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Deliverable 3.2

CITYLAB Local Living Lab roadmaps

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CITYLAB consortium by Living Lab			
Living lab	**Municipal partner(s)**	**Industry partner(s)**	**Research partner(s)**
Brussels	Brussels Mobility	Procter & Gamble Services	Vrije Universiteit Brussel
London	Transport for London	TNT Gnewt Cargo	University of Westminster
Oslo	Oslo kommune	Steen & Strøm	TOI
Paris	Mairie de Paris		IFSTTAR DLR
Randstat	Gemeente Rotterdam	PostNL	TNO
Rome	Roma Capitale	Poste Italiane MeWare SRL	Università degli studi Roma Tre
Southampton	Southampton City Council	Meachers Global Logistics	University of Southampton
Networking and outreach partner			
POLIS			

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Executive summary

CITYLAB's deliverable 3.2 'Local living lab roadmaps' examines how to apply the living lab guidelines to the seven cities participating in CITYLAB, i.e. London, Southampton, Oslo, Paris, Rotterdam, Brussels, and Rome. This deliverable aims at capturing the city-specific ambitions for the local living labs (LL) and the measures and implementations that contribute to achieving the ambition. Most cities do not start from scratch with regard to the living lab approach, as often freight plans or strategies are already followed, measures and implementations are already taken in order to improve existing local urban freight issues, data is collected and the activities are evaluated. The living lab approach could be helpful to align these already existing activities or to start a cooperative approach with local stakeholders to improve the local urban freight issues.

This deliverable distinguishes between the ambition of cities and local stakeholders on urban freight transport and the ambitions of cities in the CITYLAB project. Next, a distinction is made between application of the living lab approach on a city level and to the implementation case. In the first case, one can speak about a proper work within/on a living lab environment on a city level. The second case focusses more on the concrete demonstration processes where the living lab principals can also be used. The focus of the Deliverable 3.2 is on the establishment and running of a city logistics living lab environment. As the ambitions of the CITYLAB project participants vary on these two major points, for each city this deliverable describes: 1) what the overall ambitions are concerning urban freight transport; and 2) how the project CITYLAB contributes to achieving these ambitions, varying from setting up (or supporting existing) living lab on a city level to only running an implementation.

London and Paris are already working within settings similar to the city living lab environment as defined in this project. These cities have most prerequisites in place for a city logistics living lab, including an urban freight strategy, existing cooperation mechanisms between relevant stakeholders (public-private-research institutes), measures and implementations related to the urban freight strategy as well as a form of monitoring the impacts of these measures and implementations. In CITYLAB, Paris and London mainly like to use the local CITYLAB's implementation case as contribution to the city objectives. The other CITYLAB cities like Southampton, Oslo, Rotterdam, Brussels and Rome also have some of the prerequisites in the city. We can argue that Paris is already in the living lab execution phase (although some elements could be added), whereas, for example, Rotterdam just started and is mainly in the planning phase. On the other hand, Southampton and Rome are merely in the beginning of setting up a city living lab environment and have not (or hardly) made a start with the living lab approach. Where cities find themselves in the living lab phases partly determines their ambition within the CITYLAB project.

Southampton and Rotterdam aim at developing a city logistics living lab environment within the CITYLAB project. Brussels would like to use the local CITYLAB's implementation case as contribution to the city objectives (like London and Paris) and at the same time would like to improve that consultation process in line with the living lab principles. Rome would like to learn from using the living lab guidelines in the implementation case to find support and get experience in order to, maybe later, start developing a living lab environment in their city (centre). In, as these cities in fact are already running living labs.

The overall aim for the CITYLAB project is to examine how the lessons and experiences from these cities can be incorporated in the city logistics living lab guidelines, whereas it could be valuable to see what parts in their existing way of working could contribute from the provided living lab approach.

This deliverable describes the characteristics of the existing freight system and policy framework for the seven CITYLAB cities, the main focus of the living lab within the CITYLAB project, the current position of the different cities in the living lab process, as well as the ambitions of the city living lab in relation to the activities in CITYLAB.

1 Introduction

Background CITYLAB

The objective of the CITYLAB project is to develop knowledge and solutions that result in roll-out, up-scaling and further implementation of cost effective strategies, measures and tools for emission-free city logistics. In a set of living laboratories, promising logistics concepts will be tested and evaluated, and the fundament for further roll-out of the solutions will be developed.

The project consists of seven interrelated work packages. The overall objective of WP 3 is to establish living labs in the seven CITYLAB cities as a co-creation of the local CITYLAB research partner, city partner and industry partner. The figure below presents the structure of the project.

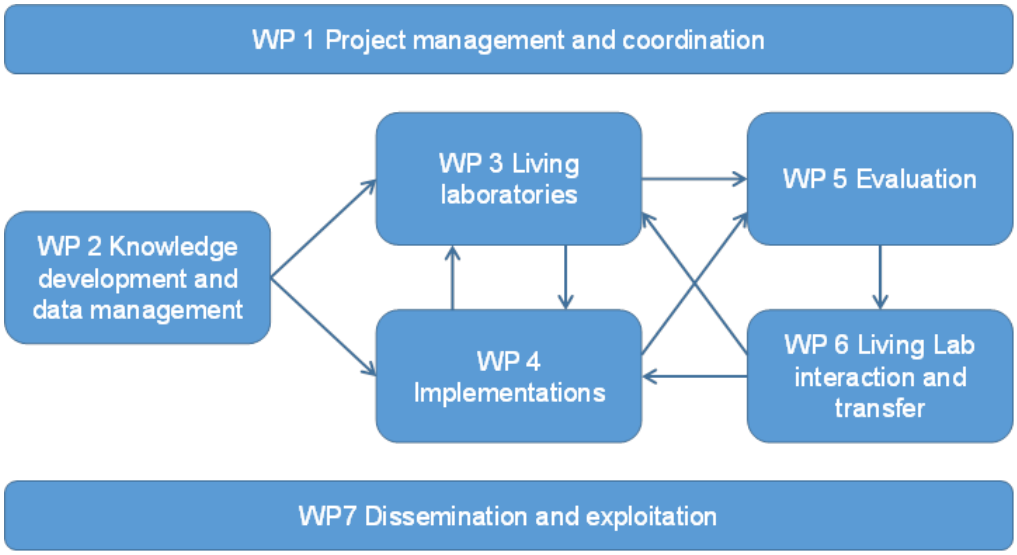


Figure 1. PERT diagram CITYLAB

WP 3 consists of four subtasks where the objective of the task 3.2 is to develop specific roadmaps for each individual living lab of the CITYLAB project. The roadmap should cover the main findings from the planning phase of the Living Lab methodology and give a clear overview of the ambition, the scope, the evaluation framework, the main stakeholders, and other relevant aspects. It also gives a first overview of potential measures that are planned for in this specific CITYLAB.

Living Labs in CITYLAB project

Each living lab within the CITYLAB project is different. Some cities have already established cooperation structures similar to the Living Labs and have clear goals and priorities for the urban freight transport as defined in this deliverable, whereas other cities are only in the process of developing an urban freight plan. There are also cases where the freight plan is not yet on the local agenda. Therefore, each Living Lab within the CITYLAB project will have an individual shape and construction, going from being implemented and running within a full-scale working local Living Lab environment to a Living Lab focusing on one specific implementation case.

Document structure and reading guide

This document is based on the local CITYLAB plans produced by each Living Lab within a project. Deliverable 3.2 presents a summary of the local roadmaps and positions different local Living Labs in the framework of the CITYLAB project.

Chapter 2 of the document is a short informative memo on the methodology proposed for the setup and organisation of the Living Lab environment and for the organisation of specific

implementation cases within this Living Lab environment. This memo is a further elaboration and a summary of the CITYLAB Deliverable 3.1 and serves as a foundation for the description of the Living Lab phases within each individual Living Lab roadmap

Chapter 3 consists of the summaries of the local CITYLAB Livings Labs plans, focusing, per city, on the following aspects:

- Characteristics of existing freight transport system and policy framework
- Focus of the Living Lab in the CITYLAB project
- Where does the city stand in the Living Lab process
- What are the ambitions of the CITYLAB for the city.

Chapter 4 gives overall conclusions on where different CITYLAB cities stand in the Living Lab process and what are their ambitions within the projects and on a city level. Finally, Chapter 5 presents conclusions from this deliverable and highlights the next steps.

Annexes of the Deliverable contain detailed local CITYLAB plans produced by the cities together with the local research partners, which can be considered as a starting point for the activities in the remainder of the CITYLAB project on setting up, running, improving, examining the local city logistics living labs.

2 City Logistics Living Lab guidelines memo

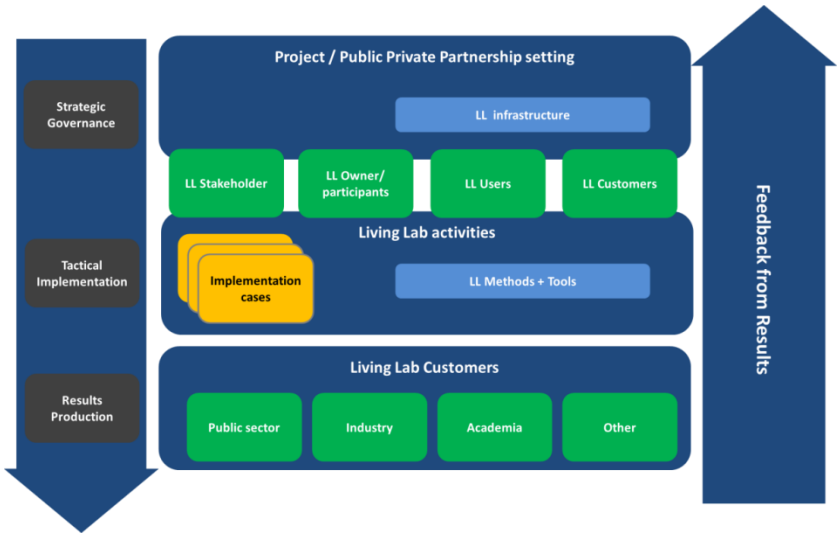
The Living Lab guidelines presented in Deliverable 3.1 are used as guidance for the City Logistics Living Labs that will be set-up within the CITYLAB project. These Living Labs will be used to implement measures and concepts in real-world situations aiming to establish effective solutions for improvement of urban freight logistics practices.

2.1 Establishing a City Logistics Living Lab environment

A Living Lab (LL) is defined as a dynamic test environment where complex innovations can be tested and improved in real-life. The city or city centre can typically be such a living lab environment where several implementations performed by different stakeholders run in parallel.

A City Logistics Living Lab environment consists of three levels:

1. On the strategic level, different Living Lab participants (city authorities, industry, research organisations, etc.) are interacting with each other providing actual governance of the Living Lab. The ambition, the concrete goals and the objectives for the City Logistics Living Lab are defined at this level and are usually framed within dedicated policy documents: e.g. urban freight plan, logistics plan, local transport strategy, etc. On this level, local city authorities play a leading role, defining urban freight transport development priorities together with other involved parties and providing and maintaining efficient cooperation mechanisms, bringing together a variety of stakeholders and users concerned with urban freight transport problems in the city. Usually the local authorities have the role of Living Lab owner; this level is called the Living Lab infrastructure (see Figure 2).
2. The next layer consists of the practical and tactical implementation of the solutions or, so-called ‘implementation cases’ or ‘measures’, aiming at resolve or address concrete goals and objectives which are established on the strategic level. These implementation cases are carried out by city, industry partners or research partners, or combinations of these actors. The implementation cases might share common stakeholders, users, infrastructure and benefit from the information received from evaluation of each other. In any case, they need to address the main ambition of the Living Lab environment established in city (i.e. the Living Lab activities in Figure 2).
3. The third layer deals with the results of the implementation cases: the final customers (see Figure 2) of the Living Lab are benefitting from the results and based on the evaluation ‘feedback loop’ decide on the new cycles for the implementation cases and possibly for the new directions for the Living Lab. All implementation cases are benefiting from cross-evaluation and are learning from it. The Living Lab environment also assures that transferability of solutions is taken into consideration.



[1]Source: Adapted from Innovation Alcotra (2011)

Figure 2. A Living Lab conceptual architecture

Several implementation cases can run in parallel and focus on different or closely related subjects, all, nevertheless, falling into the scope and ambition of the specific Living Lab. These might have in common different actors participating in it, share some parts of the infrastructure, benefit from common analysis and, most important, from the cross-evaluation (Figure 3) in the Living Lab environment. It is also necessary to assess how the decision taken on one implementation case will impact the development of the solutions / measures from other implementation cases.

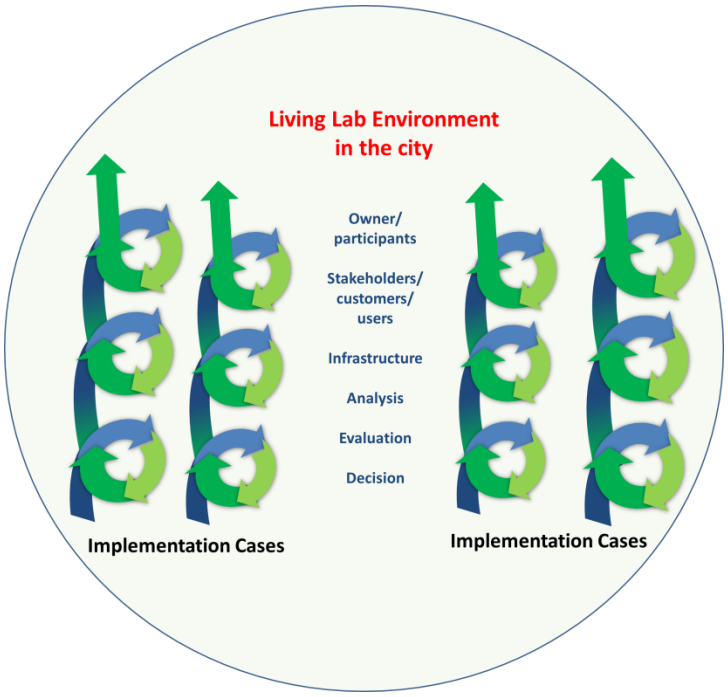


Figure 3. Living Lab environment

2.2 Living Lab guidelines

The Living Lab guidelines focus on how to plan, implement, evaluate and act in the context of the Living Lab environment. Cities do find themselves in different stages of the Living Lab process: some cities have already established cooperation structures similar to the Living Labs environment, have clear goals and priorities for the urban freight transport development and sometimes have even data collection in place to monitor progress of the goals. Within other cities the authorities are only in the process of development of urban freight plans. There are also cases where the freight plan is not yet on the local agenda. Therefore, to actually setup or run a City Logistics Living Lab, like the CITYLAB, one needs to apply the Living Lab guidelines (as described in D3.1) at least for two levels: to set up the Living Lab environment in a city and to perform specific implementation cases and measures.

Figure 4 illustrates how the Living Lab methodology is applied for these two different levels. So the phases described in the guidelines, i.e. plan, implement, evaluate and act / decide, are applied to:

- the Living Lab environment, where the local authorities are usually the Living Lab owner, supported in CITYLAB by the local research partner; and
- the implementation case(s), where other stakeholders can be the owner. For example, for implementations industry partners could be owner and for policy measures governance agencies could be owners.

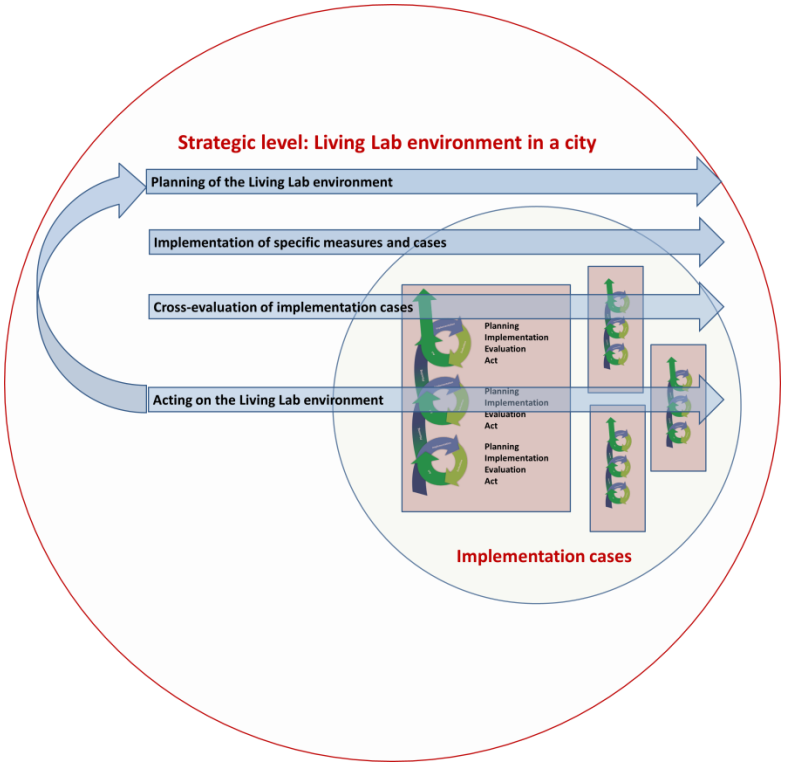


Figure 4. Setting up a Living Lab environment and specific cases / measures

The steps and phases that were described in the guidelines are, for the majority, similar; the level on which they are applied differs. The strategic level (larger circle on Figure 4) addresses the steps necessary to establish the City Logistics Living Lab in the city. This is a macro-level,

which defines ambition, scope, partners and cooperation structures necessary to be involved in the Living Lab environment on the city level. It also provides a clear vision of what the Living Lab environment is about and tries to achieve. The evaluation of the Living Lab environment will focus more on the Living Lab process and on the combined effects of implementations and measurements. The cross-evaluation between the cases should be assured and the process on how cases can learn from another in the real-time setting. It also looks on the transferability of cases to other stakeholders.

The second level (inner circle on Figure 4) focuses on the implementation cases running within the Living Lab environment. Similar steps as described in the Living Lab guidelines are applied to these cases, but focusing on the concrete implementation of solution, measure or technology.

2.3 Living Lab methodology and process

A cyclical approach is the foundation of the Living Lab methodology. Following this approach, several solutions can be tested and improved to fit the needs of the real-life environment. One cycle within a Living Lab usually consists of the following phases: planning, implementation, evaluation and acting phases (Figure 5). The cycle can be continued into a new loop with the improvement of existing solution, can be finalised with rolling out of the solution or interrupted because the solution is considered as not interesting. During a cycle also a new idea for the Living Lab can be born and can then be developed within another implementation case.

