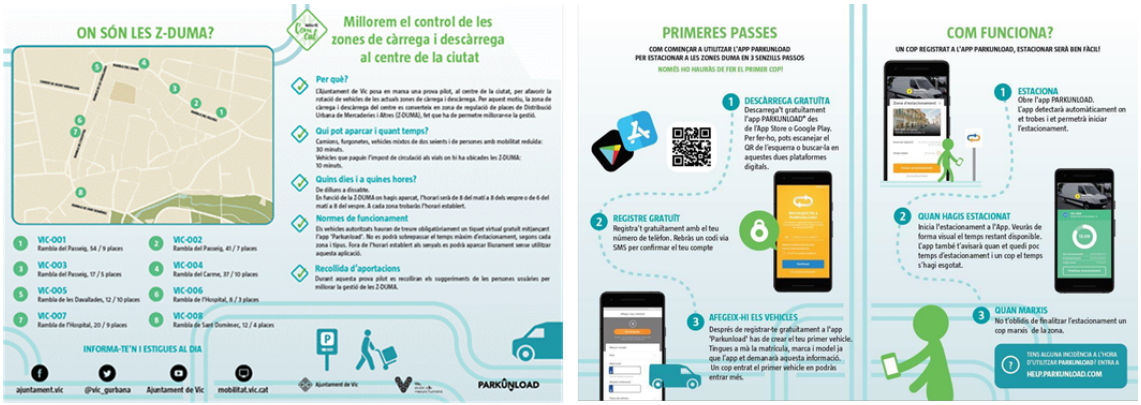


Figure 29. Z-DUMA Communication leaflet for Vic

Horizontal and vertical signage delimiting the loading and delivery zones, including overall parking rules, regulation hours and clear instructions to download and operate Parkunload (see Figure 30).

Figure 30. Different types of signage of Z-DUMA and S+LAODZ zones in Vic and Paris

Social media: The cities and all project partners will use social media channels mentioning the hashtag **#SLOADZ** and the EIT Urban Mobility (in line with the *EIT Urban Mobility Communication guidelines for partners 2021)*, in order to generate project awareness and communicate the small victories, achievements and results of the project. This would need to be done before, during and after launching the pilot.

Official websites and post in social media of the City council: publish information including detailed information (regulations, maps, data, etc.) about the pilot project of S+LOADZ in the city (see Figure 31).

Figure 31. Examples of Vic's Z-DUMA information campaign

Press release: A Press Release will be produced for each of the pilots, translated into local languages and distributed via local media. The English versions will be used to promote a widespread European dissemination.

Webinars:

- Webinar to engage the local ecosystem of the pilot in each city.
- Shared-knowledge webinar among the pilot cities to generate capacity building among them by sharing lessons learns and best practices.

Events & informative sessions:

- Awareness will be raised about the S+LOADZ innovations by contributions to city network events and informative sessions. These will be hold with representatives of stakeholders to inform them about project scope, objectives and goals.
- A final public event will be organized where Final Report highlights will be presented to key European stakeholders and local authority representatives (see Figure 32).

City' specific S+LOADZ information in the App:

- Update Parkunload help and support centre with additional articles and videos related to the new types of vehicles, regulations and digital loading or delivery zones available in cities.

Publication: In order to disseminate the project results, generate interest and awareness in this innovative solution and induce replicability of S+LOADZ to *Handbook for Implementation of Multi-Sustainable Digital*

Loading and Delivery Zones for City Logistics will be developed and published in the project site website and shared via social media.

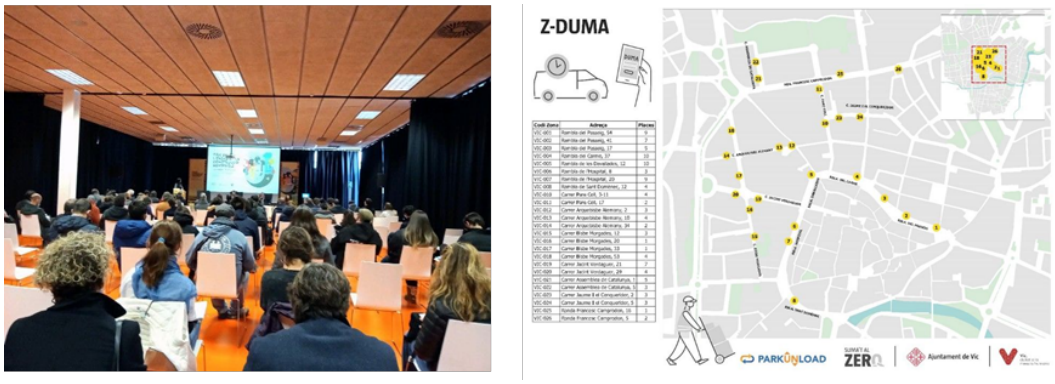


Figure 32. Examples of Vic's Z-DUMA information campaign

8.5. Communication Roadmap

The communication roadmap indicates the specific communication task per project partner during the project lifecycle. The roadmap of S+LOADZ is shown in Figure 33.