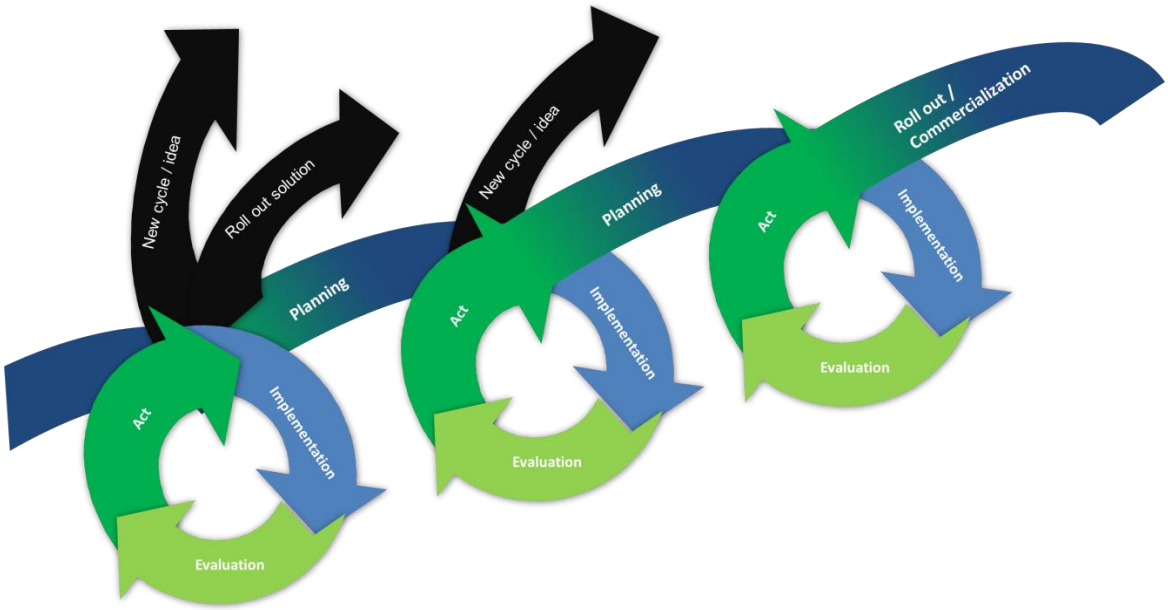


Figure 5. Living Lab cycle

Figure 6 illustrates these Living Lab phases, that can apply to both the Living Lab environment and the Living lab implementation case.

The goals of the ***Planning phase*** (Figure 6) are to agree on the Living Lab or Living Lab implementation approach and the way of working, to build knowledge and define the exact goals and requirements for the later phases (i.e. Implementation and Evaluation). In order to achieve these goals the following activities are suggested:

- **Set-up**: the overall goal and ambition for the Living Lab or for the Living lab implementation case (LLic) are defined; the crucial partners are identified, consulted and get involved. The scope of the Living Lab system (or of the LLic) , as sub-system of the real-world logistics environment is determined.
- **System analysis:** depending on the Living Lab ambition and scope a set of analyses is performed in order to get a clear overview of the outside elements that may influence the success of the Living Lab.
- **Design**: in the design block implementation cases (technological solutions or soft measures) to be tested are designed and described. The evaluation and monitoring system for the current cycle is developed.
- **Implementation plan**: the outcome of the planning phase is an implementation plan where all previous steps are summarised and timing, resources, milestones and other necessary information for the Living Lab cycle are defined.

Note that in the case where the methodology is applied to a specific implementation case the same steps are followed, but in relation to the specific implementation case (e.g. set-up, system analysis, design and implementation plan of the implementation case).

The goal of the ***Implementation phase*** (Figure 6) is to deploy solutions in the real-life environment and gather the actual results. In this phase all arrangements are to be made in order to start and perform field experimentations. This phase is composed from two activities:

- **Preparation**: the Living Lab system and concrete implementation case(s) are prepared for actual execution. For example the functionalities needs to be developed, staff needs to be trained and fall back procedures and escalation protocols need to be put in place. Also a baseline measurement needs to be performed.
- **Execution**: execution refers to real-life implementations of the specific LLic (new technology or concept) in the Living Lab. The input for the evaluation is gathered.

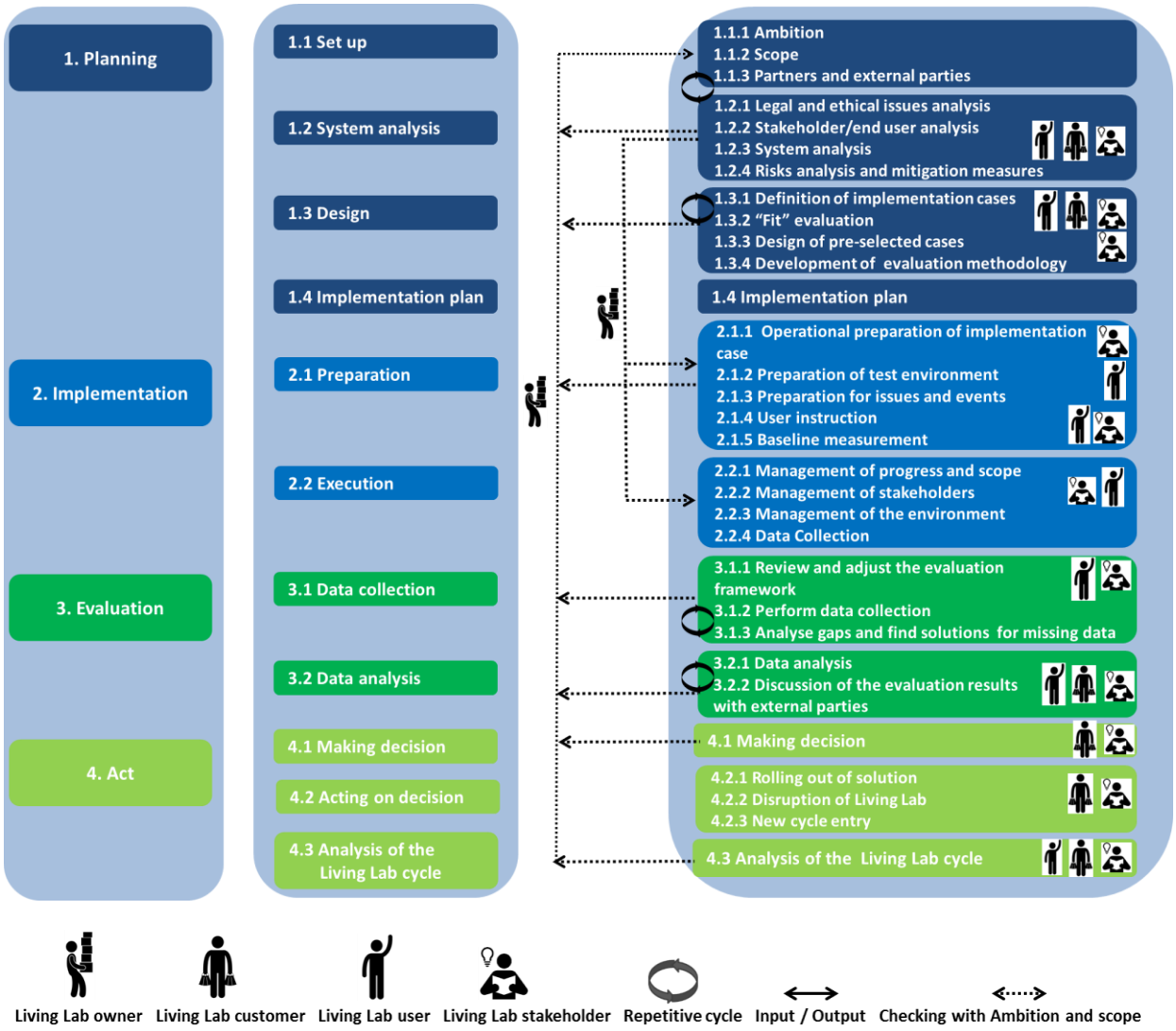


Figure 6. Living Lab methodology steps and main characteristics

The goal of the ***Evaluation phase*** (Figure 6) is to evaluate the results and to compare them to original ambitions and targets as well as to the 'business as usual' situation. Depending on the tested concept or technology, a number of Key Performance Indicators are evaluated and feedback from external parties is collected. The phase consists of:

- **Data collection**: data collected during the previous phases is to be evaluated and checked for gaps. Where missing data are identified, solutions are to be found to fill in missing data.
- **Data analysis**: data analysis is to be performed and conclusions need to be drawn about KPIs, process and stakeholder evaluation, technological maturity of the solution/technology as well as business case feasibility.

Ideally, data collection takes place in a LL on the city level and can be used to evaluate several LLics. In practice some specific data collection activities have to be undertaken in both the LLic as well as as the Living Lab itself. The LLic's data can feed to the data collection in the Living Lab. Based on the data collection, evaluation is performed on the level of the Living Lab environment. For the Living Lab environment a focus on a higher level is made on cross-evaluation between the LLic(s) and extra effort is put in the transferability of tested solutions.

The ***Act/decision phase*** (Figure 6) takes the results of the evaluation phase and use these to decide on the continuation or not of the implementation case (LLic) as well as the Living Lab itself.

- **Making decision**: this activity focuses on taking decisions on the future development of the implementation case and consequently on the future of the Living Lab as a whole.
- **Acting on decision:** the decision taken falls into one of the following categories which than represents the second activity block in this phase:
    - **New cycle entry:** a new cycle can start by introducing adjustments to an existing implementation case, or with a completely new idea that came out from one of the previous phases. In case the Living Lab implementation results need to be readjusted, some activities in the Planning and Implementation phases will need to be reviewed or rebuilt by going into the new Living Lab cycle. This phase is crucial as it provides a cyclical turn of the Living Lab.
    - **Roll out of solution:** the technology or solution is ready for rolling out. Further rolling out or commercialisation can be done outside of the Living Lab.
    - **Disruption of Living Lab:** the decision is made to stop the Living Lab or a LLic. All the arrangements necessary to finalise the implementation case or / and to stop the Living Lab environment and report on its outcomes are to be performed.
- **Analysis of the Living Lab cycle:** at the end of each cycle it is important to evaluate whether the Living Lab environment (still) corresponds to ambitions, goals and means and is the best environment to achieve project results and to decide what kind of improvements can be introduced into the process of the next Living Lab cycle.

Continuous **monitoring of the environment**, and, more precisely of the Living Lab ambition, the scope, the key factors from the external environment as well as the potential risks is necessary in order to keep the Living Lab up to date with important developments in the environment and increase the final adoption rate of the tested solutions by the users. For example changes in legislation could impact the chances of success for the Living Lab or make the implementations easier or more difficult. These changes need to be incorporated in the other Living Lab activities at any time if they influence the Living Lab results, which might make it necessary to review some previously done work. Figure 6 highlights that monitoring of the environment should be in the responsibility of the Living Lab owner, who, in case of really big changes, communicates it promptly to all the Living Lab participants. In some cases changes in the environment / ambition / scope might require reconsideration of the whole Living Lab cycle.

Secondly, a distinctive feature of the Living Lab methodology is a necessity to ensure continuous **stakeholder / user / customer commitment.** Ideally, results from all of the steps need to be checked and / or validated with external partners. Figure 6 identifies the steps where involvement of the external parties is of the most importance.

3 Executive summaries for each city

Each CITYLAB city was asked to produce a local CITYLAB plan, containing:

- The description of the existing local city Living Lab environment, focusing on the current urban freight transport context, the urban freight transport problems in the city, the existing policy guidance and cooperation frameworks, and existing data collection.
- The description of the Living Lab environment and specific implementation case(s) that will be developed within a CITYLAB project, focusing on the planning phase of each case and producing a concrete implementation plan for the implementation case(s).

Chapter 2 presents the main findings from these local plans provided by each city. Detailed local roadmaps can be found in an Annex to this document.

3.1 Living Lab London

Characteristics of existing freight transport system and policy framework in London

Main challenges for London include air quality and infrastructure capacity problems. The London Freight Strategy which defines a long-term freight strategy is currently under development by Transport for London. Currently, the key strategic document is the London Freight Plan published in 2007, which defines urban freight transport development in London and covers an 8-year period. It recognised the need to improve the efficiency of the freight sector whilst also reducing the environmental and social impacts of freight transport on London, particularly the contribution to climate change. Other documents relevant for the development of the urban freight transport are:

- The Olympic Legacy document, which is a follow up on policies which were tested and applied during the London Olympics in 2012.
- The London Mayor's Transport strategy which, among others, sets out the Mayor's vision for London and details how Transport for London and partners will deliver the plan over the next 20 years.

Besides this, a set of measures in London transport policies supports the developments relevant for urban logistics and addresses the main challenges of the London freight transport system.

There is a lot of interaction between different groups of urban freight transport stakeholders in London, which are formalized within the following frameworks:

- Central London Freight Quality Partnership (CLFQP) is a public/private partnership between the freight industry, local government, local businesses, the local community, environmental groups and others with an interest in freight. CLFQP is set up to develop a common understanding of, and to encourage innovative solutions for, freight transport and servicing activity in central London.
- Transport for London (TfL) co-ordinates the London Freight Forum, which brings together 160 logistics providers. It was set up to coordinate planning and preparations for the London 2012 Olympic and Paralympic Games and continued as a result of its perceived success. The forum consists of operators, businesses, trade associations, regulators and highway authorities, and provides the focus for ongoing engagement.

A variety of indicators is available for monitoring the urban freight transport situation in London, though there is no formally-established coordinated continuous monitoring process of urban freight transport indicators. For traffic data in general, the latest year for which data are available is 2010. For the emissions and environment indicators, the London Atmospheric

Emissions Inventory (LAEI) is a database with information on emissions from all sources of CO_2 and air pollutants in the Greater London area. The noise mapping is developed by the Department of Environment, Food and Rural Affairs (DEFRA). Information collected on traffic safety contains data for road traffic collisions that involve personal injury occurring on the public highway reported to the police. The latest published floor space data in London is from 2008.

London already has many elements that can be described as following a living lab approach, for example the cooperation with industry and research institutes as well as the combined set of measures and implementations contributing to the overall ambitions, i.e. improving air quality and infrastructure capacity problems. In that sense, London can provide lessons and examples contributing to the CITYLAB living lab handbook as well as to the other cities, that are starting to work in this way. London continues working in the way it developed over the years. The implementation cases do fit the overall ambition.

Focus of the London living lab in the CITYLAB

There is a foundation to set up a Living Lab environment for London and main background elements are already present on a city level: developed freight strategy with concrete ambitions, goals, targets and implementation measures; cooperation structures supporting interaction and dialogue between different participants of the urban freight market in London; monitoring of some key parameters on a city level. Furthermore, Central London Freight Quality Partnership is already functioning similar to the Living Lab principles, being an ongoing forum to develop:

- An understanding of freight issues in central London
- Sustainable solutions for freight access and services issues in central London
- Responses to proposed initiatives affecting freight and servicing.

London CITYLAB Living Lab will be focused on the task of developing and implementing a specific solution that will be beneficial for London. Two main industry partners, TNT and Gnewt Cargo, seek to explore how to increase new distribution hub operational concepts that support viable business cases for last-mile-operation with clean vehicles. The solution, which is implemented by TNT and Gnewt cargo, is to double the current volume distributed via electric vehicles through the addition of domestic parcel distribution business, to assess the benefits of this growth, and to increase again this volume by adding further TNT parcel or bulk business to be delivered via electric van later on. A sub-objective is to monitor growth and assess the conditions for successful growth, demonstrating that the operation is profitable and scalable. Another potential solution to be tested by TNT will be to implement the solution of a mobile depot. This concept is a major further development of the STRAIGHTSOL prototype.

Where do they stand in the Living Lab process?

London started the development, planning and preparation phase for the implementation action in autumn 2015. The physical operations are planned to start in spring 2016 and end early 2017. An intermediate evaluation is foreseen in June 2016, to prepare the extension and scale-up phase. The implementation case fits in the low emission strategy by London. In the living lab process London is already further, as it started with the London Freight Strategy. In the CITYLAB project the aim is to see how we can learn from the experiences, and adapt the city logistics living lab to lessons and experiences from London on the one hand, and on the other hand see how the guidelines might contribute to the success of existing practices in London.

Scale-up analysis including assessment of impacts and growth potential are integral part of the implementation. The before data collection and ex-ante impact assessment is provided since December 2015. Initial CITYLAB behavioural questionnaires interviews were conducted on the situation before start in February 2016. The data collection system is in place and will be performed by the university of Westminster.

TfL is currently supporting the search for a new depot in Central London, suitable to accommodate substantial growth.

Before the first parcel can be delivered with the new business development model, a lot of preparation on the ground is needed. The implementation is currently at the stage of preparation and refining.

Ambition of the CITYLAB for the city

Results of the London CITYLAB Living Lab implementation cases will support the growth of clean vehicle usage in London, and support the implementation action of TNT and Gnewt Cargo. The ambitions of the currently existing (but not explicitly named) living lab for city logistics in London are to improve air quality and deal with infrastructure capacity problems. The CITYLAB implementations contribute to the ambitions.

3.2 Living Lab Southampton

Characteristics of existing freight transport system and policy framework

Southampton has huge economic potential and is a key regional transport hub comprising Britain's most important port with major international connections, a growing international airport and well-connected rail links. The main objectives concerning urban freight transport that are top priorities for the city as a whole at this moment are: to improve air quality and minimise pollution; to reduce the number of heavy duty vehicle movements in urban areas within the Solent region; to facilitate a structure that will enable economic growth to continue unhindered by issues of congestion and, in particular, to maintain effective operation of the Port of Southampton.

Freight transport strategy of Southampton is reflected in its Local Transport Plan. The long-term ambition for the city is defined within a Transport for South Hampshire framework (2009): to facilitate the safe and efficient transportation of freight into, out of, and within the region, supporting a competitive local and regional economy, whilst taking into account the existing and future needs of our society and the environment. There is a set of concrete short-term objectives which further help to achieve these long-term ambitions and which are translated into supporting implementation measures.

Cooperation in the urban freight transport in Southampton is not yet formalized in a form of Freight Quality Partnership or any other official structure. There is a recognition that this should be improved.

Some data describing the situation in the urban freight transport is collected on a city level. But that is not formalized in the continuous monitoring process.

Focus of their living lab in the CITYLAB

The main ambition of CITYLAB in Southampton is to perform a series of implementation cases using the Living Lab methodology. The proposed implementation cases in Southampton focus on large municipal organisations and comprise an investigation of complementary methods for reducing numbers of inward deliveries of goods and services. CITYLAB will highlight how working with neighbouring organizations in joint procurement and consolidation could reduce costs and environmental impacts.

Also, during the CITYLAB project the first steps will be laid down to establish the living lab environment on a city level. As no urban freight partnership exists in Southampton or in Hampshire, no organization plays a similar role to that of the proposed Southampton living lab.

Where do they stand in the LL process?

Southampton is in the planning phase of the Living Lab process for its implementation cases. Setting up and system analysis were performed and the design of the solutions is now on-going.

Ambition of the CITYLAB for the city

The Southampton Living Lab's ambition is to vastly improve air quality within the city while maintaining economic prosperity. Within the CITYLAB project, on the city level, the objective is to further develop cooperation mechanisms between different actors of the urban freight transport in order to make a next step to the creation of the Living Lab environment in the city. The planned organisation comprises:

- Consultation and drafting of a Memorandum of Understanding (MoU) (stating freight-related objectives and possible measures)
- Publicising the MoU and directly approaching companies involved in DSPs and other relevant organisations to seek their agreement with it
- Convening living lab meetings to discuss progress, results and ways forward
- Organisation of other dissemination events.