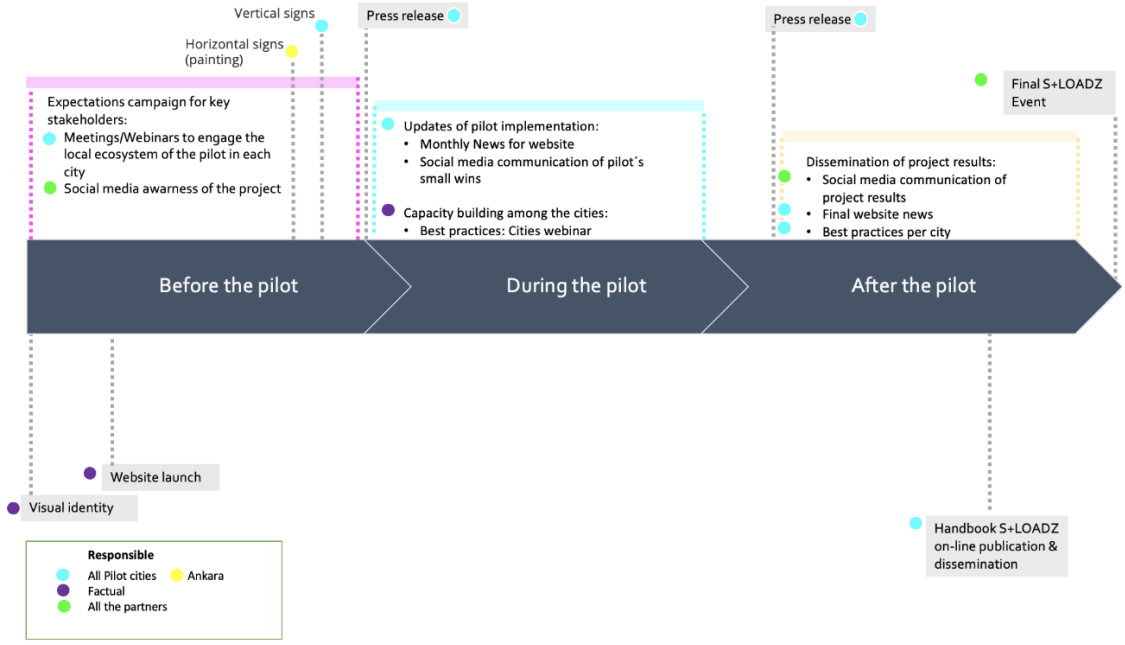


Figure 33. Communication Roadmap

8.6. Monitoring and Evaluation

To follow up the communication plan and guarantee a successful communication during the project implementation, the next indicators will be measure (Table 10):

Communication indicator	Target value	Evaluation
Number of visits S+LOADZ S+LOADZ website	100	Monthly
Number of news created per partner city in the Website	6	Bi-Monthly
Number of appearances of #S+LOADZ hashtag in social media	20	Bi-Monthly
Number of press Releases /City	2	Every three months
Number of video views	150	Monthly since release of the videos
Number of downloads of the S+LOADZ Handbook	50	One time, December 2022
Number of internal/external events to create awareness of S+LOADZ	4	Bi-Monthly

Table 10. Factors to evaluate the success of S+LOADZ information campaign

9. Training plan and customer support

The proposed training plan aims that all the staff involved in the S+LOADZ project will receive the necessary training to be able to correctly execute their role on daily operations before launching the pilot in each city.

9.1. Parkunload Components

Parkunload platform provides the following components to cities and end-users:

- **Road signs with a Bluetooth sensor** per loading or delivery zone.
  - Signage includes parking rules and instructions to download the Parkunload app.
  - Bluetooth proximity sensor allows to quickly display accurate parking conditions per vehicle and user profile in just 3 seconds.
- **Parkunload mobile app for drivers**.
  - Parkunload app in Google Play (Android) (Parkunload, 2021).
  - Parkunload app in App Store (iOS / Apple) (Parkunload, 2021).
- **Parkunload mobile app for parking enforcement agents**.
  - Parkunload Control app in Google Play (Android) (Parkunload, 2021).
- **Back Office application for Cities** to admin, operate and monitor Parkunload's platform.
  - Web-based application restricted to authorised users.
- **Advanced data reporting tools**, based on Big Data technologies.
  - Web-based reporting tools developed within the S+LOADZ project.
- **Cloud-based central services and databases**.
  - Secured cloud-based services located in a relevant global IT provider.
- **API services to integrate with third party applications.**
  - Integration services with parking occupancy services or parking control platforms.
- **Smart parking button,** to automatically start and stop parking sessions with one click.
- **Help Centre,** for drivers, parking enforcement agents and city administrators.

- Web-based help centre available from Internet and Parkunload's applications for drivers, parking enforcement agents and city administrators (Parkunload, 2021).

- **Customer support centre,** for drivers, parking enforcement agents and city administrators.
  - Contact forms available from the Internet and Parkunload's applications for drivers, parking enforcement agents and city administrators.

According to this, Parkunload provides several sources of digital resources, as well as supporting tools to help end-users manage the set of applications autonomously.

9.2. Training Plan for Cities

Parkunload plans to execute the next activities to guarantee that city users and parking enforcement agents receive the proper training before launching the pilots:

- **Webinar for city users,** considering a training session of up to 3 hours per city for both admin and help desk users.
  - Introduction to Parkunload platform architecture and main features.
  - Introduction to the Parkunload app for drivers using Digital Loading and Delivery zones.
  - Introduction to Parkunload app for parking enforcement agents.
  - Detailed description of Parkunload's Back Office application for city users.
    - Administration tasks, including parking rules per zone.
    - Help desk tasks, including proof-of-parking management.
  - Introduction to advanced data reports developed in the S+LOADZ project.
  - Frequently Asked Questions (FAQ).
- **Webinar for parking enforcement agents,** considering a training session of up to 3 hours per city for either parking agents or police.
  - Detailed description of the Parkunload app for drivers using Digital Loading and Delivery zones, in order to be able to help end-users if required.
  - Detailed description of the Parkunload app for parking enforcement agents.
  - Introduction to Parkunload's Back Office application for users in a control centre.
    - Dashboard view and main KPIs in real-time.
    - Statistical charts and information in real-time, including parking availability.
  - Introduction to advanced data reports developed in the S+LOADZ project.

    - Frequently Asked Questions (FAQ).
- **Continuous training activities**
    - **Online Help Centre,** available in 5 languages for end-users at:
        - https://help.parkunload.com/
    - **App-based Help Centre** available in 5 languages in the Parkunload app for drivers.
    - **App-based Help Centre** available in 5 languages in the Parkunload app for agents.
    - **Online Help Centre** available in 5 languages in the Parkunload Back Office application.
    - **Videos with basic instructions** related to Parkunload apps.
    - **Registered webinars.**

Highlight that training activities will involve demos of Parkunload's applications in real-time in order to facilitate the comprehension of the smart loading zones platform.

9.3. Customer Support for Cities

The technical support plan for the operation foresees the availability of resources to solve possible doubts and operational or technical incidents by Parkunload.

Parkunload's platform includes an advanced digital tool to manage technical incidents and support for end users, which allows any communication to be recorded.

The main channels for contacting Parkunload's technical support services are as follows:

- **App-based contact form,** which is available in all the applications of Parkunload's platform, such as Parkunload app for drivers, Parkunload control app for parking enforcement agents and Web-based Back Office for cities.
- **E-mail contact at info@parkunload.com**, for city users and parking enforcement agents.
- **Technical support phone number**, for city users and parking enforcement agents.
- **Web-based Help Centre,** for drivers, parking enforcement agents and city administrators.
- **App-based Help Centre,** for drivers, parking enforcement agents and city administrators.

The opening hours of the Parkunload Technical Support Service are as follows:

- Office support from 9h to 19h from Monday to Friday.
- Online registration of technical issues at any time.

The resolution time for technical incidents will depend on their impact and will be set according to the following Service Level Agreement (SLA):

- **Critical technical issue,** which may disable the whole system or most of the core Parkunload features.
    - Up to 6 hours during office hours.
- **Severe technical issue,** which may partially disable the system or some of the core features of Parkunload.
    - Up to 24 hours during office hours.
- **Soft technical issue,** which affects non-vital features of the Parkunload platform applications.
    - Up to 1 week during office hours.
- **End-user technical support** from both app or web-based contact forms for questions and technical issues.
    - Up to 48 hours during office hours. If required.
    - Parkunload will refer the inquiry to the city's Mobility Department to address the issues at a municipal level. It is important to note that Parkunload does not deal with complaints or questions related to penalties issued by the parking enforcement service.

Parkunload monthly report to cities the technical issues and tickets of support.

10. Quality Assurance Plan

This chapter presents the Quality Assurance Plan (QAP) for the S+LOADZ project and contains; 1) the project management structure, 2) the roles of the partners in relation to the QAP and 3) the quality assurance process for key activities and deliverables.

The quality assurance plan aims to reach the following objectives:

- The deliverables, milestones and activities on the project are aligned with the S+LOADZ proposal, objectives and timeline and are delivered with expected quality.
- The roles and responsibilities of all the project partners are clear for every partner.
- The performance and functionality of the technical solution (App) of S+LOADZ is validated.
- The quality of the activities and deliverables of the project.
- The key processes within the project are effectively organised and monitored.

The overall management structure of S+LOADZ as shown in Figure 34 is composed by:

1. Project Management Team: consist of the project coordinator, workplan leader, activity leader and reviewer partner, which acts as a quality manager. This team has the purpose to guarantee that each deliverable is made on time, on-budget and with the expected quality. The team closely monitors the activities included in the specific work package, anticipates potential problems and delays and implements the necessary actions to avoid problematic situations.
2. The Partner Board (PB): it is the superior decision-making body, it includes one representative of each of the project partners and aims to make final decisions on the project development, contractual issues, budget changes, consortium structure and overall project direction.

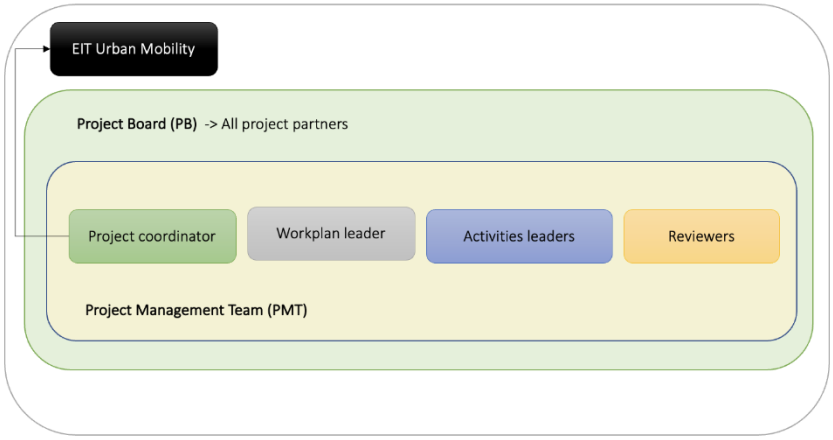


Figure 34: Management structure

The project management team (PMT) is specific to each work plan and activity, and the only cross-cutting partner for all work plans is Factual the project coordinator. Figure 35 shows the specific Workplan Leader, the main activity leader (not necessarily the exclusive one), and the main reviewers for each of the seven workplans.