Southampton City Council and the University of Southampton will be the main organisers of the living lab concept in Southampton, supported by Meachers Global Logistics, the operators of the SSDC. These CITYLAB partners will also be the main drivers and organisers of the implementation cases to be performed, with a hope for support from external organisations such as Southampton Solent University and from local hospital trusts. The living lab setup and planning is largely driven by the CITYLAB project.

Further, the prime CITYLAB objective of Southampton is to undertake a series of implementation cases that focus on delivery practices of the large municipal organisations, supporting the main Living Lab ambition of improving air quality while not harming economic prosperity.

3.3 Living Lab Oslo

Characteristics of existing freight transport system and policy framework

At this moment, Oslo does not have an urban freight transport strategy, therefore there is currently no formulated long-term ambition to be achieved by the local urban freight transport sector. The work on the strategy is currently ongoing. The medium-term goals (2 to 7 years) for the city are expressed in the strategy for reducing emissions from urban freight by 50% by 2020.

Even though Oslo does not have an urban freight transport policy plan, in autumn 2015 it introduced a City Council Declaration. This declaration is a leading document setting up several measures to be performed on a city level, of which the following will affect CITYLAB:

- To introduce low emission zone(s) in Oslo
- To introduce a car-free inner city
- To set up a consolidation centre for city distribution
- To further electrify transport.

The main objectives of all measures are to improve air quality by reducing emissions and to improve urban freight logistics by collecting data and performing a feasibility study on a UCC. To facilitate reaching of some of the targets a collaborative agency, bringing together actors like transporters, logistic service providers, police and different agencies representing public authorities, was established, on the 9th of September 2015, in the form of the Forum for Urban Freight Transport. The Forum shall focus on freight distribution within a specified geographical

zone in Oslo. Local city level cooperation groups also exist between different transport industry stakeholders to improve city distribution.
Oslo is collecting a variety of data on a city level, which enables them to monitor urban freight transport. Three main types of data are collected:

- Traffic data (e.g. traffic counts, vehicle km per year in the city, vehicle load factors for freight vehicles)
- Emissions data (e.g. CO2, PM, NOx, O3, SO2, CO, noise)
- Spatial data (e.g. total non-residential floor space, estimates of logistics activities (in m2)).

Focus of their living lab in the CITYLAB

Oslo CITYLAB Living Lab focuses on one implementation case: introduction of the new logistics function in the Steen & Strøm shopping centre in Økern. New logistic functions are introduced to bundle inbound and outbound freight flows from the individual shops. This reduces stoppage times for trucks, decreases congestion in the freight receipt areas and increases efficiency of in-house logistics. To evaluate the concept, data are collected from one centre in Sweden which uses similar logistics functions. To assess the differences between centres with and without common logistics functions, data are also collected from other centres without common logistics functions.

Where do they stand in the Living Lab process?

The Oslo implementation case is at the preparation stage of the implementation phase. There is a permission to build a shopping centre, but construction (actual implementation) has not started yet. There have been delays in the engineering and the process of obtaining building permissions from the Municipality of Oslo, so the planned opening date of the centre has been altered. The centre is now expected to be opened by 2020.

Ambition of the CITYLAB for the city

The Municipality of Oslo has a target to achieve 50% reduction of environmental emissions by 2020. For this, a set of measures is developed. CITYLAB implementation case contributes to one of the measures.

The total duration of the Oslo implementation case goes out of the scope of the CITYLAB project. The current plan is to have the first Living Lab implementation case results in 2020 – 2022. The role of CITYLAB is defined as bringing co-creation into the design of the freight flows.

3.4 Living Lab Paris

The main challenges to Paris urban policy coming from urban freight are logistics sprawl and air pollution by severe NO_x and PM emissions. The long-term urban freight transport ambition is to reduce overall emissions of the territory and activities by 75% in 2050 compared to 2004. The overall goal of the city council is to have 100% of deliveries to be non-diesel by 2020. These policy challenges are supported through the elaborated policy framework on the city and region level. In 2013 more than 80 organisations, institutions and associations in the area of urban freight transport have signed the Paris Charter for Sustainable Urban Logistics, committing themselves to progress in the field of urban logistics. This document represents the urban freight transport action plan for the city of Paris. There exist several other initiatives supporting the Paris urban freight transport policy, e.g. Air quality plan (2015), Paris Climate Plan (2012), Urban Zoning Plan for Paris (to be updated in 2016). The Region of Paris has an important freight policy activity too, formulated in three main master plans for the region: General Master plan (2013), Air, Energy and Climate Master Plan (2012), Sustainable Regional Mobility Plan (2014).

In the wake of the Paris Charter for Sustainable Urban Logistics the freight forum was created, which is now providing the main platform of cooperation in urban freight transport. In this framework today, various representative organisations (shippers, carriers, 3PLs, store-owners, etc.) regularly get together in several implementation working groups to work with the various departments of the Paris municipality. Additionally other forms of cooperation exist, for example within the framework of the MetroFreight Centre of Excellence or with various groups such as AFILOG or Club Demeter, working closely with city authorities on urban freight.

The Charter for Sustainable Logistics, combined with the freight forum both fall under the scope of the Living Lab definition as proposed within CITYLAB. The Charter includes a clear ambition and scope and it identifies 16 projects presenting concrete initiatives for the logistics sector within a five-year duration (2013-2017), with some strategies aiming at a longer term (2020 – 2030).

On a city level a variety of indicators is collected on traffic, which helps to monitor the development of the urban freight transport system and its impacts. Additionally, the 2010-2014 Paris Urban Freight Survey has collected and computed many indicators. Furthermore, data on emissions, environment, noise, safety and spatial data are available.

Focus of their living lab in the CITYLAB

The focus of the CITYLAB project for Paris is on two specific implementation cases. These cases are part of the 16 projects defined by the Charter of Sustainable Logistics and are looking at urban logistics terminals:

- Project 2 is about Chapelle International
- Project 5 is about small urban logistics spaces.

The municipality and the region of Paris, together with a logistics real estate developer, are developing a model for logistical zones and facilities, called logistics hotels. Logistics hotels are appropriate for dense urban environments, combining logistics with other activities such as offices, retail and public services. CITYLAB Living Lab is focusing on two already existing “logistics hotels”, at different stages of implementation: Chapelle, at construction phase (works began in September 2015) and Beaugrenelle at operating phase (opened in 2012).

Where do they stand in the LL process?

Both cases of the Paris CITYLAB Living Lab are currently situated within the Implementation stage of the Living Lab methodology. The planning phase was covered before the start of the CITYLAB project: the planning of the Paris two logistics hotels has actually taken place over the past ten years (2006-2016).

Referring to the Living Lab methodology (Deliverable 3.1), the Chapelle case is within a Preparation phase (2.1) and Beaugrenelle implementation case is in the Execution stage (2.2). Beaugrenelle logistics terminal is in operation since 2012. Now its economic and environmental impacts need to be assessed, so parallel to Execution stage the case is entering Evaluation stage. Chapelle International project has obtained the building permit (June 2014) and work has started. Detailed technical specifications have been fine-tuned. An important step for finding clients (users of the facilities and transport operators) has been reached, with the signature of an agreement at the end of 2015 with Eurorail and Norbert Dentressangle (XPO) to develop rail shuttles between major logistics parks in the North of the Paris region, and the Chapelle logistics hotel.

Ambition of the CITYLAB for the city

In order to deal with “logistics sprawl”, the Paris administration aims at reintroducing logistics terminals in densely-populated areas. As said above, two “logistics hotels” are assessed, at different stages of implementation. The motivation of this CITYLAB Paris Living Lab project for the city of Paris is to reduce negative consequences of logistics sprawl:

- Reduce negative impacts of deliveries, especially emissions (CO_2, PM, NOx), noise and congestion at points of entrance to the dense urban area through consolidation and transfer to cleaner modes of transport.
- Provide efficient, modern logistics facilities to businesses serving the dense area of the Paris region.
- Increase mix of activities in specific areas of Paris: logistics activities, leisure, datacentre, shop/store, sport facilities, office spaces.
- Test new architecture, planning and urbanism concepts for the integration of logistics facilities in dense urban areas: form, acoustic, energy efficiency, integration of pedestrian flows.

3.5 Living Lab Rotterdam

Characteristics of existing freight transport system and policy framework

Air quality problems were the main reason for Rotterdam to seriously start working on urban freight transport, whereas the majority of logistics' efforts are usually focussing on the harbour and the related hinterland connections (as Rotterdam is Europe's biggest port). Since 2014, when several developments came together, Rotterdam aims at making a zero emission urban freight system in its city centre possible by 2020. This ambition fits in the larger sustainability strategy of Rotterdam and is formulated in a roadmap together with front-runners from the local Ecostars program and the research institute TNO. Based on four lines of actions, the city of Rotterdam and its partners work on making zero emission urban freight transport alternatives feasible:

1. Technology action line: where the city works on a fuel strategy (including examination of charging infrastructure, availability of zero emission vehicles, financial instruments to support the business case or reduce risks for using zero emission vehicles, etc.).
2. Smart logistics action line: where there is an active cooperation with transport organisations to reduce logistics traffic in peak periods as well as to find zero emission solutions / alternatives for city logistics in Rotterdam's centre.
3. Drivers' behaviour action line: where efficient driving is actively promoted by using an app and a game to find Rotterdam's most efficient driver (combined with data collection possibilities).
4. Policy, procurement, data and communication action line (lead or initiated by the city of Rotterdam): where the city of Rotterdam stimulating zero emission by using its influence on procurement of transport (own transport, direct procurement transport services and indirect via the consumption of goods/services), but also by stimulating policies for zero emission transport and active communication to industry.

This roadmap is not a formal policy document, but provides the direction for actions and initiatives supported or initiated by the city of Rotterdam. One of the elements of developing this roadmap was to form a freight partnership with local transport companies, front-runners who are actually working with alternative engines in Rotterdam. Ideas exist to form a second partnership with shippers and large freight attracting buildings/companies in Rotterdam, who are able to influence logistics by making changes in their procurement. Cooperation also takes place with interest groups and other Dutch cities. One of the elements in this roadmap is the development of zero emission logistics supporting policy measures, which is currently being developed. The idea is that logistics that is performed without emissions, receives privileges on existing regulation. The establishment of a low emission scheme that includes vans is another example of a related policy measure. Next to the roadmap, Rotterdam and TNO also cooperate in better insight in the current urban logistics (i.e. a one-week fleet monitor was undertaken in data collection) and a city dashboard enabling (semi) real-time insights in the

traffic situation and the traffic history, as well as detailed information on urban logistics for all city centre entry points (static).

Focus of their Living Lab in the CITYLAB

The living lab focuses on the city centre of Rotterdam, as this is set by the ambition for zero emission city logistics in Rotterdam. In CITYLAB there is no implementation case specified for the Rotterdam Living Lab. The focus of the CITYLAB project for Rotterdam will be on the further development of the Living Lab environment on the city level, as well as find new initiatives and measures contributing to the ambitions.

Outside the CITYLAB project various implementations (i.e. initiatives and policy measures) are being established due to the fact that Rotterdam started working as a Living Lab. Those will be taken into consideration during the project work. The most telling examples are the start-up of a new transport company offering zero emission last mile logistics for several large retail chains in Rotterdam. This start-up company looked for these customers in order to start operating zero emission city logistics and at the same time have a reasonable business case. Another example is the attempt for policy privileges for zero emission transport, i.e. 'emission free is regulation free'. Next, the attention for the topic due to the GD010ZES (local green deal for Rotterdam in which the ambition for zero emission city logistics was formulated) also resulted in an increase in funds for the issue; both due to more specified directed proposals on the topic as well as more attention and as a result more funds to make actions happen in this domain. An example is the increased and improved data collection effort in order to better know what is actually the current urban logistics in the city and what the effects are of the different vehicles operating (in for example emissions and the impact on local air quality).

Where do they stand in the Living Lab process?

The establishment of the living lab in Rotterdam has only recently started, and as a result not all process steps that are described have actually been done yet. The living lab is mainly in its planning phase, and the first implementations are just starting. At the same time, evaluation and acting mechanisms are being started in order to be able to continue the process.

The overall ambition of the living lab is to achieve zero emission city logistics by 2020 in the Rotterdam city centre. This shared ambition was formulated by the city, the transport companies and TNO. For the city this period is relatively long as it includes two local elections in which the city board could change. The companies argued that this ambition (within 5 years) is good: if it would be stated further in the future it would not require (immediate) action from them, as a result no action would be taken by them as there are always more urgent issues to handle.

The main partners in this living lab, next to the city of Rotterdam and TNO, are the front runners (logistics companies) that signed the GD010ZES. New partners to start implementations are continuously looked for. And as the new initiatives grow in importance, the role of these new partners increases as well. There is also cooperation with other cities, for those actions that cover larger issues than one city; e.g. the stimulation of innovative investment options to improve the business case for operators using electric vehicles. Other forms of cooperation are examined, on street or area specific way, on procurement, but also with the larger transport interest groups in the Netherlands.

Ambition of the CITYLAB for the Rotterdam

Rotterdam's ambition within CITYLAB is twofold: on the one hand the CITYLAB project and the establishment of the living lab in Rotterdam enables Rotterdam and TNO to cooperate on data collection, the forming of the living lab and the process management. Next, the other cities in the projects can provide examples both from a city / living lab level, as well as for implementations, that could contribute to zero emission city logistics in the city. Besides, the network of cities (also due to other projects, such as FREVUE and VREF CoE SUFS, as well

as the national Green Deal on Zero Emission City Logistics or as chair in Polis) enables the city of Rotterdam to cooperate with other cities and expand its influence.

3.6 Living Lab Brussels

Characteristics of existing freight transport system and policy framework

The Brussels-Capital Region is the competent authority in matters such as transport, economy, urban development and housing, environment, public works and energy policy and therefore is the appropriate authority level for urban freight transport policy making for Brussels. In 2011, the Region developed a Strategic Plan for Goods Traffic in accordance with its mobility plan. The freight plan, which was accepted by the Government in 2013, was drafted together with the private sector: shippers as well as carriers and receivers. Actions are planned till 2020, but the objective is to review this plan every two years to keep it up-to-date and flexible. Defined urban freight transport ambition in the Brussels Capital Region is to gradually reduce emissions and vehicle movements. Specific targets on both objectives are established for 2020, 2030 and 2050. The plan contains 5 strategic axes for reaching these targets and for each axis dedicated measures are listed as well:

1. Organise a physical structure for urban distribution
2. Integrate urban distribution in land-use planning and logistics real estate decisions
3. Improve the efficiency of deliveries through operational measures
4. Collect data, support research and encourage innovation
5. Take the role of coordinator.

The Brussels-Capital Region is convinced that they can only come to more sustainable urban freight transport in collaboration with the private sector. In 2000, the Brussels-Capital Region founded a Regional Mobility Committee, which has an objective to come up with recommendations and advice concerning mobility in Brussels and which is also used to discuss urban freight transport in Brussels since 2011. Since its start in 2011, the mobility department of the Region organizes a Mobility Committee on urban freight transport two or three times a year inviting all relevant stakeholders to participate.

How the Brussels' urban freight transport system develops and how it impacts society is monitored through a variety of indicators. There is no single integral system bringing together specific data for freight transport indicators, but a substantial amount of information is available through official sources from the mobility department of the Brussels-Capital Region, the Belgian Institute for Traffic Safety, the environmental department of the Brussels-Capital Region and the Brussels Institute for Statistics and Analysis.

Focus of their living lab in the CITYLAB

There already is an urban freight partnership in Brussels: the Regional Mobility Committee. This committee on urban freight transport can be considered as a living lab especially because this consultation body was used to formulate the ambition, scope and measures in the Strategic Plan for Goods Traffic. The goal is to adopt even more aspects of a Living Lab during the course of CITYLAB.

It is the ambition to perform one implementation case using the Living Lab methodology (the one of Procter and Gamble Business Services (PGBS)). The Living Lab implementation focuses on increasing load factors by unlocking free capacity to supply consumer goods cost-efficiently to small independent retailers and reduce generated impacts of distribution and shopping. Currently the majority of the store owners go to the wholesaler with their own vehicle.

The goal of the Living Lab implementation is to supply these stores in different parts of the Brussels Capital Region with available transportation capacity from different service-driven companies. Several companies have daily delivery and/or service trips and need to design-in spare capacity in both their vehicles and the delivery network because they are often service-driven and need to execute specific delivery tours regardless of being fully loaded. Through Citylab, PGBS, as a shipper, wants to understand if using free transportation capacity of an already present-in-the-city service-driven company can be an alternative compared to other supply modes (3PLs, shop owners buy packages themselves, distributors …). As is elaborated under 'Design' in the next section, different implementations are going to be tried. The aim is to involve 20-30 stores and supply them in different ways. One business with free capacity delivers to these stores a couple of months, after which another company takes over. This allows testing different ways of supplying as well as adjusting the implementation if necessary. Due to the complexity of the new distribution set-up, initially only PGBS products are included. If successful, collaboration with other manufacturers will be sought at a later stage to increase load factors even more.

Where do they stand in the LL process?

The implementation case of Brussels is currently situated at the end of its planning phase. The living lab owner, participants and users are reflecting on the design of pre-selected implementation cases and on which concrete solution to choose for the next living lab cycle.

Ambition of the CITYLAB for the city

The long-term ambitions for the Brussels living lab at a city level are similar as the general ones for urban freight transport in the Brussels-Capital Region (Strategic Plan for Goods Traffic, 2013) and focus on reduction of emissions and vehicle movements in the city. This ambition within CITYLAB is supported by the PGBS implementation case.

3.7 Living Lab Rome

Characteristics of freight transport system and policy framework

Rome's city centre is characterized by its historical heritage, and consequently challenging infrastructure for modern (freight) transport. The major objectives for the city of Rome to work on urban freight transport are twofold: improve / maintain accessibility and reduce negative impacts (emissions and pollution). The new Mobility Masterplan (NMM) includes a freight plan outlining this urban sustainable freight distribution objective in more detail. The freight plan includes concrete measures, such as the new access controls around the low traffic zone (LTZ) for freight, the enlargement of the LTZ, evaluation on a variable pricing policy, van-sharing promotion and aims at increasing vehicle load factors using new transit points.

Currently, three local networks are already established in Rome to cooperate with industry: i.e. a working group with logistics operators in Rome's city centre, a working table with producers of freight transport and a working table examining the feasibility of urban freight terminals.

The city of Rome collects data on a yearly basis for the traffic system by counts and cameras; for the LTZ details are available on type of (freight) vehicle. Data is available on emissions (local and global) as well as on the air quality in the city.

Focus of their living lab in the CITYLAB

Although all elements are in place (i.e. freight plan, working tables with relevant representatives, data collection on freight transport in the city as well as relating the data to the freight system's effects) in the city centre of Rome, and the immediate cause is found in Rome's objectives: improve / maintain accessibility and reduce negative impacts (emissions and local pollution), no formal living lab or other active form of collaboration taking joint-action

on improving the sustainability of the urban freight system is established in Rome, nor will be established in CITYLAB. The CITYLAB living lab focuses on the implementation cases and these are used as showcases to – if it turns out to be a success – eventually use the living lab approach for setting up an active participation and collaboration with relevant stakeholders in the form of a city logistics living lab in Rome's city centre.