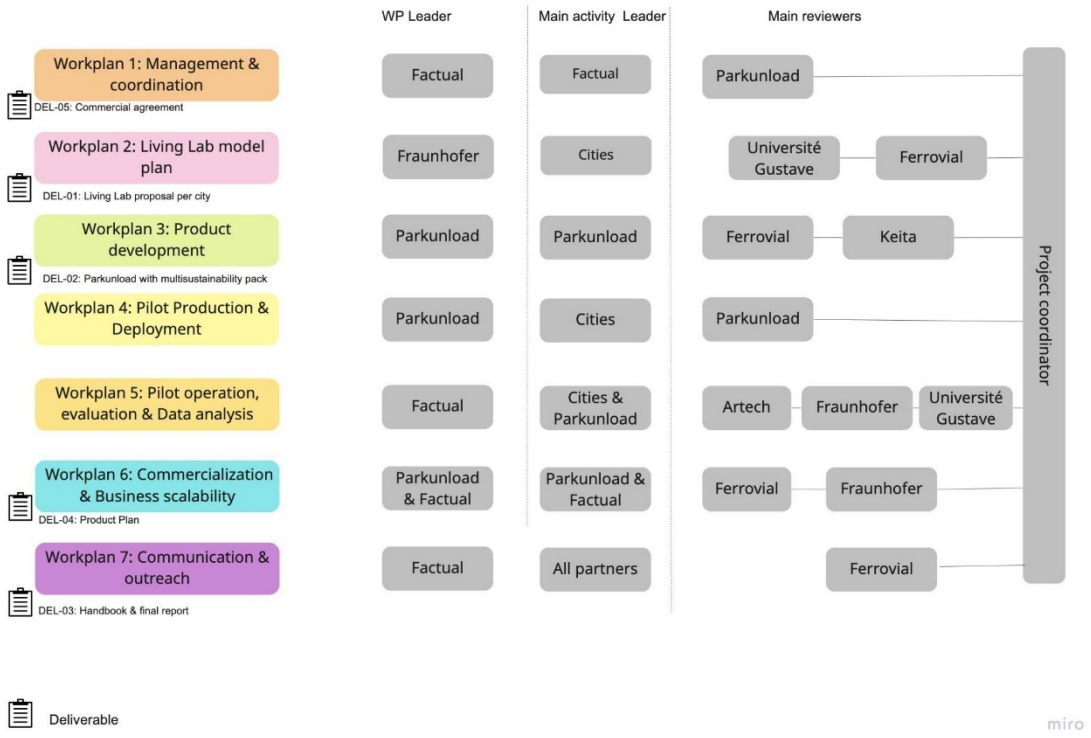


Figure 35: General work packages, main activity leaders and reviewers' team

Table 11 shows in more detail the activity leader for each one of the activities and deliverables included in the seven (7) workplans. The activity manager will be in any case the main responsible for the development of the activity, while the work plan manager will consolidate all the information in the final deliverable and together with the Project Management Team will follow up on each one of the activities of the deliverable.

Workplan ID	Task ID	Activity	WP Leader	Activity Leader
WP1	**1.0**	**Project Management & Coordination**	**Factual**	
WP1	1.1	PM & Coordination of partners and key stakeholders involved in the pilots, ensuring quality and alignment with project objectives	Factual	Factual
WP1	1.2	Ensure consistency and pursuing a global vision of the project across multiple cities and scenarios	Factual	Factual
WP2	**2.0**	**Living Lab Model Plan per city**	**Fraunhofer**	

WP2	2.1	Analysis and definition of the legal and operational framework required per city and scenario, including sustainability features regarding Sustainable Loading and Delivery Zones (S+LOADZ)	Fraunhofer	Parkunload
WP2	2.2	Functional specification for each type of Sustainable LDZ included in project scope (i.e., S+LOADZ1 to S+LOADZ4)	Fraunhofer	Parkunload
WP2	2.3	Management of local stakeholders, including logistic operators, and parking authorities	Fraunhofer	Cities
WP2	2.4	Analysis and definition of the technical framework per city, including functional and system integration requirements, such as with vehicle emissions databases	Fraunhofer	Parkunload
WP2	2.5	Installation and deployment plan per each city and scenario, including signage, code, and dynamic parking conditions per zone	Fraunhofer	Parkunload
WP2	2.6	Definition of the parking control plan during the pilot	Fraunhofer	Parkunload
WP2	2.7	Definition and design of micro-subsidies programmes aimed at rewarding logistics companies that best adhere to the pilot cities' sustainability policies	Fraunhofer	KEITA
WP2	2.7	Quality Assurance plan per city pilot and scenario	Fraunhofer	FACTUAL
WP2	2.8	Training plan to city stakeholders, drivers, and enforcement agents	Fraunhofer	Parkunload
WP2	2.9	Communication plan per city, including marketing collaterals, civic or parking enforcement agents, and pre-launch, launch and post-launch activities	Fraunhofer	FACTUAL
WP3	**3.0**	**Product development including with multi-sustainability pack**	**Parkunload**	
WP3	3.1	Design and development, testing, homologation and launch of the multi-sustainability features pack of Parkunload's platform, including software upgrades to mobile app for drivers (Android, iOS), mobile app for agents (Android), web-based BackOffice and Cloud-based central services.	Parkunload	Parkunload
WP3	3.2	Fine tune developments aligned with additional inputs from WP2, including the integration with Keita Mobility Factory's "micro-subsidies" platform.	Parkunload	Parkunload
WP3	3.3	System integration with available national databases of vehicle emissions per license plate.	Parkunload	Parkunload
WP3	3.4	Dashboard enhancement with Sustainability indicators and charts in real-time, including KPIs and additional indicators, statistics and charts in Parkunload's BackOffice related to Sustainable City Logistics, such as parking patterns, parking time, parking occupancy, rewards, etc.	Parkunload	Parkunload
WP3	3.5	Software localization according to the project scope. Development of software localization tasks to adapt Parkunload's mobile applications to end user's language.	Parkunload	Parkunload
WP3	DEL	DEL 03 Parkunload with multi-sustainability pack	Parkunload	
WP4	**4.0**	**Pilot production & Deployment**	**Parkunload**	

WP4	4.1	Supply, configuration and assembling of Parkunload's Bluetooth components per city and scenario. Supply, configuration, and packaging of Parkunload's Bluetooth proximity sensors.	Parkunload	Cities
WP4	4.2	Supply of Parkunload's Smart Parking Button for some Logistic Operators.	Parkunload	Cities
WP4	4.3	Manufacturing and assembling of customized parking signs per digital Loading and Delivery Zone. Design and manufacturing of customized road signs per digital LDZ with a unique zone code.	Parkunload	Cities
WP4	4.4	Parkunload's platform set-up per city, area and Sustainable LDZ. - Registration city areas and LDZ, according to the configuration described in the Deployment plan per city.	Parkunload	Parkunload
WP4	4.5	Installation and QA of parking road signs per sustainable digital LDZ.	Parkunload	Cities
WP4	4.6	Execution of a training plan for all the users of the municipalities, including online contents, such as Help Centre with Questions and Answers (Q&A), videos and articles for end users (Parkunload app), parking authorities (Mobile app for agents) and city planners (BackOffice).	Parkunload	Cities
WP4	New	Final Deployment plan per city	Parkunload	Cities
WP5	**5.0**	**Pilot operation, evaluation & Data analytics**	**Factual**	
WP5	5.1	Platform operation for several types of S+LOADZ in different countries and scenarios. Parkunload's platform operation in pilot environment. Execution of Parkunload's maintenance plan and customer support plan during the pilot.	Factual	Parkunload
WP5	5.2	Parking control and information activities per city during the pilot in S+LOADZ.	Factual	Cities
WP5	5.3	Periodical reporting activities based on Big Data from logistic vehicles' activity per S+LOADZ. Additional reporting tasks based on Big Data analysis with other tools and platforms such as Google Data Studio.	Factual	Parkunload
WP5	5.4	Data analytics activities based on parking and availability patterns per zone, scenario, and city, including KPIs measuring the effectiveness of the pilot per city, scenario, and precise S+LOADZ.	Factual	Fraunhofer
WP5	5.5	Evaluation activities and monthly reports to amend either parking conditions or operational activities.	Factual	Cities
WP5	5.6	Minor software upgrades and enhancements regarding Parkunload's multi-sustainable pack based on both operational and technical performances during the pilots.	Factual	Parkunload
WP5	5.7	Documentation of the final report S+LOADZ Building on the Key Deliverable 1.	Factual	Cities
WP6	**6.0**	**Commercialization & Business scalability**	**Factual & Parkunload**	
WP6	6.1	Innovation strategy	Parkunload	Parkunload

WP6	6.1.1	Innovation strategy for connected car platforms (Android Auto, Apple Car) on Commercial Vehicles.	Parkunload	Parkunload
WP6	6.1.2	Innovation strategy regarding Big Data and Business Intelligence services for Cities and Logistic operators.	Parkunload	Parkunload
WP6	6.1.3	Innovation strategy regarding data driven dynamic parking condition per area of the city, based on air pollution, traffic and parking occupancy information in real-time.	Parkunload	Parkunload
WP6	6.2	Business scalability	Factual	Factual
WP6	6.2.1	Definition of key factors to replicate S+DLZ model from the technical and functional perspective.	Factual	Factual
WP6	6.2.2	Definition of the Commercialization plan and pricing for a few types of S+LOADZ.	Factual	Factual
WP6	6.2.3	Definition of pricing strategy and alternative business models for European capitals, as well as mid-size cities.	Factual	Factual
WP6	6.2.4	Development of a Go-to-Market strategy and business plan, including a well-defined Financial Sustainability Mechanism.	Factual	Factual
WP7	**7.0**	**Communication & Outreach**	**Factual**	
WP7	7.1	Develop an overall project communication strategy.	Factual	Factual
WP7	7.2	Documentation for the dissemination of best practices, technical guidance and methodology for running pilots in European cities	Factual	All partners

Table 11: Activity leaders per work package

For the project deliverables and specific key activities presented in Table 12 a specific quality assessment process will be developed to guarantee its quality. For the rest of the activities the quality will be assured by the Project Management Team and the project coordinator based on the project plan.