The implementation case's processes and results could help establishing a living lab on a city level. This can be one of the goals for the last year in the CITYLAB project, but that activity is not planned for at this moment.

Where do they stand in the LL process?

Rome is at the beginning of LL process. The implementation that focuses on minimizing empty trips is used as a test case for the living lab approach and to find stakeholders' support for such a cooperative approach.

For the implementation case, the ambition is actually threefold: next to experiencing with a living lab approach, concrete objectives are minimizing CO_2 emissions and increasing the amount of recycling performed. This implementation case is at the planning level at the moment; the implementation plan shows the actual testing is planned for the end of 2016. The following steps, evaluation and action, have to be planned afterwards, as is the transfer from the lessons from the implementation case to the possibilities for a living lab in the city of Rome.

The main partners in the implementation case are Poste Italiane, MeWare, the City of Rome and the University of Rome Tre. The local CITYLAB partners are already involved in all the major active working groups dealing with urban freight distribution policy innovation in the city of Rome. In more detail, RSM (Rome Mobility Agency) participates / coordinates in all the working groups previously described. RSM is also the living lab owner for Rome's implementation case.

Ambition of the CITYLAB for the city

The main aim for Rome is to experience with the living lab approach in a small area first (i.e. the implementation cases) and to learn from experiences of both the local implementation cases as well as from the other CITYLAB cities, as an instrument for the future to coordinate, systematise and bolster urban freight-related shared policies and activities.

4 CITYLAB Living Labs

This chapter defines objectives of the Living Lab development at the CITYLAB project level. It gives an overview of where different Living Labs are currently standing in the project and how they will be developed further.

4.1 Living Lab environment on a city level and implementation cases

CITYLAB cities find themselves in different positions according to where they stand in the establishment of the Living Lab environment in their cities, but also in their ambitions and goals from CITYLAB project. Some of the cities want to put an effort in the further creation of the urban Living Lab environment, others only want to focus on the concrete implementation cases, third ones plan to do both. Table 1 summarizes for different CITYLAB cities the following items:

- Does city already have (independently on CITYLAB) the prerequisites to function within a Living Lab environment?;
- What are the ambitions of the city within CITYLAB project: to work on the establishment of the Living Lab environment on a city level; to work on an implementation case (s); or both?

Table 1. Living Lab environment in CITYLAB cities

	London	**Southampton**	**Oslo**	**Paris**	**Rotterdam**	**Brussels**	**Rome**
Prerequisites for the LL environment							
Urban freight strategy/plan	x	x		x	x	x	x
Established cooperation mechanisms	x		x	x	x	x	x
Existence of measures/ implementation cases	x	x	x	x	x	x	x
Monitoring process	x		x	x	x		x
Objectives within CITYLAB							
City level		x			x		
Implementation case	x	x	x	x		x	x

A minimum set of prerequisites which are necessary for the Living Lab environment setting is:

- To have a strategy/plan, or any other policy document guiding the development of the urban freight transport system on a city level;
- To have established cooperation mechanisms bringing different kinds of urban freight transport stakeholders together;
- To have a program/roadmap for the further development of urban freight transport in the city, specifying a set of measures or work directions;

- To have established ongoing monitoring/evaluation processes.

As Table 1 illustrates, the majority of the cities already have the elements necessary to run an urban freight Living Lab environment on a city level. In Paris, London, Rotterdam and Brussels the work on the urban freight transport is already organised in the frameworks that can be considered similar to the Living Lab processes described in Chapter 1.

For the CITYLAB project these cities are not specifically focusing on the further development of the local Living Lab environment, but in any case all implementation cases performed are supporting ambitions, targets and goals of the Living Lab environments on the city level. Rotterdam and Southampton, additionally to running specific implementation cases, want to make a further step in the development of the Living Lab environment on a city level. London and Paris are focusing on the development, support and implementation of the specific cases, and can provide examples for the cities developing living lab approaches. Rome first starts experiencing with the living lab approach in its implementation, before trying to start with it on a city level.

4.2 CITYLAB cities at different stages of the living lab process

Table 1 illustrates that frameworks similar to the city Living Lab environment are already functioning in London, Paris, Rotterdam and Brussels. Though, different cities are situated in the different stages of the Living Lab process. Figure 7 – Figure 8 provide illustrations on how local living labs (or structures similar to it) are currently looking in Paris and London. The elements which are not connected with a circle and highlighted in blue (e.g. Continious monitoring of the LL environment in case of London and Brussels) are those which are currently not structurally performed on a city level. These figures also illustrate the relation between the CITYLAB project and Living Lab environment on a city level.

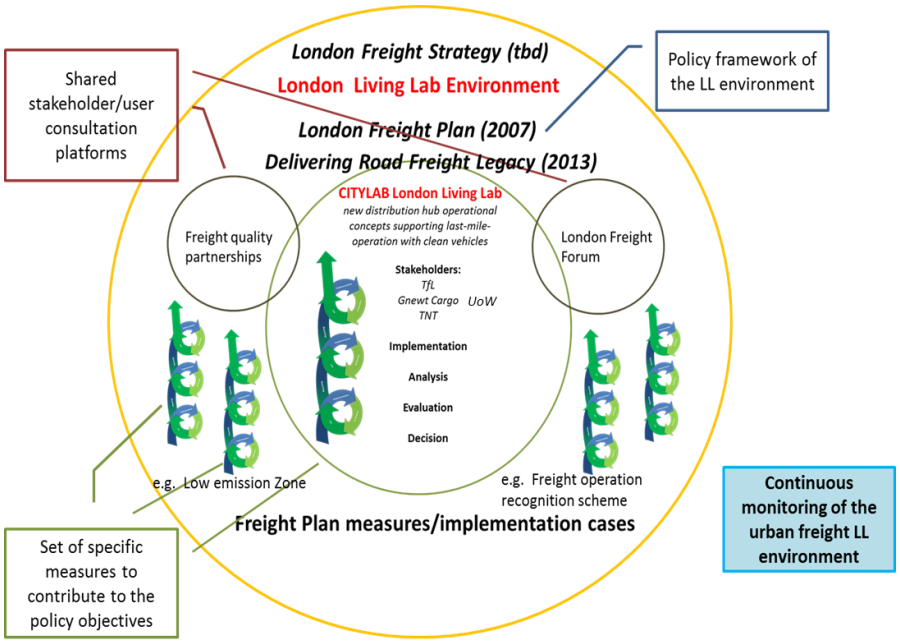


Figure 7. Living Lab environment in London in relation to CITYLAB contribution

London has all the elements necessary for running of the Living Lab on the city level and one can argue that this process is already running through the variety of shared stakeholder/user consultation platforms looking at the overall ambition defined within a local policy framework. Demonstration case that will be performed within CITYLAB project and the overall ambition of

the London CITYLAB Living Lab is to contribute to the current London freight strategy with multiple involvements in policies activities, cooperation and projects targeting more specifically efficiency, air quality, consolidation, electric vehicles, data and monitoring.

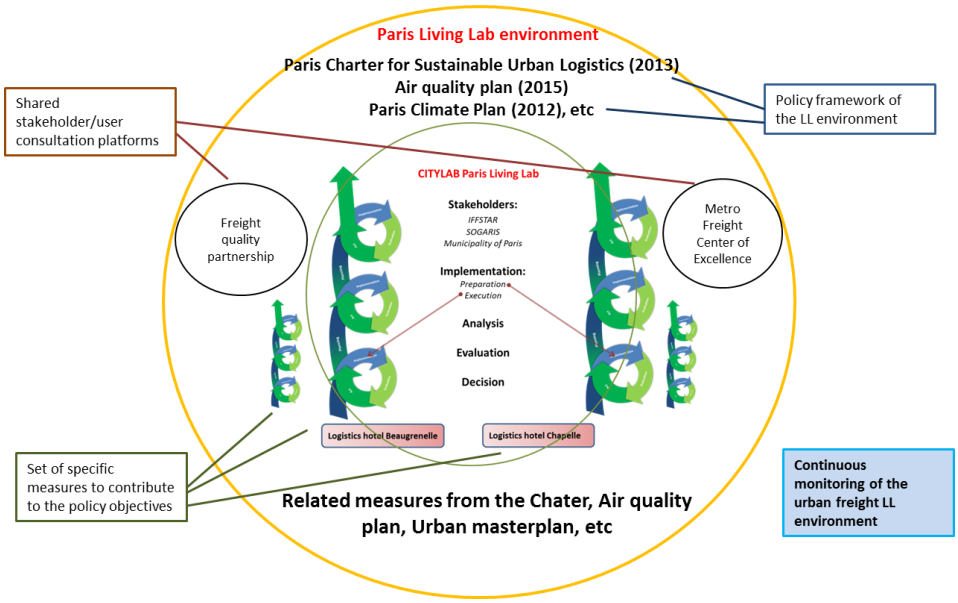


Figure 8. Living Lab environment in Paris in relation to CITYLAB contribution

Similar situation is observed in Paris, where urban freight transport policy is formalised within Paris Charter for Sustainable Urban Logistics which also establishes a cooperation structure to bring together different stakeholders from the urban freight transport sector. There is a set of measures that helps to achieve an overall ambition for ubran freight transport, which is to reduce the overall emissions of the territory and activities from 75% in 2050 compared with 2004. CITYLAB project focuses on the evaluation of two implementation cases.

For the implementation cases, CITYLAB Living Labs situate themselves in different phases of the Living Lab process. Figure 9 illustrates the phase the implementation cases in the CITYLAB project are in.

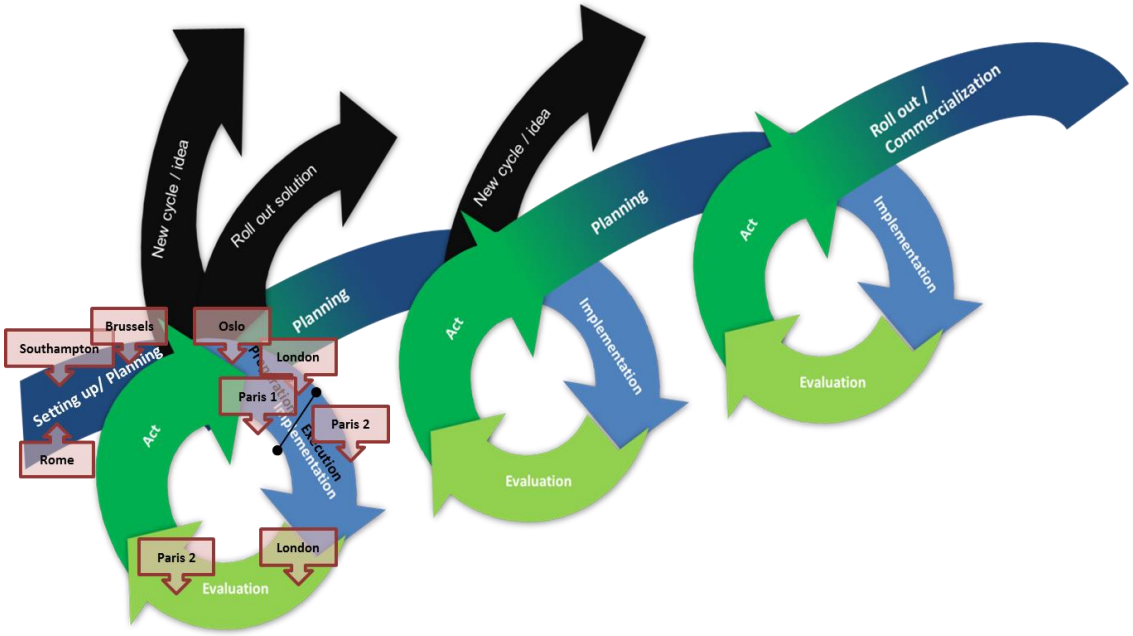


Figure 9. CITYLAB implementation cases

Southampton and Rome are in the beginning of the planning phase, conducting analysis and fine-tuning the cases. Brussels is finalising its planning phase by designing concrete solutions for its case.

Oslo, London and Paris 1 (Chapelle) are in the process of preparation and making practical arrangements within Implementation phase. Paris 2 (Beaugrenelle) is already running and Execution phase since 2013. London and Paris 2 have started, in parallel working on the Evaluation of the cases.

5 Conclusion and next steps

Chapter 4 illustrate that there is a big difference in the CITYLAB Living Lab environments and implementation cases in the CITYLAB project. The objective of the CITYLAB will be to learn from this diversity and to integrate corresponding parts in the updated handbook of living labs in city logistics (CITYLAB Deliverable 3.4).

Looking at the Living Lab environment on the city level, the project can learn from several cases:

- Paris has already structures similar to Living Lab environment running successfully in the city and that would be very interesting to learn from this experience: how cooperation between different urban freight transport stakeholders is organised, how in general the process of the running of the Living Lab environment on a city level is assured. Specifically, Paris cases are looking at evaluation of two implementation measures. That would be interesting to know how common learning from the results of different measures is organised and if there is a transferability of good practices.
- London, although implicitly, is already running many elements of a living lab. We would like to learn how cooperation mechanisms are organised and maintained and to see whether the insights from living lab approach might also be helpful for improving the existing way of working.
- Southampton is interesting from the point of view of further development of cooperation mechanisms for the Living Lab environment on the city level and from the application of the Living Lab methodology to the concrete implementation case.
- Rotterdam is in the beginning of the process of the Living Lab formalisation on the city level. We are going to assist the city in the next steps.

Further the knowledge received from the cities that are mainly focused on specific demonstration cases can also contribute to the city living lab methodology in the following way:

- Specific contribution Oslo will be on looking in detail in how the Living Lab structures can support implementation and evaluation of one particular case.
- In Brussels the P&G methodology for running of the Living Lab will be applied for the implementation case. This will enrich the current approach and we can learn from the lessons learned and enrich the methodology proposed in Deliverable 3.1.
- Rome is planning to follow the Living Lab approach as proposed in the Deliverable 3.1 to implement their case. This will be used as a way to learn working with the living lab approach in order to examine if it is useful for Rome to use it to start working in or with a city logistics living lab environment.

Guidelines developed in Deliverable 3.1 implicitly presume, that living labs start from almost nothing. In CITYLAB project, London, Paris and Brussels have already environments similar to those defined as city logistics living labs. Their process that evolved or developed through time, involves many stakeholders, and has its own analysis / evaluation methods in place. For London and Paris the methodological guidelines as proposed in CITYLAB deliverable 3.1 as well as the template used for the description of the local roadmap used in this deliverable (see Annexes) did not directly fit their existing living lab process. So they felt the template and guidelines were sometimes constraining. This distinction between developing living labs (as is the main emphasis of the developed method in CITYLAB) and usefulness to living labs or elements from it that are already running is something that requires more attention in the remaining of the CITYLAB project.

These experiences will be monitored during the CITYLAB project and included in the updated handbook of living labs in city logistics (CITYLAB Deliverable 3.4).

6 References

Innovation Alcotra (2011), Best practices database for Living Labs: overview of the Living Lab approach; L:iving Lab best practice database specification, Innovation Alcotra, Deliverable 2.3

Nesterova N., Quak H. (2015), CITYLAB Deliverable D 3.1 (Practical guidelines for establishing and running a city logistics living laboratory).

ANNEXES: Local implementation plan per CITYLAB city

London CITYLAB

Living Lab environment in London

Characteristics of freight transport system and policy framework

Main challenges for London include:

- Growing London population and associated pressures on land use and infrastructure. Population is due to reach 10 million by 2031.
- Employment is set to grow by 14% in the next 20 years, centred on Central and East London.
- If unchecked, congestion will also go up by 14%, centred on Central and East London. Highway capacity is diminished strongly in the last years (Figure below)
- Mayor's ambition to increase the number of cyclists in London will result in less capacity on the road network.
- Rapidly growing e-Commerce industry and associated growth in van numbers. Demand for goods and services forecast to rise by 15%
- 24% of CO_2 from road transport.
- Air quality and emissions problems, especially in Central London and along major traffic axis

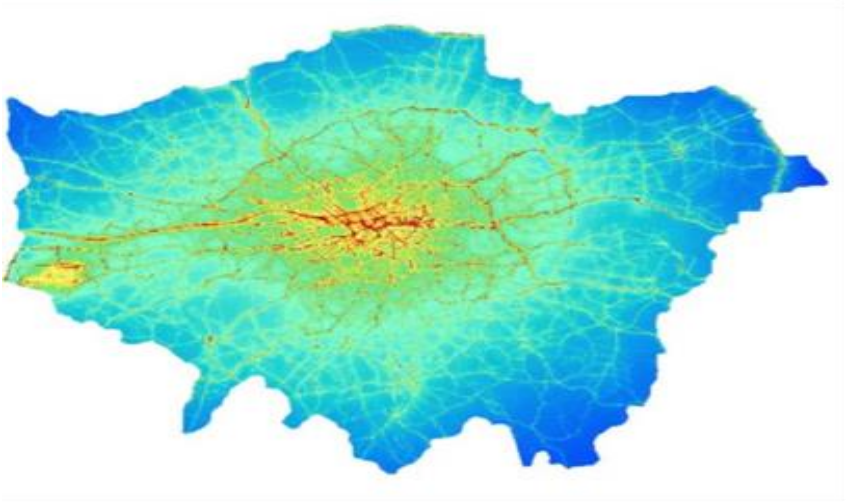


Figure 10 : London's pollution problem

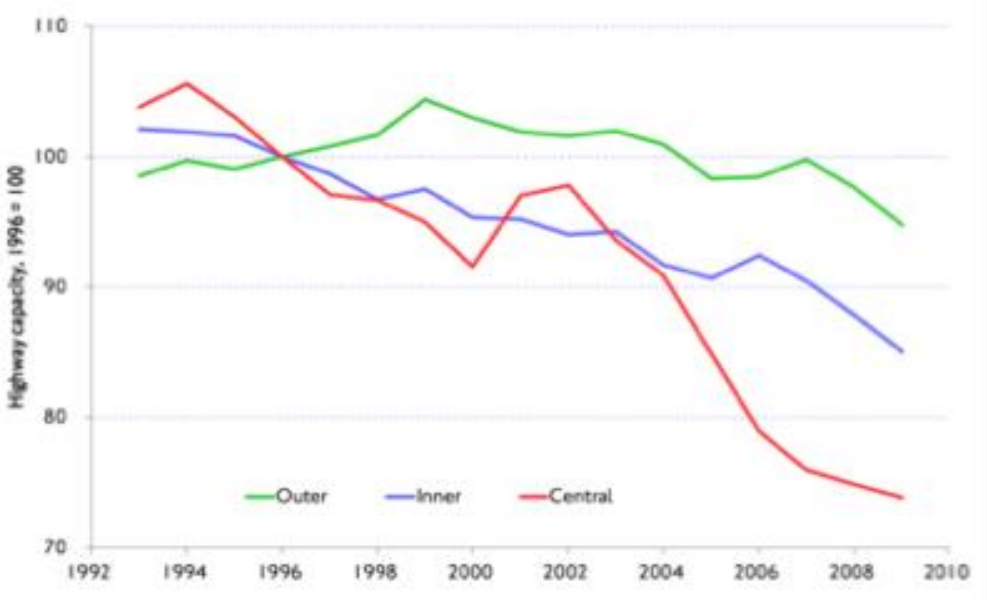


Figure 11: London's highway capacity problem

Key issues for London include:

- Increase logistics and freight transport efficiency
- Decrease emissions
- Increase safety
- Improve loading and unloading efficiency
- Develop and support innovative solutions
- Conduct and coordinate a dialogue with stakeholders
- Collect and compile relevant data for the industry and decision makers.

London Freight Plan is the key strategic document, which defines urban freight transport development in London (https://www.tfl.gov.uk/info-for/freight/planning/london-freight-plan). The London Freight Plan Strategy is regional in its scope and covers an 8-year period.

Other documents relevant for the development of the urban freight transport are:

- The Olympic Legacy document is a follow-up on policies that were successfully tested and applied during the London Olympics in 2012. This legacy document is currently being revised and an interim Direction of Travel will be available in Summer 2014 followed by the main long-term freight strategy in Summer 2015.
- The (current) London Mayor's Transport Strategy also contains information on freight transport in London. The strategy sets out the Mayor's transport vision for London and details how Transport for London and partners will deliver the plan over the next 20 years.

Table 2: Ambitions, goals and targets of the London freight strategy

	Short description, date published	**Web-link (if available)**
UFT ambition (long-term, >7 years)	London Freight Strategy – a longer term freight strategy for London is currently under development by Transport for London (TfL).	
UFT goal (medium term, 2-7 years)	To help build on the London Freight Plan and the lessons from the London Olympics Games in 2012, TfL produced a two-year programme that focuses on joint priorities around safety, reliability and efficiency. The programme document was entitled "Delivering a Road Freight Legacy" (see column on right). The Games showed that, through positive engagement and collaboration, the freight industry is able to change the way it operates for the wider benefit of London. The Freight Forum was established as the central focus for improving communication between TfL and the freight industry in the build up to the Games and has continued since. The Forum's collaborative approach to freight management needs to continue to help enhance safety, increase efficiency and deliver a number of other improvements within the industry. This programme outlines how TfL and the freight industry can continue to work together to build on this approach and deliver a freight legacy for London, both through the actions in the document and the development of a longer-term freight plan for the Capital.	A document "Delivering a Road Freight Legacy" addresses issues including improving road safety, making best use of the road network, minimising congestion and ensuring reliable journey times. It was published in September 2013. https://tfl.gov.uk/info-for/freight/planning/london-freight-plan
UFT targets (short term, < 2 years)	The London Freight Plan was published in 2007. It was produced to support the sustainable development of London by giving clear guidance and direction to complement the freight policies in the (previous) Mayor's Transport Strategy and Climate Change Action Plan. It recognised the need to improve the efficiency of the freight sector whilst also reducing the environmental and social impacts of freight transport on London, particularly our contribution to climate change.	"The London Freight Plan - sustainable freight distribution: a plan for London" was published in November 2007 https://tfl.gov.uk/cdn/static/cms/documents/london-freight-plan.pdf

Table 3: Measures of London transport policies relevant for urban logistics

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	London Low Emission Zone
Measure 2	London Congestion Charging Scheme
Measure 3	Freight Operator Recognition Scheme
Measure 4	London Freight Forum
Measure 5	The Safer Lorry Scheme
Measure 6	Construction Logistics and Cyclist Safety (CLOCS)
Measure 7	Retiming deliveries
Measure 8	Delivery and Servicing Plans (DSPs)
Measure 9	Construction Logistics Plans (CLPs)
Measure 10	Freight Information Portal

Cooperation on urban freight transport

There is a lot of interaction between different groups of urban freight transport stakeholders in London, which are formalised within the frameworks described below.

First, since the start of the implementation of the London Freight Plan in 2007, freight quality partnerships are active in London. London's FQPs is a partnership between the freight industry, local government, local businesses, the local community, environmental groups and others with an interest in freight. For example, Central London Freight Quality Partnership (CLFQP) covers the City of London; London Boroughs of Camden, Islington, Southwark, Lambeth; Royal Borough of Kensington & Chelsea; and the City of Westminster. This is a public/private partnership, set up to develop a common understanding of, and to encourage innovative solutions for, freight transport and servicing activity in central London. It is an ongoing forum to develop:

- An understanding of freight issues in central London.
- Sustainable solutions for freight access and services issues in central London, taking full account of local economic, environmental and social factors.
- Responses to proposed initiatives affecting freight and servicing.

Second, Transport for London co-ordinates the London Freight Forum, which brings together 160 logistics providers, London boroughs, universities and other organisations who are operating in London. The London Freight Forum - established to improve communication between TfL and the freight industry and help coordinate planning and preparations for the London 2012 Olympic and Paralympic Games. As a result of its success, the collaborative approach to freight management has continued and the forum now provides the focus for ongoing engagement. Meeting twice a year, it includes operators, businesses, trade associations, regulators and highway authorities. The Forum aims to:

- Build and develop productive working relationships between freight operators, local authorities and TfL, creating opportunities to work in partnership to produce industry-wide solutions that benefit Londoners;
- Improve the understanding of road freight and its vital contribution to the London economy, ensuring that all stakeholders recognise freight requirements, restrictions and daily challenges and that freight is considered at all stages in the design and management of London’s roads and streets;
- Build an evidence base to increase the availability and transparency of information, demonstrating the impact of freight and maximising the uptake of best practice behaviours

Finally, industry is also involved in many projects, for example FORS, High Street Surveys, Out-of-Hours Consortium and Central London Freight Quality Partnership, Construction logistics industry-led stakeholder group.

Existing data and monitoring on urban freight

Variety of indicators is available for monitoring of the urban freight transport situation in London. For traffic data in general the latest year that data is available is 2010. Table 3 provides an overview.

Table 4: Data and monitoring of urban freight in London: Definition and availability

Indicator	Details
Traffic counts (and how)	Rolling programme of traffic and cordon/screenline counts – mostly manual counts
Split of freight vehicles (in city or nationally) by engine type (e.g. EURO norm)	Rolling programme; camera data is continuous. Split of freight vehicles between heavy goods vehicles and light goods vehicles (vans) available from traffic count data. Heavy goods vehicles can be subdivided into rigid and articulated heavy vehicles. Standard manually collected traffic count data does not indicate engine type. Vehicle data by engine type is potentially available from location specific camera data for the Congestion Charging Zone and the Low Emission Zone.
Vehicle km per year in the city (total by freight vehicles and non-freight, and split by vehicle type, e.g. artic HGV, rigid HGV, van, car, bus etc.).	Annual vehicle km data available for heavy goods vehicles, light goods vehicles (vans), car, bus, motorcycles. Standard manually collected traffic count data not available by
Tonnes of freight lifted in the city (year)	Most recent year for which data is available is 2010
Tonne-kilometres performed in the city	Most recent year for which data is available is 2010
Empty running data for freight vehicles	Most recent year for which data is available is 2010
Vehicle load factors for freight vehicles	Most recent year for which data is available is 2010
(Average) journey distances for freight vehicles	Most recent year for which data is available is 2010
Percentage lorries / vans	See split of freight vehicles response above.
Data on congestion	TfL has data collection and analysis efforts focused on journey time reliability on selected routes – not specifically collected for freight vehicles.
Freight modal split (road, rail, water in vehicle km, tonne-km or tonnes lifted)	Most recent year for which data is available is 2010
Data on enforcement (e.g. illegal parking, violation of low traffic zone, low emission zones, etc.)	Annual data. Depends on type of vehicle enforcement. Fines for Congestion Charging Scheme non-payment and Low Emission Zone non-compliance reported annually.

For the emissions and environment indicators, the London Atmospheric Emissions Inventory (LAEI) is a database with information on emissions from all sources of CO_2 and air pollutants in the Greater London area. The base year for the current LAEI is 2010, with a back projection to 2008 and forward projections to 2012, 2015 and 2020. The next LAEI will be available later in 2015 and use a base year of 2013. This database provides indicators as:

- (Estimates) on CO_2 emissions
- (Estimates) on local emissions (PM10, NOx, …)
- Air quality.

The noise mapping is developed by the Department of environment food and rural affaires (DEFRA). Information collected on traffic safety contains data for road traffic collisions that

involve personal injury occurring on the public highway reported to the police. Damage only collision are not included. Data is as reported to the Metropolitan and City of London police services in accordance with the STATS19 national reporting system. Data is collected by police at the scene of an accident or in some cases reported by a member of the public at a police station, then processed and passed by the police to Transport for London for checking and analysis.

An overview of available spatial data is presented in table below.

Table 5: Spatial data relevant for urban logistics in London: Definition and availability

Indicator	Details
(Estimates) commercial activities in city (e.g. floor-space / FTE)	Latest published floor-space data for commercial activities in London is from 2008 (by the UK Department of Communities of Local Government). Used to be updated every five years but currently unclear whether an update of the 2008 data will be published.
Total non-residential floor-space in the city	Same as above
Total residential floor-space in the city	Population, household size and number of households available. Data on residential floor-space less readily available. Source: Mayor of London (2014) Housing in London 2014: The evidence base for the Mayor's Housing Strategy (report)
(Estimates) logistics activities (in m^2)	There were estimated to be approximately 30,000 transport and logistics workplaces in London in 2013. Latest published logistics floor-space data in London is from 2008 (by the UK Department of Communities of Local Government). Used to be updated every five years but currently unclear whether an update of the 2008 data will be published.
Estimates land use (residential area, commercial area, industrial area, etc.)	Latest published floor-space data in London is from 2008 (by the UK Department of Communities of Local Government). Used to be updated every five years but currently unclear whether an update of the 2008 data will be published. Residential floor-space data not readily available.

Focus of the London CITYLAB Living Lab

There is a foundation to set up a Living Lab environment for London and main background elements are already present on a city level:

- Developed freight strategy with concrete ambitions, goals, targets and implementation measures.
- Cooperation structures supporting interaction and dialogue between different participants of the urban freight market in London.
- Monitoring of some key parameters on a city level.

The overall ambition of the London CITYLAB Living Lab is to contribute to the current London freight strategy with multiple involvements in policies activities, cooperation and projects targeting more specifically efficiency, air quality, consolidation, electric vehicles, data and monitoring.

There is a general interest of the London authorities in supporting economic growth of clean urban freight solutions and business innovations via regulations (such as exemption of the London Congestion Charge for electric vehicles) and consultations. The CITYLAB Living Lab of London will contribute actively to implement this policy.

Planning of the London Living Lab implementation case

Set Up

Ambition

The Ambition of the London Living Lab of CITYLAB is to support the growth of clean vehicle usage in London, and support the implementation action of TNT and Gnewt Cargo with a clear set of framework actions and strategies.

The goals are:

1. Deliver an implementation action on growth of electric freight deliveries in London.
2. Monitor growth, assess costs and benefits, demonstrate beneficial impacts for market and private business and public sector.
3. Develop and run a trial with a two stages approach. Initial transfer of business from diesel fleet to electric fleet, intermediate evaluation, second transfer of business of diesel fleet to electric fleet, final evaluation.
4. Support growth with search for an appropriate depot location in or close to Central London.
5. Deliver a growth potential analysis for transferability to other businesses and other cities.
6. Analyse success factors and barriers.
7. Link and analyse links with other London logistics a policies such as ULEZ planning, FORS, etc.
8. Provide recommendations for policy makers.

Scope

Area: Central London

Main policy / city objective and the influence of city logistics on it: London freight plan

Logistics specification: Parcels deliveries B2B and B2C

Shipment specification: Parcels, bulk (roll cages) and garments

Users involved for execution of operations: TNT and Gnewtcargo, other TNT subcontractors

Users involved for planning of operations that are often outside the city: TNT clients, Gnewt Cargo clients

Main customers, receivers and size of freight market (e.g. shippers or freight forwarders involved), as well as power in the supply chain: TNT is a global player for parcels deliveries. Gnewt Cargo is an independent carriers' carrier with 100% electric fleet in London.

Other involved stakeholders: Transport for London, University of Westminster, Central London Freight Quality Partnership.

Living Lab Partners

TNT: Forwarder and Logistics Service Provider, responsible for performing the tasks of organisation and planning and operations of the trial.

Gnewt Cargo: Carriers' carrier and freight operator, responsible for performing the tasks of organisation and planning and operations of the trial.

TfL: Local authority responsible for transport policy and strategies. Organisation of the framework conditions, link with the London freight policy, support for search for Central Depot location.

UoW: Academic research, responsible for monitoring, data collection, data processing and reporting of the London Living Lab.

Living Lab Public Private Partnership

Central London Freight Quality Partnership.

Transport for London Freight Unit.

Freight Forum.

Freight in the city.

System analysis

Legal and ethical issues

No legal or ethical issues, the London Living Lab does fit within the existing legal framework.

Stakeholder/end user analysis

Industry partners:	TNT and Gnewt Cargo
City partner:	Transport for London
Research partner:	University of Westminster
Motivation:	Improve business models for clean deliveries with tricycles and other electric vehicles.

TNT will build on the experiences with the mobile depot in Brussels in the STRAIGHTSOL project. The concept is a major further development of the STRAIGHTSOL prototype with less costly equipment and more capacity, aiming at achieving the throughput of fare more parcels per day and a much greater possibility to achieve a profitable business case for clean, consolidated parcel deliveries in city centre.

Gnewt Cargo have several years of experience from operation with clean vehicles in London and they are aiming at improved efficiency and profitability of their operations. They need to establish the most suitable arrangement of distribution centres, vehicle types and operating patterns.

Industry and logistics businesses in London are at multiple levels involved with Transport for London freight policies. For example over 2,000 organisations are FORS accredited. Regular consultations with key stakeholders take place, including bi-annual London Freight Forum and Freight Quality Partnership meetings.

A Stakeholder analysis will be performed with a questionnaire (CITYLAB task 2.2).

System analysis

Most relevant background market information is the lack of profitability of electric vehicle that hinders its wider deployment in London. Despite EU policies, UK policies on mitigation of climate change, London policies on reducing air pollutant emissions and congestion, the growth of electric vehicle used for freight deliveries is too slow.

Electric freight vehicles represent less than 1% of total new vehicle registrations in UK in 2014 and 2015.

Growth and good examples are not well understood.

The London Living Lab trial will allow a better understanding for growth conditions.

Risks analysis and mitigation measures

One major issue is the high price of adequate estates and facilities in Central London

To provide dedicated space, a public policy would be required, but this type of logistics planning integrated into the urban planning is missing in London. Currently all electric freight vehicles of Gnewt Cargo are starting from four locations in Central London.

The TNT depots are located in the suburb.

It is important that the close proximity to final delivery area is maintained as key advantage of Gnewt Cargo and electric freight, because this diminish the total distance driven in London. The current model run with TNT is estimated to lower the total distance per parcel to about 65%, when compared to the current practice of starting the daily rounds from suburban depots.

The current trial plan foresees the transfer of TNT parcels delivery round departure point from the TNT depot in Barking to the Gnewt Cargo depot in Holborn.

Figure 12: Locations of the Gnewt Cargo depots in Central London

Design

Definition of the implementation cases

Multiple solutions were envisaged, among which a solution of a mobile depot.

The second solution was to monitor growth and assess the conditions for successful growth.

In London, TNT and Gnewt cargo seek to explore new distribution hub operational concepts that support viable business cases for last-mile-operation with clean vehicles. We will also look at potential synergies between these solutions.

TNT emphasise business case development for parcel deliveries with a mobile depot solution, including the use of a trailer and multiple tricycles and electric vehicles for last mile distribution in London, targeting fragmented last mile deliveries and large freight generators such as hospitals and public administrations. The concept is a major further development of the STRAIGHTSOL prototype, and TNT will test a vehicle/trailer solution that is less expensive than the previous trials, that complies with the requirements which will be determined under strict profitability and sustainability criteria, by TNT and the London Living Lab partners. Gnewt Cargo is a fast growing business in Central London and the number of depots in use grew from 1 to 5 within the year 2014. Business growth is expected to continue and the issue of how best to use the different depots for the various clients and the appropriate vehicles and operational patterns needs to be clarified. It is not well known how start-up businesses can continue to sustain growth with their electric freight solutions in urban areas. One of the key problems is the high costs of centrally located logistics depots. Restrictions and characteristics of the multiple logistics depots and consolidation centres used by Gnewt Cargo (such as location, size, rental price, and client's depots) are affecting the business case and it is unclear how to quantify the most beneficial depot management solution for electric freight vehicles. Gnewt will make deliveries starting from the central depot and deliveries from other depots, and the operational outcomes of using electric vehicles such as small vans and electric tricycles will be compared. At the end of the project, the best solutions in terms of depot management will be analysed and explained for each business type and for each vehicle type.

One deviation from the original Description: the solution of TNT mobile depot previous envisaged at the proposal stage cannot be implemented immediately. At this point the previous trial proved not to be commercially viable and the practicality within the London area of finding suitable transhipment sites will take more time than we have before implementation. However, it may be wise not to close that option entirely at this stage.

"Fit" evaluation

Not available.

Development of evaluation methodology

This will be done in accordance with D5.1 Impact evaluation methodologies.

Objectives and general question to be answered by the implementation: What is the best possible management solution for clean inner city distribution, consolidation and clean vehicle use, from the point of view of a local authority, a large carrier, and a small carriers' carrier?

Methods:
1) Survey with quantitative before-after data collection, and data processing.
2) Meetings, qualitative story telling about the business contracting and cooperation.
3) Internal business impact evaluation, impact assessment for local authorities about traffic, emissions and road space occupancy and other criteria to be determined.

Expected impacts: TNT's previous use of the mobile depot in the STRAIGHTSOL project resulted in CO_2 savings of 25% compared to "business as usual" and also reductions in local

emissions. Similar savings can be expected in London due to the replacement of vans. It is the goal of TNT to increase the profitability of the operations to also make a viable business case. For Gnewt Cargo the operations with electric vehicles reduce emissions by around 50% compared to operations with diesel vans. The main contribution of the CITYLAB implementations will be to support sustainable business models that facilitate further expansion of clean last-mile solutions.

Table 6: Expected impacts from the implementation case

Topic	Short term (what?)	Long-term ambition (in time)
Increased efficiency / load factor	CITYLAB trials of TNT and Gnewt will have a beneficial outcome for London as these two businesses are major players in urban logistics in London. Adapt and test other successful solutions that were developed in other CITYLAB partner cities.	Extend the solutions provided by the findings on the best business cases for the two solutions trialled in London, and for the other solutions, in order to either scale up within the organisation or create entirely new start-ups that will implement the innovative market solution.
Reduce time in city (loading unloading)	Consolidation will reduce the traffic time.	Through the extended market share of consolidation solutions and the future growth of the business run with clean vehicles in London, a substantial reduction in freight traffic is expected, first in Central London and progressively in the entire city.
Global emissions	It is expected that consolidation and clean vehicle use will reduce the CO_2 emissions by at least 50% compared to the diesel use.	Extended market share will further decrease the emissions.
Air quality (and local emissions)	It is expected that consolidation and clean vehicle use will reduce the air pollutant emissions by at least 50% compared to the diesel use.	Extended market share will further decrease the emissions.
Retime logistics activities (e.g. out of peak period)	It is expected that travelling to the central consolidation centres will be performed during off-peak periods.	Extended market share will further decrease the peak time traffic
Reroute logistics activities	For TNT, the use of cycles will imply the entire re-routing of all delivery rounds performed via the consolidation centre or the mobile depot in Central London. For Gnewt cargo, the use of two different depots will be assessed and the different routing options will be an essential part of the benefits to be expected from an efficient depot management solution.	
Increase accessibility (reduce congestion)	The use of a central or mobile consolidation centre solution will reduce traffic, compared to the use of suburban depots only	
Improve traffic safety	Cycle use and slow electric vehicle use will increase safety.	
Other effects, i.e.:	Increased profitability and better business case of clean and consolidated solution, obtained as a	Either via replication from other businesses or via scaling up existing businesses, the long-term expectations are that the economic growth

	result of the Living Lab trials, will lead to a higher future growth of businesses running such solutions.	of clean logistics solutions tested in CITYLAB will be continued and sustained over the next years, during and after the project ends.