Workplan ID	Type	Leader	Activity	Delivery/Activity reviewers
WP1	Milestone	Factual	MS01 Communication & outreach strategy	Parkunload, Ferrovial
WP1	Milestone	Parkunload	MS06 Comercialization agreement SIGNED	Factual, Ferrovial
WP2	Deliverable	Fraunhofer	DEL 01 Living Lab proposal per city	Université Gustave Ferrovial (Communication plan)
WP2	Milestone	Fraunhofer &Parkunload	MS02-Living Lab Model Plan & Enhance platform presentation	Université Gustave & Ferrovial (Communication plan)
WP3	Milestone	Parkunload	DEL 03 Parkunload with multisustainability pack	Ferrovial, Keita & Factual

Workplan ID	Type	Leader	Activity	Delivery/Activity reviewers
WP3	Deliverable	Parkunload	DEL 02 Handbook S+LOADZ	Université Gustave Ferrovial
WP4	Milestone	Parkunload	MS03 Pre-pilot set up. Pilot deployment and product demostration per city	Factual, Franhofer & University Gustavé
WP5	Milestone	Factual	MS-04 Mid-pilot progress report and adjustments	Parkunload, Franhofer & University Gustavé
WP5	Milestone	Factual	MS05 Pilot conclusions per city	Parkunload, Franhofer & University Gustavé
WP6	Activity	Parkunload	Innovation strategy	Ferrovial & Factual
WP6	Activity	Factual	Business scalability	Ferrovial & Parkunload
WP7	Deliverable	Factual	DEL 03 Final report S+LOADZ	Franhofer, University Gustavé, Ferrovial

Table 12: List of deliverables, key activities and reviewers

The process on how to assess the quality of the deliverables of Table 12 is presented in Figure 35. As presented, once a draft deliverable is completed it must be submitted to the reviewers, 3 weeks before the deadline, for a quality assessment. In order to do so the reviewers will evaluate in no more than 5 working days the quality assurance of the deliverables considering the following assessment parameters:

- Relevance
- Alignment with project objectives
- Completeness of the delivery
- Innovation level
- Usability level
- Quality of achievements
- Quality of presentation of achievements

Based on that quality assessment the reviewers should submit a consensual final evaluation of the deliverable draft, resulting in one of the following statements:

- Fully accepted
- Accepted with minor corrections
- Rejected unless major corrections are applied

If the deliverable is not fully accepted the process develop-review will iterate until the deliverable has the required quality as presented in Figure 36.