Possible attributes include: reduction in total vehicle kilometres and vehicle kilometres travelled in the inner city / city centre; reduction in vehicle journeys; reduction in use of larger goods vehicles; retiming vehicle activity; reductions in fossil fuel consumption, CO_2 emissions and local air pollutants.

London implementation case roadmap

Table 7: Key questions when creating LLIP

Preconditions for success, external dependencies and assumptions	• *What are the relevant legal frameworks for the Living Lab system?* London Freight Plan, London Transport Strategy • *Are there legal issues during the execution of the Living Lab?* No • *Which dependencies exist between the Living Lab system and its environment?* Links to Transport for London policies • *What are the critical quality factors?* Cooperation • *Which assumptions are made?* Growth is feasible • *Are there ethical issues in executing the Living Lab?* No
Risks	• *What are the risks in Living Lab execution?* Lack of adequate depot at reasonable costs • *What are the risks of stakeholder change?* none • *What are the technology related risks?* none • *What are safety and security risks?* none • *For each of the risks what are probabilities and effects and how can the risk be mitigated?* Search for new depot locations
Deliverables and milestones	• *What are the official Deliverables?* Intermediate report, final report • *What are the official milestones?* Intermediate evaluation, final evaluation, workshops • *What additional Deliverables are needed for project control and reporting?* WP5 evaluation dashboard • *What additional milestones are needed for project control?* Workshop participant comments and partner inputs
Approach	• *How are the activities executed?* TNT and Gnewt Cargo to start a new business cooperation on domestic freight for EC postcodes • *Which methods are used, such as interviews, questionnaires, workshops, etc.?* Parcels delivery planning, monitoring and evaluation, data collection and processing, reporting and workshop, second stage with extension to other postcodes areas of London and to other cities • *How do partners and activity teams interact? Meetings*
Timeline and planning	• *What is the expected duration of all Living Lab phases and activity blocks?* Six months for first stage, six months for second stage, end in March-April 2017 • *What dependencies influence the planning?* None besides internal TNT/Gnewt Cargo interactions on the practicalities of the parcels delivery business • *Does the resulting timeline fit with the project timeline?* yes
Resources and their organisation	• *What are the partners' responsibilities in the execution?* TNT: Planning and implementing the trial Gnewt Cargo: Planning and implementing the trial TfL: Provide link to Transport policy and search for depot location UoW: Collect and process data, write reports, • *Who are the critical people needed in the team?* Andrew Lowery, Sam Clarke, Jacqueline Short, Julian Allen, Jacques Leonardi • *What is critical technology needed?* Electric vans; adequate depot with accessibility for trucks • *What other resources are needed?* Search for another depot • *Under which conditions can these resources be made available for the Living Lab?* Availability of suitable space at moderate costs

Budget and expected costs	• *What is the overall Living Lab budget and is it distributed correctly among partners so that it reflects their respective work? CITYLAB budget is adequate* • *How is the budget spending over time related to milestones and Deliverables? Adequate and in line with budget plan*
Monitoring, control, reporting and communication	• *How does the team work together? No issue* • *Are sub-teams needed? No* • *Are there cultural/language barriers in the team? No* • *What are the procedures or protocols to communicate with partners? Emails, meetings* • *What are the procedures or protocols to communicate with stakeholders? Meetings, workshops, emails* • *Which meetings are needed and used and when? (Telco's, face to face meetings) Besides CITYLAB meetings: London Living Lab Meeting at start, meeting at end of first stage, Workshop meeting* • *How do we report on meetings? Emails with meeting notes* • *How do we resolve issues? Emails and calls* • *How and to whom do we report issues? Meeting notes are made available to Living Lab partners*

Gnewt Cargo: The parcels delivery business of Gnewt Cargo focuses on London Congestion Charge Zone. The company is performing City centre distribution as carriers' carrier with a centrally located consolidation centre, and pure electric van fleet. Key task is to be taking over additional business from TNT.

TNT: Switch from one carrier with standard fleet to Gnewt Cargo for good coming from TNT National parcels network. One of the TNT network depots is in Barking, East of London (about 9 miles from Tower Bridge). Instead of starting deliveries from Barking, the goods will be transferred by truck to the Gnewt depot in Central London. Probably giving to Gnewt about 7-10 van payload of each 60-80 parcels per day, out of national TNT network, for final distribution. The previous LSP serving Central London will move to another area of distribution.

TfL: Role of Transport for London in the Living Lab implementation is to be giving the framework for best possible impact that can be expected. Also TfL will support TNT and Gnewt Cargo in search of the best consolidation/transhipment depot solution. The depot should ideally be centrally located, offering enough suitable parking and loading space, and with a bay allowing large truck access, off-peak, and between 06:00 and 10:00 in the morning for unloading operations.

UoW: Support with set-up of the Living Lab implementation and preparation of the implementation plan. Data collection, interviews, meetings and quantitative data processing. Reporting of the changes occurring during the implementation. Legacy, lessons learnt and final report.

Medium term steps of the implementation, June 2016-March 2017:
TNT will be giving Gnewt Cargo more (additional) goods and parcels after positive evaluation of the solution. TNT will prepare the potential growth of the solution beyond London. Exchange with other Living Labs of the CityLab project will possibly allow a replication in another city.

Intermediate evaluation is foreseen in June 2016, to prepare the extension and scale-up phase. Scale-up analysis including assessment of impacts and growth potential are integral part of the implementation. End of trial foreseen in March 2017.

Southampton CITYLAB

Living Lab environment in Southampton

Characteristics of freight transport system and policy framework

Southampton is the second largest city in the South East with a population of over 240,000 and has huge economic potential. It is a key regional transport hub comprising Britain's most important port with major international connections, a growing international airport and well-connected rail links. It is an ideal location for travel to work and for leisure and has two universities, with global recognition for its research and innovation. It is known for its green credentials, parks and open spaces, arts and cultural facilities and retail offer.

The *main objectives* / *motivations* / *problems* (concerning urban freight transport) that are top priorities at this moment (concerning urban freight transport)?

Objectives/Motivations:

- to improve air quality and minimise pollution
- to reduce the number of HGV movements in urban areas within the Solent
- to facilitate a structure that will enable economic growth to continue unhindered by issues of congestion and, in particular, to maintain effective operation of the Port of Southampton

Problems: *For the city as a whole*

- pollution levels in and around the port of Southampton and along some key corridors around the city
- congestion levels are increasing
- the economic situation means that finances are tight

For carriers

- advantages/benefits of using a consolidation centre (e.g. the Southampton Sustainable Distribution Centre (SSDC)) are not always immediately obvious
- fear of losing control over supply of product

Table 8: Southampton urban freight transport strategy

Does your city have an urban freight transport strategy / policy scheme at this moment? (If yes could you share it)	SCC policy is covered within the framework of South Hampshire, as was described above: http://www3.hants.gov.uk/tfsh-freight-strategy-2009.pdf SCC's freight transport strategy/policy is also reflected in its Local Transport Plan, whose webpage is at: http://www.southampton.gov.uk/roads-parking/transport-policy/default.aspx This provides links to various relevant documents already described above, including: Implementation Plan (2015-2018) Local Transport Plan 3

Table 9: Ambitions, goals and targets of the Southampton freight strategy

	Short description, date published	**Web-link (if available)**
UFT ambition (long-term, >7 years)	To facilitate the safe and efficient transportation of freight into, out of and within the region, supporting a competitive local and regional economy, whilst taking into account the existing and future needs of our society and the environment.	Transport for South Hampshire (2009) http://www3.hants.gov.uk/tfsh-freight-strategy-2009.pdf
UFT goal (medium term, 2-7 years)	It is suggested that the long-term ambition (above) will be met through achieving the following shorter-term objectives: 1. To maximise the contribution of the freight and logistics sector to maintaining and enhancing the economic competitiveness of the sub region 2. To secure investment in measures that seek to make best use of existing capacity and improve journey time reliability on strategic lorry and rail freight network routes 3. To support the provision of new capacity on those road and rail corridors within the sub-region critical to customers of freight and logistics operators, including access routes to port and dock areas 4. To improve understanding and communication between local authorities and freight and logistics operators, and raise the profile of freight within local transport planning 5. To achieve wider recognition of the vital role played by the freight and logistics sector in delivering a flexible and responsive service economy, and create more positive perceptions of the freight sector 6. To promote positive freight planning linked to environmental, community and safety considerations. 7. To encourage a holistic multi-modal approach to freight transport which recognises the most appropriate mode for each type of movement	
UFT targets (short term, < 2 years)	Help raise awareness of scope for innovative/technological solutions. Encourage sustainable development practices in businesses through the development of travel plans. Apply for funding towards rail capacity improvements. Develop a process for communities to raise concerns about adverse impacts of HGVs and for assessing scope to address them. Implement route strategies for principal and local freight routes. Ensure roads and bridges on strategic routes are maintained to the necessary standard. Support initiatives to raise public awareness of the vital role played in the supply chain by ports and logistics operators in supplying consumer goods and products	
UFT action plan	The current Urban Freight Strategy (UFS) is badly in need of updating and Southampton itself would benefit from its own freight strategy that could feed into the one for South Hampshire. By January 2017, Southampton City Council (SCC) will be in a strong position to write its own UFS after	

	it has had two years of Delivery and Servicing Plan data to look at along with a Low Emission Strategy for the city. In addition, the city's Local Transport Plan 3 and Implementation Plan (2015-2018) mentions an "Urban Freight Strategy – a pilot system for 'Freight Traffic Control' where dynamic routing is used to guide HGV drivers onto optimal routes for deliveries and access."	
UFT other policy document, i.e.:	Transport for South Hampshire (2009). Annex 1: Freight Trends and Policy Backgrounds	http://www3.hants.gov.uk/annex-1_-trends-and-policy-background-note-2

Table 10: Measures of Southampton transport policies relevant for urban logistics

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	Southampton Sustainable Distribution Centre (SSDC), run by Meachers Global Logistics since December 2013, operates a consolidation centre service along with general warehousing. The promotion of the SSDC is ongoing and from September 2015 the SSDC will have a Sales Executive working on it two days a week. The impact of the SSDC is to improve air quality and reduce congestion and pollution through consolidating loads going into Southampton. The centre currently has eight users storing over 2000m^2 of items. There are also two projects with two public bodies looking at how the SSDC can potentially reduce over 500 vehicle movements a week. More information can be found at http://southamptonsdc.co.uk/
Measure 2	Delivery & Servicing Planning (DSP) is currently being offered to Southampton organisations under a Southampton City Council project run by the University of Southampton. In a similar way that a travel plan aims to understand how a business's employees get to work and how they could do so more sustainably, a DSP audits the freight vehicle activity to and from a business with the aim of developing a sustainable freight strategy. A DSP will help your organisation to: • Quantify the numbers of delivery and service vehicles visiting your premise by activity type and time. • Manage deliveries and service activity to reduce and re-time trips • Assesses procurement strategies to evaluate how to reduce / consolidate orders that generate freight movements • Identify where safe and legal loading can take place • Use delivery companies who can demonstrate their commitment to best practice) • Save time and money • Improve the safety of delivery and servicing activity at your site • Improve reliability in your supply chain • Reduce the environmental impact of your organisation • Cut congestion in the local area **Activities that DSPs commonly address** • Deliveries and collections • Servicing trips, (including maintenance of office equipment, facilities and utilities, cleaning and waste removal catering and vending) • Freight activity resulting from special events **How freight impacts can be reduced** • Engaging with facilities management to identify the urgency of deliveries and the scope for consolidating vehicle loads. • Working with procurement, suppliers and contracts management to ensure sustainable procurement processes e.g. reducing the frequency of stationery orders, or consolidating orders between different departments) • Co-ordinating and managing delivery and servicing activities to take place during specific times of the day • Encouraging safe and lawful loading by providing legal loading areas or by scheduling deliveries for when it is safe to do so using booking systems.

	What it involves A DSP requires an independent audit of your core goods and service activities using surveys, interviews and desk-based analysis of procurement and delivery records for a standard operating period. It then quantifies the daily freight and servicing activity (arrival times of vehicles by activity type, the duration of visits (loading/ unloading/ servicing), the recipient department and size and urgency of items). It also identifies the background to the procurement processes which lead to the generation of orders and freight activity. This project begun in February 2015 and will continue to March 2017. For more information see http://www.southampton.gov.uk/roads-parking/transport-policy/dsp.aspx
Measure 3	A Low Emission Strategy is currently being developed for Southampton that should be ready to implement in early 2016. The strategy will look at: • reducing freight movement in the area, • encouraging the retiming of vehicle movements to when the roads are quieter • improving the standard of vehicles using Southampton's road network to newer, cleaner vehicles. This project is in its early stages but is expected to have a significant impact.

Cooperation on urban freight transport

Table 11: Forms of cooperation on urban freight transport in Southampton

Do you work together with logistics industry in your urban freight transport strategy?	Yes, but not as much as we should.
Are familiar with 'Freight Quality Partnerships' (or likewise public private partnerships, if yes could share it / describe)	Yes aware of the concept laid out by the UK Department for Transport but Southampton does not have an official FQP.
What is the intensity of this strategy (geographical scope, duration, etc.)	South Hampshire; from 8 July to 29 September 2010, the three Local Transport Authorities of Hampshire County Council, Portsmouth City Council and Southampton City Council ran a consultation on a draft Local Transport Plan 3 (LTP3) Joint South Hampshire Strategy, with responses summarised at: http://www.southampton.gov.uk/policies/LTP3ConsultationSummary_tcm63-363664.pdf
Preconditions or clarifications that are needed before developing a CITYLAB living lab environment (agreements with other actors mentioned above, etc.):	Southampton City Council (via Neil Tuck; neil.tuck@southampton.gov.uk will need to clear all requests)

Existing data and monitoring on urban freight

Table 12: Monitoring and data collection: *traffic*

	Short description and results	How often collected and link or report available?)
Traffic counts (and how)	Annual 12-hour counts at 31 sites across the city 5 Automatic Traffic Counter sites (Millbrook Road east, Mountbatten Way, Northam Bridge, Maybray King Way and Bursledon Road)	
Freight modal split (road, rail, water in vehicle km, tonne-km or tonnes lifted)	Not available with great accuracy although estimates are available in the Port of Southampton Master Plan	http://www.southamptonvts.co.uk/Port_Information/Commercial/Southampton_Master_Plan/
Data on enforcement (e.g. illegal parking, violation of low traffic zone, low emission zones, etc.)	Circa 45,000 penalty charge notices issued a year – these are for parking contraventions. We currently do not enforce any other form of contravention.	

Table 13: Monitoring and data collection: emissions and environment

	Short description and results	How often collected and link or report available?)
(Estimates) on CO_2 emissions	1,153 Kt is the estimate from several different industries for the year 2012.	http://naei.defra.gov.uk/data/local-authority-co2-map
(Estimates) on local emissions (PM10, NOx, …)	NOx - ~30-40 µg m-3 per year as background concentration as of 2012. PM10 - ~ 13-17 µg m-3 per year as background concentration as of 2012. PM2.5 - ~ 12.5-15 µg m-3 per year as background concentration as of 2012. Ozone - >5 days with a background concentration greater than 120 µg m-3 as of 2012.	The 'air defra' website has overlaid data for several air pollutants across the UK at a relatively coarse resolution. http://uk-air.defra.gov.uk/data/gis-mapping
Air quality	The 10 air quality management areas defined in Southampton have ranges of NO_2 which exceed the standard of 40 µg m-3.	http://www.southampton.gov.uk/planning/air-quality-planning/air-quality-management-areas.aspx
Noise emissions	Rail - ~65-74.9 dB Road – Varies greatly with distance from a road, ~0.5-74.9 dB Industry – A few major spots have high noise levels, which decreases with distance ~ 55-75+ dB Aircraft – Varies greatly	http://services.defra.gov.uk/wps/portal/noise

Traffic safety	Deaths from a road traffic accident (2010 – 2012): 6 This report covers detailed aspects of traffic and accidents from 2000 to 2012	http://www.publichealth.southampton.gov.uk/Images/Road%20Traffic%20Accidents%20Briefing%20-%20April%202013.pdf

Table 14: Monitoring and data collection: *spatial*

	Short description and results	How often collected and link or report available?)
(Estimates) commercial activities in city (e.g. floor-space / FTE)	The following floor-space (m^2)(thousands) estimates were made for Southampton in 2005 (does not seem to have been updated since): • All bulk classes – 2,047 • Retail premises – 574 • Offices – 495 • Commercial offices – 415 • Other offices – 80 • Factories – 570 • Warehouses – 340 • Other bulk premises – 67	http://www.neighbourhood.statistics.gov.uk/dissemination/LeadTableView.do?a=7&b=6275251&c=southampton&d=13&e=8&g=6401303&i=1001x1003x1004&m=0&r=1&s=1439216379828&enc=1&dsFamilyId=934&nsjs=true&nsck=false&nssvg=false&nswid=1344
Total non-residential floor-space in the city	2,746,560m^2	http://neighbourhood.statistics.gov.uk/dissemination/LeadKeyFigures.do?a=7&b=301520&c=southampton&d=140&e=8&g=411870&i=1001x1003x1004&o=1&m=0&r=1&s=1439219167016&enc=1
Total residential floor-space in the city	4,634,970m^2 (buildings) 14,015,930 (gardens)	http://neighbourhood.statistics.gov.uk/dissemination/LeadKeyFigures.do?a=7&b=301520&c=southampton&d=140&e=8&g=411870&i=1001x1003x1004&o=1&m=0&r=1&s=1439219167016&enc=1
Size of the city (in km^2)	51.81km^2	https://www.southampton.gov.uk/council-democracy/council-data/statistics/
Population of the city	245,300	https://www.southampton.gov.uk/council-democracy/council-data/statistics/

Focus of the Southampton CITYLAB Living Lab

The main ambition of CITYLAB in Southampton is to perform a series of implementation cases using the Living Lab methodology.

Also, during the CITYLAB project the first steps will be laid down to establish the living lab environment on a city level. As no urban freight partnership exists in Southampton or in Hampshire, no organisation plays a similar role to that of the proposed Southampton living lab.