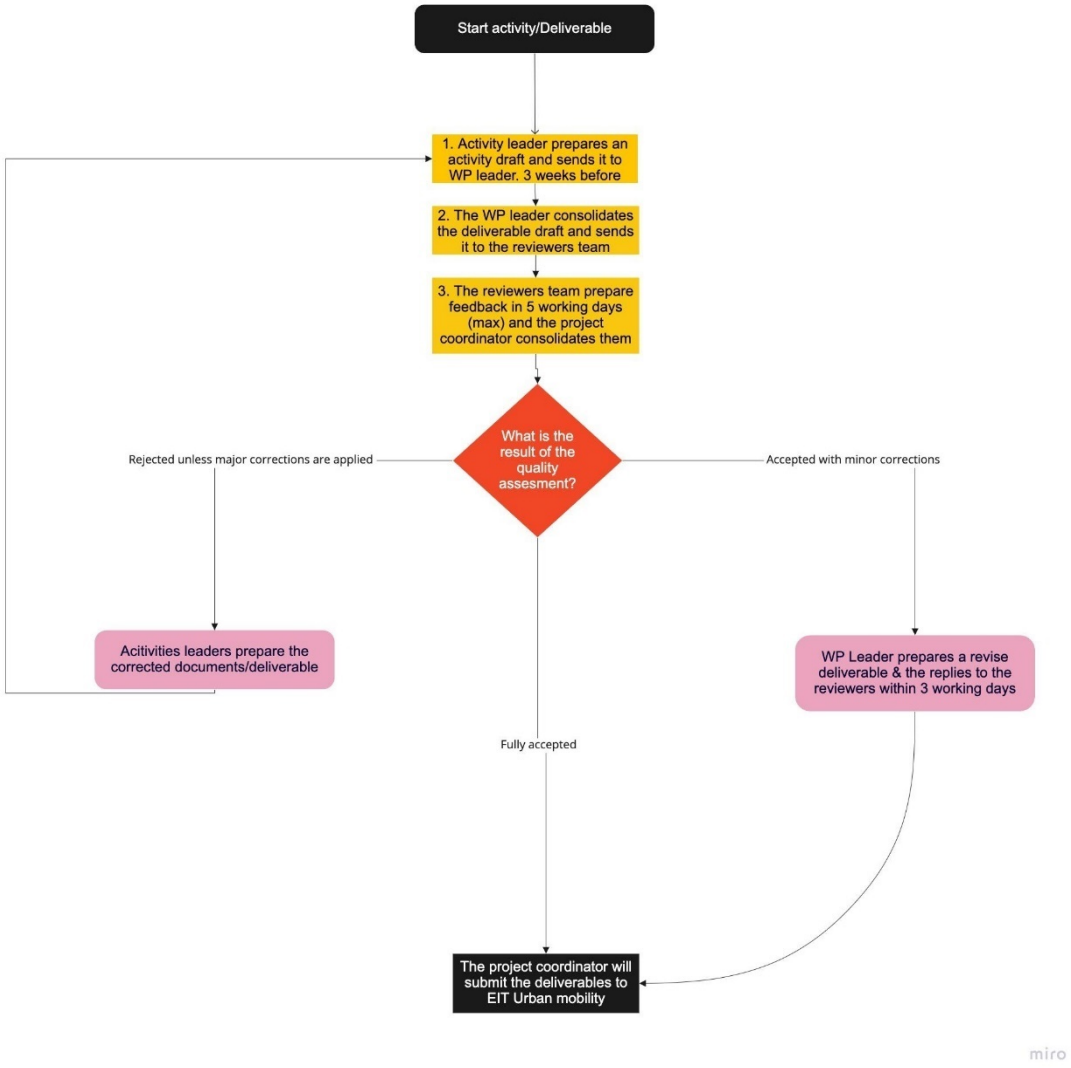


Figure 36: Project performance process

11. KPIs and Success Criteria

To evaluate the project's success, a list of different criteria, acting as KPIs, was created (see Table 13). Within that list, the different KPIs are classified according to their respective dimension of sustainability. By changing the sustainability dimension from economical to operational, the practical aspect of bringing digital loading zones to the model cities is emphasised. The column background gives a short explanation on why a certain criterion has been selected as KPI.

KPI	sustainability type	background
# of S+LOADZ over time	operational	rate of LDZ successfully converted to S+LOADZ / newly installed S+LOADZ
# of parking places within S+LOADZ over time	operational	rate of parking places successfully converted to S+LOADZ - parking places / newly installed S+LOADZ-parking places
average parking rotation / zone over time	operational	S+LOADZ will help to increase parking rotation in LDZ, especially during peak hours
# of vehicle types / zone over time	operational	display heterogeneity of usage S+LOADZ
# of illegal parking / zone	operational	S+LOADZ will help logistic operators to improve their driver's parking behaviour, resulting in fewer tickets
%-availability of loading spaces over time	operational / environmental	S+LOADZ will help to increase turnover in LDZ, resulting in more available parking spaces for logistic transport vehicles and lesser park searching traffic
% low emission vehicles / zone over time	environmental	display sustainability of usage S+LOADZ
rate by stakeholder	social	S+LOADZ will help to improve relationships between logistic operators and other stakeholders
# of social media & press mentions	social	media coverage will raise awareness of the project and lead to more contributions

Table 13. Operational, environmental and social KPIs

12. Conclusions

The main goal of this deliverable is the definition of the living lab model for the participant cities: Vic, Paris, Ankara and the two cities of the Métropole du Grand Paris. The document uses the initial information from the project proposal to translate the first generic objectives to specific development and deployment plans, considering the particularities of each city and its interests. As usual, it starts with a diagnosis of the current problems in each city, mainly focused on lack of parking rotation, illegal parking and increase of traffic congestion which is affecting the urban mobility of the selected cities and increasing its negative externalities such as road safety issues and pollutant and GHG emissions. The deliverable goes in depth with the current status of the regulation in each city as the different bylaws and country laws are a challenge for a broad deployment of the S+LOADZ project goals.

The next step is the definition of the pilot scope and objectives considering the covering area, local infrastructure and administrative & legal aspects, and the subsequent development plan focused on the changes that will be introduced to the Parkunload's platform (including the micro-incentives programmes rewarding logistics companies) and deployment plan which includes the combination of legal, software updates and infrastructure changes. In a nutshell:

- Vic: LDZ in pedestrian areas, cargo bike regulation in digital LDZ, pollution episodes layer, LEZ layer, short-term parking near primary services.
- Paris: LDZ for Urban Distribution of Goods 24h/7 (+160 additional zones in the 10th district), parking enforcement productivity, pollution episodes layer, LEZ layer and add-on features on existent "Aires de Livraison connectées" in the 4th district (parking availability and enforcement). In addition, S+LOADZ project would lead to a regulation change for the digitalisation of the kerbside in the city, which is a milestone for the city logistics.
- Ankara: 750 parking spaces for trucks, vans, LCV, and vehicles distributed among 4 types of loading zones according toto vehicle categorization, priority loading zones near buildings, pollution episodes layer, LEZ layer.
- Métropole du Grand Paris (1 city - Argenteuil): +30 Digital loading/delivery zones in city centre, pollution episodes layer, LEZ layer, parking enforcement tasks.

Also, other processes that will be implemented in all the cities: communication plan to the target audiences and the definition of key messages through different channels, training and customer support and a quality assurance methodology.

This deliverable is the first step to achieve one a couple of KPIs of S+LOADZ project:

- KONHE3.2: Cities engagements in projects
- KSN02: Living labs within a project that actively involve citizens

The iterative adjustment of the living lab model plans for each pilot city developed within the framework of WP 2 will continue throughout the duration of the project, as new requirements and findings will be generated on an ongoing basis with regard to the knowledge, expertise and experiences of each consortium partner. The results of WP2 will directly be processed within the following work package WP 3 in order to

advance the further development of the technical products. In particular, the procedural, operational and legal requirements identified in WP2 are included and taken into account during the development process. WP 3 will then aim to design, develop, test, homologate and launch a new pack of features in Parkunload's platform to make digital loading zones even more efficient and sustainable in a diverse set of on-street scenarios. This product development task is absolutely aligned with Parkunload's product roadmap to deploy pragmatic solutions to regulate, control, monitor and analyse S+LOADZ at large scale in Europe. For the handbook on the implementation to be developed within WP 3, a large amount of the results of WP 2 will be needed.