Southampton City Council and the University of Southampton will be the main organisers of the living lab concept in Southampton, supported by Meachers Global Logistics, the operators of the SSDC. These CITYLAB partners will also be the main drivers and organisers of the implementation cases to be performed, with hoped for support from external organisations such as Southampton Solent University and from local hospital trusts. The living lab setup and planning is largely driven by the CITYLAB project.

The planned organisation comprises:
- Consultation and drafting of a Memorandum of Understanding (MoU) (stating freight-related objectives and possible measures)
- Publicising the MoU and directly approaching companies involved in DSPs and other relevant organisations to seek their agreement with it
- Convening living lab meetings to discuss progress, results and ways forward
- Organisation of other dissemination events.

As regards concrete implementation case, large municipal organisations (LMOs) such as hospitals, councils and higher education institutions generate significant freight vehicle movements in urban areas with some universities receiving in excess of 400 inbound movements per week. Consolidation centres have traditionally focused on serving smaller, independent retailers to reduce the overall number of freight vehicle movements in urban areas. Very little work has focused on the potential benefits to large municipals of consolidating deliveries off-site for inward delivery. This implementation represents an extension of the activities of the SSDC that is already in operation. Delivery and Service Planning audits will allow LMOs to assess their freight and service vehicle flows, and quantify the benefits of consolidating subsets of these. CITYLAB will also highlight how working with neighbouring organisations in joint procurement and consolidation could reduce costs and environmental impacts.

Planning of the Southampton Living Lab environment

Set Up

Ambition

The Southampton Living Lab's ambition is to vastly improve **air quality** within the city while maintaining **economic prosperity**.

Specific goals identified to date are:

- Reduce pollutant emissions levels on key corridors – currently 10 air quality management areas have been identified in Southampton, where air quality objectives are not being met and where road traffic is primarily to blame, of which freight transport is a major contributor - see:
  - https://www.southampton.gov.uk/planning/air-quality-planning/air-quality-management-areas.aspx
  - Southampton air quality action plan update (November 2009)
- Planning and implementation of Clean Air Zones - Southampton is one of five UK cities (the others being Birmingham, Leeds, Nottingham and Derby) targeted by the UK government (DEFRA, 2015) as requiring interventions by means of introduction of clean air zones to discourage entry of old polluting buses, coaches, taxis and heavy goods vehicles (HGVs) (the plan does not extend to light goods vehicles or private cars) – see further details in section on **Legal Issues** (link to DEFRA document below):
  - https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486636/aq-plan-2015-overview-document.pdf

Scope

The Southampton Living Lab's scope is expected to cover:

Area - the whole unitary authority area of Southampton

Policy / city objective and the influence of city logistics on it - To improve air quality, particularly in identified areas of concern (10 identified air quality management areas). City logistics has a direct influence on this through use of key transport corridors.

Logistics specification (e.g. sector specific, or vehicle specific, …) - Not currently specified but will likely focus on the major freight transporters within the city (e.g. couriers, port transport, large retailers etc.). Citylab will focus on deliveries to LMOs (LMOs).

Shipment specification (e.g. goods type, conditioned goods or pallets, boxes, etc.) - Not currently specified or limited

Users involved for execution of operations (including for example subcontractors) –

For use of the SSDC, users comprise:

- Receivers of goods, e.g. LMOs who set up delivery plans that require certain logistics service providers (LSPs) to deliver goods via the SSDC.
- Meachers Global Logistics, as operators of the SSDC.

Users involved for planning of operations that are often outside the city (e.g. logistics service providers, shippers)

With the planned introduction of clean air zones, all freight transport operators with business in Southampton may be affected.

For those using the SSDC:

- Shippers of goods to the LMOs who are advised to send to the SSDC.
- Couriers and other carriers of goods who are required to go through the SSDC.

Main customers, receivers and size of freight market (e.g. shippers or freight forwarders involved), as well as power in the supply chain.

The current focus is on the largest generators of incoming freight, particularly LMOs.

Living Lab Partners

The Southampton living lab partners are expected to include, as a minimum:

- Southampton City Council – owner.
- University of Southampton – external adviser and user.
- Solent University (e.g. procurement, halls) – user.
- University Hospital Southampton (NHS Foundation Trust) (e.g. procurement) – user.
- Meachers Global Logistics – operator of the SSDC.
- Solent Transport (a partnership comprising SCC, Portsmouth City Council, Hampshire County Council and Isle of Wight Council, formerly known as 'Transport for South Hampshire and Isle of Wight') – stakeholder.
- Solent Local Enterprise Partnership – stakeholder.
- Hampshire Chamber of Commerce – stakeholder.

Other external parties that may have an interest in the Southampton living lab include:

- Isle of Wight Chamber of Commerce
- Isle of Wight Council
- Isle of Wight NHS Trust
- Hampshire County Council

- New Forest District Council
- Business South, a business engagement organisation that aims to drive economic prosperity
- West Quay Shopping Centre
- Marlands Shopping Centre
- Southern Enterprise Alliance (http://www.sea.uk.net/)
- Large businesses that have taken part in the Delivery and Service Planning (DSP) initiative:
  - DP World (operate container facilities at the Port of Southampton)
  - ABP (Associated British Ports)
  - Southampton Football Club
  - Old Mutual Wealth
  - Mayflower Theatre
  - Steve Porter Transport Group

Living Lab Public Private Partnership (PPP)

No formal living lab PPP is envisaged by SCC. Instead, SCC propose to draft an updated 'Memorandum of Understanding' (MoU), after consultation with key stakeholders, that states the ambitions and specific goals of the Southampton living lab along with suggested measures to achieve them. Such measures may include:

- Increased use of the SSDC for freight consolidation and storage.
- Use of cleaner vehicles.
- Collaboration between freight transport operators to avoid everyone delivering everywhere.
- Out of hours deliveries / use of locker boxes.
- Rationalisation of goods and services purchasing practice.

The MoU will be widely publicised and direct contact will be made with key freight transport operators and freight generators in the city to encourage them to sign up. A previous MoU had been in place between October 2013 to October 2015, specifically aimed at use of the SSDC, and was signed by Hampshire County Council, New Forest District Council, SCC, the University of Southampton, Southampton Solent University and University Hospital Southampton.

Existing partnerships and member organisations that the Southampton living lab will engage with include:

- **Solent Transport**, which involves local authorities only and whose remit covers all aspects of transport in the region.
- **Solent Local Enterprise Partnership**, a locally-owned partnership between businesses and local authorities and supported by the further education, voluntary and community sectors.
- **Hampshire Chamber of Commerce**, a membership organisation, owned and managed by local businesses in the county (Hampshire) and with a Planning and Transport Committee for the Southampton area.

System analysis

Legal and ethical issues

a) **Air quality**

Local authorities are responsible for complying with the UK Government's local air quality regime which led to Southampton identifying exceedances of the annual mean nitrogen dioxide level at 10 locations across the city. Air Quality Management Areas (AQMAs) were declared as part of an Air Quality Management Plan produced in 2007. An Air Quality Action Plan, first produced in 2009 and regularly reviewed since then, has progressed work on 48 individual initiatives.

EU member states were required to meet set limits for all pollutants by 1 January 2010 under the EU Ambient Air Quality Directive; the UK was granted an extension to 1 January 2015. The levels set for all pollutants were achieved except for nitrogen dioxide. In the UK, 38 zones, including Southampton, currently exceed the annual mean value for nitrogen dioxide levels. Southampton is one of only 8 areas in the UK where prediction modelling shows that nitrogen dioxide levels will still be above EU air quality limit values beyond 2020. Consequently, the EU has started infraction proceedings against the UK government for non-compliance. In the spring of this year, DEFRA reminded all non-compliant local authorities of their local air quality management responsibilities and of discretionary powers under the Localism Act allowing the government to pass on all or part of any infraction fine to a local authority that has not taken reasonable steps to address any non-compliance. It is estimated that the total fine for the UK could be as high as £300 million per year. It is therefore extremely important for the SCC to look seriously at implementing any recommendations DEFRA make to enable Southampton to become compliant in terms of nitrogen dioxide levels.
DEFRA published their Plans to Improve Air Quality to be submitted to the EU early this year. The plan sets out actions being implemented at local, regional and national levels to meet the annual EU limit values for nitrogen dioxide in the shortest possible time. The plan specifically identifies a portion of the A33 Western Approach in Southampton which is of particular concern. Whilst acknowledging that local authorities are best placed to identify what measures will deliver the required reduction in nitrogen dioxide by 2020, DEFRA suggests that vehicle access restrictions (based on a national framework for new Clean Air Zones) should be considered. In anticipation of this, a bid was submitted to DEFRA to support the introduction of a Voluntary Clean Air Zone in Southampton, to highlight air quality issues and promote the uptake of voluntary actions to reduce emissions. To support this, a bid was also made to fund the setting up of a Southampton Clean Air Partnership to help drive the implementation of the Council's Low Emission Strategy and implementation of the Voluntary Clean Air Zone.

As part of this project it is proposed that the 10 AQMAs across the city be consolidated into one Clean Air Zone. The council has been successful in obtaining £80,000 to support these projects to fund signage, camera-based monitoring, a communication package, website design and consultancy support.

b) Impartiality

Both ethically and legally, SCC have to act impartially in everything they do, without showing any bias, for or against, any individual people or businesses. However, it is legal and ethical to consult individually or in joint meetings with the organisations in Southampton and neighbouring regions who generate the most freight transport within the city and region through their procurement or other activities (e.g. hospitals, universities, port operators) and with freight operators who may have to adapt to any newly adopted measures.

c) Data sharing

Any living lab partners who agree to share data or information:

- will be bound by data protection laws;
- may require other partners to sign confidentiality agreements before release

d) Monitoring legal and ethical issues

SCC, as owner of the living lab, will undertake all monitoring of legal and ethical issues.

Stakeholder/end user analysis

Stakeholder and end user goals, interests and drivers have been obtained from public websites and given in detail in **Feil! Fant ikke referansekilden.**. They can be summarised as:

- Business excellence / high standards.
- Efficiency and effectiveness.
- Sustainability / working in an environmentally-friendly way.
- Growth and development.

Table 15 – Stakeholder and end user goals, interests and drivers

Stakeholder /end user	Goals/interests/drivers
University of Southampton	The University of Southampton aims to be a distinctive, global, leader in **education**, **research** and **enterprise**, making important contributions to **society** and the **economy**. At the same time, the university is mindful of the tension between its **growth aspirations** and environmental impacts: "our vision is to embed the principles of **sustainability** into all aspects of our work, integrating sustainable development into our business planning and policy-making" (From: http://www.southampton.ac.uk/about/strategy.page) Other aims: • The **well-being** of staff and students is important, therefore we aim to provide the working, leisure and social spaces within which our staff and students can thrive • Continually aim to improve **operational efficiency** and **effectiveness**
Solent University	The Solent University charter (http://www.solent.ac.uk/about/mission-and-values/charter.aspx) identifies the following main aims: • High quality teaching and learning environment • Supportive atmosphere • Inclusivity • Transparency and Openness • Employability • Social justice Environmental policies (e.g. carbon management, sustainable food, ethical investment) are described at: (http://www.solent.ac.uk/about/governance/policies/environmental-policy.aspx)
Southampton hospitals	The University Hospital Southampton NHS Foundation trust state their core values as: • Putting patients first • Working together • Always improving, in terms of, for example, safety, quality, productivity (http://www.uhs.nhs.uk/AboutTheTrust/Our-values.aspx)
Meachers Global Logistics	Meachers Global Logistics provide transport, warehousing, freight forwarding and supply chain management services to customers with the strapline "Delivering Excellence – Worldwide". Their core values are: • Quality • Service • Expertise https://www.meachersglobal.com/
Solent Transport	Solent Transport is a local authority partnership. It aims to: • **Reduce** our need for transport, and the private car in particular • **Manage** existing transport provision with a view to improvement • **Invest** in new infrastructure to support planned growth The overall vision is to create a transport system for the sub-region that: • can cope with current and future transport requirements

	• will not have a detrimental effect on the area's environment • will improve residents' quality of life http://www3.hants.gov.uk/tfsh.htm
Solent Local Enterprise Partnership	The Solent Local Enterprise Partnership is a locally-owned partnership between businesses and local authorities and supported by the further education, voluntary and community sectors. It plays a central role in determining local economic priorities and undertaking activities to drive economic growth and the creation of local jobs. http://solentlep.org.uk/
Hampshire Chamber of Commerce	Hampshire Chamber of Commerce is a membership organisation, owned and managed by local businesses, which aims to protect and promote business interests by providing members with networking opportunities, business support and advice, products and services. It has a Planning and Transport Committee for the Southampton area. http://www.hampshirechamber.co.uk

System analysis

The key factors that can influence implementation cases within the Southampton living lab are:

- EU and UK legislation governing air quality and vehicle emissions, which threaten heavy fines if specific targets are not met. This will be a key driver for the Southampton living lab.
- The introduction of Clean Air Zones and the response of freight operators to these. For example, operators may choose to use cleaner vehicles or deliver at different times of day (e.g. off-peak).
- Advances in electric vehicle technologies may open up opportunities for transport operators to reduce their carbon footprint at an affordable cost.
- The proliferation of online buying and a 'next-day delivery' culture has led to increased use of vehicles, typically vans, for deliveries, both to the general public and businesses. The Delivery and Service Planning activities being undertaken in Southampton may go some towards ameliorating freight transport impact, as large organisations take greater responsibility for managing how their procurement practice influences this.

Risks analysis and mitigation measures

The Southampton living lab might face the following risks:

Risk 1: Lack of leadership

Future promotion and continuance of the living lab concept for freight transport, or transport in general may not be at the forefront of SCC policy, as priorities may lie elsewhere. It would require one or more dedicated 'champions' of the concept, which may be missing, especially in the current climate of cut-backs and staff losses due to increasing financial pressures.

Probability of occurrence: Medium to high.

Severity: Severe, in terms of the future of the Southampton living lab, but not in terms of tackling of freight transport issues in Southampton.

Means of detection: Lack of engagement from SCC about living lab issues.

Mitigation measure: Other CITYLAB partners can make enquiries.

Risk 2: Lack of stakeholder and/or user participation with Southampton living lab

There may be a lack of stakeholder engagement with the Southampton living lab (e.g. not signing up to the proposed Memorandum of Understanding) for various reasons, including:

- Initial uncertainty whether to participate
  - "Is it worth my time?"
  - "Will I have sufficient power or influence to make any difference to decisions made?"
- If it's perceived as being ineffective at achieving any tangible outcomes
- Lack of good organisation of meetings

Probability of occurrence: Uncertain

Severity: Unclear - Dependent on who the missing stakeholders are and how important their input to the living lab process is.

Means of detection/mitigation measure: SCC to observe and note which stakeholders are missing and encourage participation

Risk 3: Lack of user take-up of proposed urban freight solutions

Where the Southampton living lab proposes non-mandatory urban freight solutions (e.g. use of a consolidation centre), potential users will be under no obligation to take them up, with the possibility of the living lab having little practical impact.

Probability of occurrence: Dependent on perceived attractiveness of solutions

Severity: Dependent of extent of initiatives taken up or not and their impacts on the KPIs.

Means of detection: Could be difficult to detect inactivity

Risk 4: Overlooking important factors or opinions

If the living lab has a small number of active participants then there may be a danger of missing some important factors for consideration or points of view of different actors. These could be from outside organisations or from different people within the same organisation. While the Southampton living lab will, for practical reasons, probably be limited to local organisations and people, it should be borne in mind that the port of Southampton attracts freight traffic from all over the world. Whilst all origins and destinations cannot possibly be considered, the Isle of Wight is a major destination causing freight movement through Southampton and should be factored into living lab strategies.

Probability of occurrence: Low, it is hoped, due to extensive experience of personnel involved in the living lab.

Severity: Unclear

Means of detection: Difficult to detect as if missing opinion was known then it would likely have been addressed before.

Risk 5: Reluctance to share data

Where sharing of data between freight transport operators is being proposed, some operators may be unwilling to do so in order to maintain a competitive advantage over other operators.

Probability of occurrence: Medium

Severity: Unclear – dependent on application.

Means of detection / mitigation measure: SCC to talk to relevant organisations about their data sharing activities (or lack thereof).

Definition of the implementation cases

The CITYLAB ambition is to undertake implementation cases that support the living lab ambitions of improving air quality while not harming economic prosperity. In addition to these, SCC are currently considering how to implement Clean Air Zones, however, this is in its infancy, with no publishable information available yet.

The proposed implementation cases in Southampton focus on large municipal organisations (LMOs) and comprise an investigation of complementary methods for reducing numbers of inward deliveries of goods and services.

These methods may include:

1. Increased use of the SSDC for consolidation and/or storage
2. Rationalisation of goods and services purchasing practice
3. Delivery and service planning

Table 16: Stakeholder analysis

Types of stakeholders impacted (who)	Large municipal organisations who actively participate, both in terms of those working directly in purchasing departments and those who may be indirectly affected (e.g. students) Shippers / Suppliers Carriers Operator of the SSDC
Key characteristics of the solution that can be evaluated by stakeholders (e.g. attributes of the service provided)	Numbers of purchase orders made by municipal organisation Numbers of vehicles on campus associated with goods delivery and servicing Numbers of suppliers using consolidation centre Level of service (actual and/or perceived) experienced by those buying goods or services
Expected sample size of stakeholders to be interviewed (**before** having experienced with the solution)	Key purchasing personnel at large municipal organisations who actively participate = 1 or 2 people at 3 or 4 organisations Shippers / Suppliers = unknown as yet Carriers = up to 10 of the main couriers Operator of the SSDC = 1 person

Increased use of the SSDC for consolidation and/or storage

A relatively recent initiative in Southampton has been the establishment of the SSDC, operated by Meachers Global Logistics (MGL) at their own premises since December 2013. This provides a consolidation centre service along with general warehousing. The promotion of the SSDC is ongoing and from September 2015 it has had a sales executive working on it two days a week. A main aim of the SSDC is to improve air quality and reduce congestion and pollution through consolidating loads going into Southampton. The centre currently has 8 users storing over 2000 m^2 of items.

The following existing users or possible future users (under discussion) of the SSDC may provide implementation cases for CITYLAB:

- **University Hospital Southampton (UHS)** There have been discussions between UHS and CITYLAB partners to identify opportunities for CITYLAB to evaluate the logistics impacts of outsourcing some UHS goods receipt to the SSDC. In addition, UHS are currently using the SSDC for storage and delivery of medicine cabinets as part of a refit

programme (Omni Cell project). This could provide a demonstration of how service management of LMOs can be aided through the use of the SSDC in the supply chain to reduce vehicle movements and congestion at the hospital loading bays.

- **University of Southampton** and **Southampton Solent University** Discussions are ongoing with both universities about the possibility of using the SSDC for deliveries to halls of residences. Surveys at the University of Southampton have indicated the considerable impact of students' online purchasing on goods vehicle activity, with around 15 different carriers visiting each hall daily.
- **Isle of Wight consolidation centre project (serving St. Mary's hospital)**
  Following the recent completion of a Delivery and Service Plan for the hospital, CITYLAB partners are currently in discussion with the hospital trust for planned use of the SSDC

Expected impacts:	Reduction of delivery vehicle activity to LMOs Increased average vehicle loads Reduced vehicle km's driven by couriers and centralised logistics providers Associated reduction in vehicle emissions

Rationalisation of goods and services purchasing practice

Analysis of purchasing data at the University of Southampton has indicated the highly devolved nature of the buying of goods and services, with over a thousand different requisitioners. Planned further analysis aims to identify inefficient buying practices that generate unnecessary extra freight transport from which a range of appropriate consolidations actions can be taken to reduce the university's carbon footprint in this area. Options include consolidating buyers, suppliers, combining orders into fewer, larger orders and use of the SSDC. The analysis also contributes to a joint procurement dialogue, currently ongoing between the University of Southampton, University Hospital Southampton and SCC.