This deliverable is the result of S+LOADZ task A2202, "Living Lab Model Plan per City". Therefore, it is directly aligned to the project's milestone MS02 "Living Lab Model Plan and enhanced Parkunload platform presentation". In order to reach the milestone, the living lab model plans per city were developed as well as Parkunload's platform features related to the "multi-sustainability pack" in WP 3 were demonstrated.

Therefore, we consider MS02 to be reached and the task A2202 concluded.

13. References

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14. Annex

Incentive categorization:

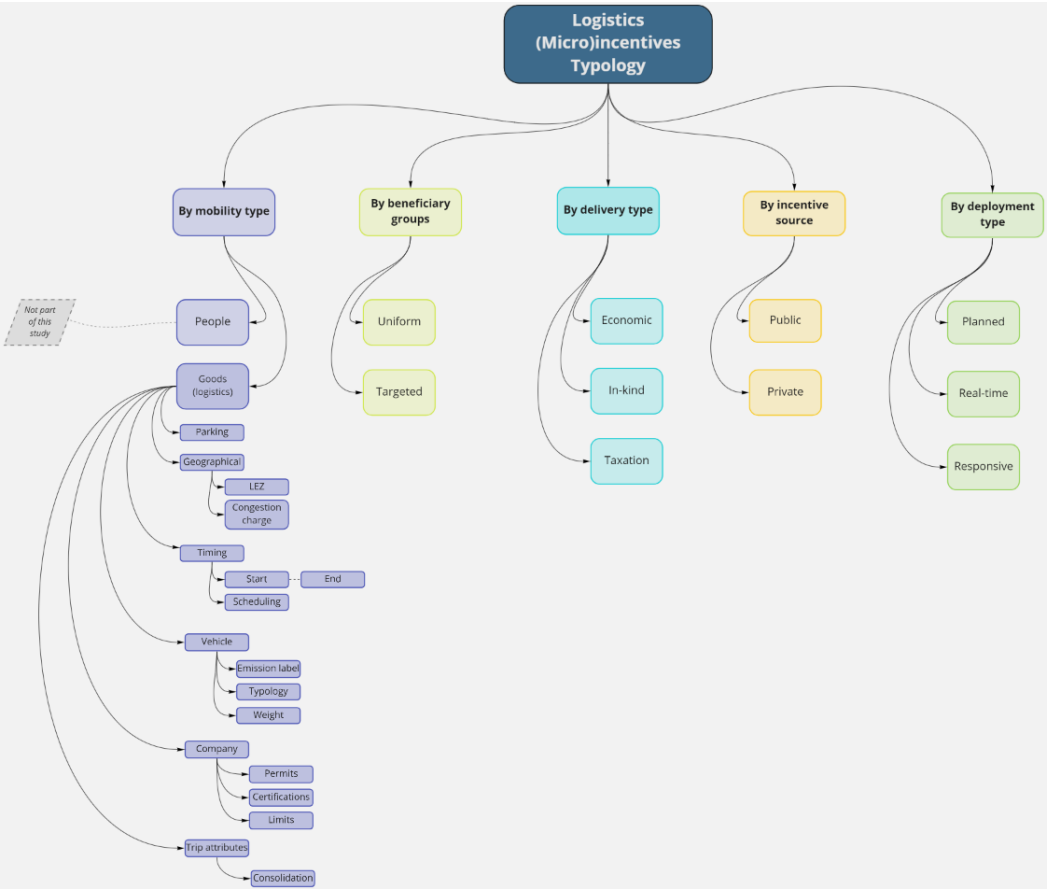

Figure 37. Map for incentive categorization

Incentive challenges:

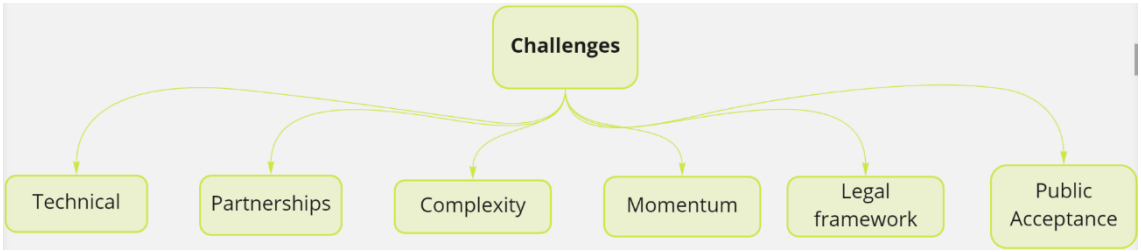

Figure 38. Map for incentive challenges

Incentive benefits potential:

Incentive Use Cases	BENEFIT (Low/High/Medium)				
	Sustainability	Equity	Mobility	Health	Political
Example: Parking in loading and unloading zone in the city center polygon is only permitted for electic vehicles	Medium Better option than fossil fuels, but not as good as delivering in active modes, like cargobike.	Low Not specific impact in terms of equity	Low No change in the congestion levels	High Electric vehicles have a high impact in the air quality of cities	Medium Electric vehicles are widely accepted as a good alternative

Figure 39. Table of incentive benefits potential