Delivery and service planning

Supported by the University of Southampton, SCC are currently providing public bodies and private businesses to develop a sustainable strategy for the freight vehicle activity they generate by means of Delivery and Service Planning (DSP). A DSP requires an independent audit of core goods and service activities using surveys, interviews and desk analysis of procurement and delivery records for a standard operating period. It then quantifies the daily freight and servicing activity (arrival times of vehicles by activity type, the duration of visits - loading/ unloading/ servicing - the recipient department and size and urgency of items). It also identifies the background to the procurement processes which lead to the generation of orders and freight activity.

Freight impacts can be reduced by:

- Engaging with facilities management to identify the urgency of deliveries and the scope for consolidating vehicle loads
- Working with procurement, suppliers and contracts management to ensure sustainable procurement processes e.g. reducing the frequency of stationary orders, or consolidating orders between different departments
- Co-ordinating and managing delivery and servicing activities to take place during specific times of the day

- Encouraging safe and lawful loading by providing legal loading areas or by scheduling deliveries for when it is safe to do so using booking systems

https://www.southampton.gov.uk/roads-parking/transport-policy/dsp.aspx

"Fit" evaluation

As the implementation cases may comprise a combination of complementary methods and are not completely known at this point in time, it is somewhat premature to undertake a fit evaluation now. However, a tentative fit evaluation summary is shown in **Feil! Fant ikke referansekilden.** considering the proposed methods as separate cases.

SCC perceive that use of the SSDC will improve air quality through replacement of many van trips by a single vehicle with a Euro 6 standard engine, but the overall picture will depend on how couriers adapt their vehicle rounds so this is uncertain. The environment local to the LMO should see an improvement in terms of reduced numbers of couriers on site. None of the proposed implementation cases are expected to have any negative impacts.

Rationalisation of purchasing is expected to have a positive effect on local air quality through reduced ordering and subsequent deliveries. All of the implementation cases are expected to contribute in some way to end user efficiency and sustainability goals.

Table 17 – Fit evaluation

Implementation case	Living lab ambition		Stakeholder / End user goals			
	Air quality	Economy	Excellence	Efficiency	Sustainability	Growth
Increased use of the SSDC for consolidation and/or storage	+	0	0	+	+	0
Rationalisation of goods and services purchasing practice	+	0	0	+	+	0
Delivery and service planning	+	0	0	+	+	0

Key: '+' means "expected positive impact"; '0' means "no expected impact"

Development of evaluation methodology

Increased use of the SSDC for consolidation and/or storage

The evaluation of use of the SSDC by LMOs should, or may, consider the following aspects:

- Environmental impact, which may be estimated from other indicators (e.g. fuel use and emissions derived from vehicle mileage)
- Floor space used and/or reserved for use at the SSDC
- Total volume of packages
- Vehicle types (and numbers) used
- Number of vehicle trips, number of stops, vehicle distances and driving time
- Time of day (e.g. contributing to peak traffic?)
- Vehicle load factors
- Work effort (person hours) (e.g. at LMO's goods reception points, at SSDC etc.), including any waiting time or idle time at the depot
- Financial costs (investment, operating revenues and costs)

- Convenience (e.g. do the operations fit in well with other work to be done?), both for LMO and SSDC operator
- Customer satisfaction (e.g. deliveries are made punctually and accurately (e.g. to correct address))
- Employee satisfaction
- Security of goods

Rationalisation of goods and services purchasing practice

The evaluation of 'smarter purchasing' at LMOs is expected to comprise a detailed before-and-after analysis of purchasing records. The 'before' analysis will be used to identify any inefficiencies in terms of numbers and frequencies of orders, numbers of different suppliers used etc., which will aid decision and policy-making for future procurement practice. Purchasing records may be used to derive estimated impact in terms of freight transport, although it is recognised that it may be difficult to do this accurately, as the relationship between purchase orders and resulting freight traffic is not well known. For this reason, it may also be desirable to undertake **freight vehicle surveys** at the goods reception areas of the LMOs to obtain direct measurements of:

- Number of vehicles (per vehicle type (van, lorry etc.))
- Number of packages delivered (per type (bag, box) and size)
- Arrival time
- Duration of visit
- Carrier
- Suppliers of goods (often visible on packaging, labels etc.)

Interviews with drivers may also be useful if wanting to know details of the vehicle round such as:

- Origin, destination and places visited
- Total number of packages delivered
- Any delivery requirements (e.g. time windows, signatures)

References

DEFRA (2015). Improving air quality in the UK - Tackling nitrogen dioxide in our towns and cities.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486636/aq-plan-2015-overview-document.pdf

SCC (2015) Local Transport Plan
http://www.southampton.gov.uk/roads-parking/transport-policy/default.aspx
- Implementation Plan (2015-2018) http://www.southampton.gov.uk/policies/Implementation-Plan-15-18_tcm63-377588.pdf
- Local Transport Plan 3 http://www.southampton.gov.uk/policies/LTP3_tcm63-365538.pdf

SCC (2015) Southampton DSP
http://www.southampton.gov.uk/roads-parking/transport-policy/dsp.aspx

Transport for South Hampshire (2009). A Freight Strategy for Urban South Hampshire.
http://www3.hants.gov.uk/tfsh-freight-strategy-2009.pdf
- Annex1: Freight Trends and Policy Backgrounds

http://www3.hants.gov.uk/annex-1_-trends-and-policy-background-note-2

Oslo CITYLAB

Living Lab environment in Oslo

Characteristics of freight transport system and policy framework

Main challenges from freight transport in Oslo is the emissions. Another challenge is location of a freight terminal that is serving both Oslo and is also a main terminal for the rest of Norway. Name of the freight terminal is Alnabru and the terminal is also serving as a dry-port for the Port of Oslo. Currently Oslo does not have an urban freight transport strategy, but the work is currently being done to make one. Therefore, there is currently no long-term ambition to be achieved by urban freight transport sector. The medium term goals (for 2 – 7 years) are expressed within a strategy for reducing emissions from urban freight by 50% within 2020-January 2015. There are two concrete targets:

- Establish an upgraded loading bay structure
- Establish a test project for an UCC.

At the moment Oslo still does not have an urban freight transport policy plan, but the new policy administration (autumn 2015) introduced a City Council Declaration. This declaration will be a leading document which poses the following measures that will affect CITYLAB:

- To introduce low emission zone (s) in Oslo
- To introduce a car-free inner city
- To set up a consolidation centre for city distribution
- To further electrify transport

The climate goals has been changed by the new political administration, or rather pushed forward in time:

- GHG emissions to be reduced by 50 % by 2020 (1990)
- GHG emissions to be reduced by 95 % by 2030 (1990)
- NOx emissions to be reduced by 60 % by 2022 (2010)

Urban freight transport strategy for Oslo foresees the following measures.

Table 18: Measures of Oslo transport policies relevant for urban logistics

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	Digitally representing current street use; e.g. for loading bays - ongoing
Measure 2	Establishing need for loading bays in coop with industry – completed 2015
Measure 3	Feasibility study for an UCC – completed 2013, planning for test ongoing
Measure 4	Overview of measures for reducing air pollution from urban freight
Measure 5	Using ITS to improve Urban Freight
Measure 6	Deliveries 24/7 in city centre
Measure 7	Using Electrical Freight Vehicles – test completed 2013, ongoing FREVUE
Measure 8	Establishing a City Logistics Plan. Consultations ongoing
Measure 9	Improved data collection – consultations ongoing
Measure 10	Re-establishing a cooperation platform within the city and stakeholders

The industry association (NHO) and the City of Oslo have worked out a feasibility study for an improved logistics for goods generated by the City of Oslo

Cooperation on urban freight transport

During autumn 2015 the municipality of Oslo decided that there is a mutual need for formalized cooperation between stakeholders on city logistics. To be successful a freight forum needs to engender collaboration among different actors like transporters, logistic sevice providers, police and different agencies representing public authorities. The collaboration agency – Forum for Urban Freight Transport – was established on 9th September 2015.

The Forum for Urban Freight Transport in Oslo shall focus on freight distribution inside Ring 3 in Oslo, the main roads connectes to the freight terminal at Alnabru and Port of Oslo and different freight receievers in the Groruddalen. CITYLAB have not any directly role in the Oslo Freight Forum.

The initiative to establish a Forum for Urban Freight Transport in Oslo was saluted by the managing director of Agency for Urban Environment.

Oslo is working to be a more modern city with sustainable transport and logistic solutions. In addition Oslo is growing and the number of residents is growing, traffic increases and the growth of freight traffic exceeds the growth in population. Oslo city centre is important for the entire Oslo area. It is important that the city facilitates a vibrant downtown with retail trade.

These challenges put extra pressure on the Agency for Urban Environment to suggest good solutions and the agency needs help from freight actors to implement good measures.

The municipality of Oslo is working on mobility issues, parking policy and access to passenger traffic in the central areas of the city. This is also linked with the security situation. Freight traffic is prioritized in this picture. A goal is to develop a plan for City logistics in close cooperation with the actors.

The Agency for Urban Environment should be a good partner to the ongoing work in the Forum for Urban Freight Transport.

The participants in the ***Forum for Urban Freight Transport*** in Oslo are fixed but additional actors could be invited to meetings with a theme on the agenda that especially affects them.

It is stressed that the discussions and decisions should be transparent.

It is important for the Forum for Urban Freight Transport to have access to information on actions of importance for the actors.

Members of Forum for Urban Freight Transport in Oslo:

- The Police
- AT (The Norwegian Labour Inspection Authority, Oslo)
- SVV (The Norwegian Public Road Authority, Oslo)
- BYM (Agency Of Urban Environment in the City of Oslo)
- PBE (Agency For Plan And Building Services in the City of Oslo)
- NHO-LT (Norwegian Logistics and Freight Association)
- NTF (Norwegian Transport Workers Union)
- NNN (The Norwegian Food and Allied Workers Union)
- TS-forum (Transport and Logistics Association Norway)
- NLF (Norwegian Haulers Association)
- OHF (Oslo Retail Association)

- LUKS (The Norwegian Supply Chain Development and Competence Center)

Stakeholders within the transport industry have established local (city level) cooperating groups for improved city distribution.

To establish a City Logistics Plan for Oslo, and other larger Norwegian cities. Initiative by stakeholders within the transport industry.

There is an initiative to conduct a framework for City Logistic Plans in Norway. The research is financed by Research Council of Norway and the project is "Sustainable Urban Logistics Plans in Norway – NORSULP". The primary objective of NORSULP is to *develop user-validated guidelines serving as baseline for sustainable urban logistics plans in Norwegian cities and urban areas.* Nine Norwegian cities, including Oslo, are part of this initiative.

Secondary objectives are to:

- Review European state-of-practice of SULPs and its relevance for capacity building in Norwegian cities
- Identify key needs of various actors in SULP planning
- Develop a harmonised approach for SULP development in Norwegian cities
- Validate the SULP approach in eight Norwegian cities
- Establish generic guidelines as baseline for development and implementation of SULPs to improve logistics performance and sustainability in Norwegian cities.

NORSULP will contribute to:

- A more holistic, sustainable and efficient transport system where city logistics measures are viewed in conjunction with public and private transport solutions and plans
- New logistic research based on local and regional needs
- Streamlining logistics planning in Norwegian cities facilitating *change* in urban logistics in a more sustainable direction.
- Capacity building in urban logistics in Norwegian municipalities and counties
- Improved mobility and performance for all users of urban transport infrastructure and urban mobility systems
- Facilitation of a viable and competitive business community in urban centres
- Increased reliability of deliveries and long-term goods strategies in urban areas
- Sustainable and attractive urban development
- Reduced local emissions in urban areas and reduced greenhouse gas (GHG) emissions
- A systematic approach to urban logistics within and across Norwegian cities

Existing data and monitoring on urban freight

Variety of data is collected on a city level. For the traffic data, the table below provides an overview of what is available:

Table 19: Monitoring of data: traffic

Indicator	Details
Traffic counts (and how)	Normal city traffic counts. Several agencies involved
Split of freight vehicles (in city or nationally) by engine type (e.g. EURO norm)	Calculated from material underlying the national lorry survey. The underlying material is not publicly available. Annual data.
Vehicle km per year in the city (total by freight vehicles and non-freight, and split by vehicle type, e.g. artic HGV, rigid HGV, van, car, bus etc.).	Number of vehicle kilometres by county of vehicle owner. Self- generated table from Statistics Norway (www.ssb.no). Annual figures.
Tonnes of freight lifted in the city (year)	Self-generated table from Statistics Norway. Annual figures.
Empty running data for freight vehicles	Calculated from material underlying the national lorry survey. The underlying material is not publicly available. Annual data.
Vehicle load factors for freight vehicles	Calculated from material underlying the national lorry survey. The underlying material is not publicly available. Annual data.
Average) journey distances for freight vehicles	Calculated from material underlying the national lorry survey. The underlying material is not publicly available. Annual data.
Freight modal split (road, rail, water in vehicle km, tonne-km or tonnes lifted)	Different statistics from Statistics Norway (www.ssb.no). Annual statistics.
Data on enforcement (e.g. illegal parking, violation of low traffic zone, low emission zones, etc.)	Annual data

Statistics published by Statistics Norway (www.ssb.no) provides annual data on CO_2 emissions in Oslo. (Estimates) on local emissions (PM10, NOx, …) are available from Air quality action plan report (2014) (http://bit.ly/1hJtLCA). Further the data on PM, NOx, O_3, SO_2 and CO are collected on an hourly basis. Real-time data can be seen at the website www.luftkvalitet.info (Measurements from Oslo: http://bit.ly/1KHnr5w). All data are published in monthly and annual reports (www.luftkvalitet.info). As regards noise emissions, noise maps are produced for road traffic, rail traffic and Oslo harbour in accordance with the EU Environmental Noise Directive 2002/49/EC. Traffic safety data are also available.

Statistics Norway provides an annual data for the following spatial data:

- (Estimates) commercial activities in city (e.g. floor-space / FTE).
- Total non-residential floor-space in the city.
- (Estimates) logistics activities (in m^2).
- Estimates land use (residential area, commercial area, industrial area, etc.).

Focus of the Oslo CITYLAB Living Lab

Steen & Strøm are planning a new shopping centre at Økern in Oslo. The goal of Steen & Strøm is to establish common functions for inbound and outbound freight flows the new Økern shopping centre. Previous demonstrations and analyses have suggested that such functions should be operationally and financially viable. In many shopping centres drivers have to bring all items from common unloading areas to the individual shops. This increases delivery times and congestion in the freight receipt areas. By introducing new logistics functions Steen & Strøm aim to reduce stoppage times for trucks and increase efficiency of in-house logistics.

The implementation will facilitate identification of consolidation opportunities for logistics service providers as well as off-hour deliveries as the transport leg and in-house transport leg in the shopping centre may be decoupled.

Steen & Strøm are still in the engineering phase. This is good for the planning of freight receipt areas, as there will be time to include input from CITYLAB workshops and dialogue with different stakeholders.

For evaluation of the concept, we will collect data from other centres to assess the differences between centres without common logistic functions and one centre in Sweden where a similar concept has been implemented.

Planning of the Oslo Living Lab implementation case

Set Up

Ambition

Goal for the Living Lab “Common logistics functions for shopping centres – Oslo” is for Steen & Strom (owner of shopping centre) to establish common functions for inbound and outbound freight flows at the Økern shopping centre.

Scope

These measures are a great and inspiring challenge for The Municipality of Oslo. We have made a strategy for 50% reduction for environmental emissions by 2020, so we are prepared for the new goals. It is this strategy that gives the local plans for city logistics. We need a City Logistics plan worked out by the city in close cooperation with the commercial and other stakeholders, including other public administrations. We have established a Forum for City distribution Oslo for the purpose of work towards a city logistics plan. This has commenced, and we see the activities in the Citylab project as valuable contribution. In the previous logistics project, Green City Distribution Oslo, we arrived at several recommendations that are now being implemented (low hanging fruits):

- A revision of loading bays, zones in an extended inner city (Ringroad 2).
- An increase in evening and night deliveries to shops.
- An increase in the number of EV delivery vans ; electrification of transport including setting up fast charging of freight EV.
- To plan and install dynamic signage for flexible street use.
- To further digitalization of kerbside parking for freight/street bound loading bays (and other parking). This is done by our geodata department, but is of importance for the planning of city logistics.
- To follow up the further planning for Steen & Strom shopping mall development and to ascertain what are the municipal traffic authority tasks in this regard.

Members of ***The Forum for Urban Freight Transport*** in Oslo will support the implementation.

We should be able to report to the CityLab consortium on the progress of these tasks. The main area for reporting (and sharing of knowledge) will be the working out of the logistics plan.

- *Area (which city area, the city centre, …).* The area: Hovinbyen a neighbourhood in Oslo.
- *Main policy / city objective and the influence of city logistics on it.* The shopping centre is part of an upgrading and the development of a neighbourhood, Hovinbyen" in Oslo.
- *Logistics specification (e.g. sector specific, or vehicle specific, …)* Sector specific: Retail trade and logistics.
- *Shipment specification (e.g. goods type, conditioned goods or pallets, boxes, etc.)* General cargo pallets packages and boxes.
- *Users involved for execution of operations (including for example subcontractors)*. In-house logistic service provider, transporter, and supply chain LSP.
- *Users involved for planning of operations that are often outside the city (e.g. logistics service providers, shippers)* LSP's and owner of shopping centre (Steen & Strøm).
- *Main customers, receivers and size of freight market (e.g. shippers or freight forwarders involved), as well as power in the supply chain.* N.a. yet.
- *Other involved stakeholders.*

Living Lab partners

The main partner will be Steen & Strom, the owner of the shopping centre at Økern, Oslo. Other partners will be shops and chain stores located in the shopping centre, Municipality of Oslo, Logistic service providers (LSPs), In-house logistic service providers, transporters and other service providers.

Other Living Lab Partners will be Members of Forum for Urban Freight Transport in Oslo:

- The Police
- AT (The Norwegian Labour Inspection Authority, Oslo)
- SVV (The Norwegian Public Road Authority, Oslo)
- BYM (Agency Of Urban Environment in the City of Oslo)
- PBE (Agency For Plan And Building Services in the City of Oslo)
- NHO-LT (Norwegian Logistics and Freight Association)
- NTF (Norwegian Transport Workers Union)
- NNN (The Norwegian Food and Allied Workers Union)
- TS-forum (Transport and Logistics Association Norway)
- NLF (Norwegian Haulers Association)
- OHF (Oslo Retail Association)
- LUKS (The Norwegian Supply Chain Development and Competence Center)

CITYLAB Participants

Industry partners:	Steen & Strøm AS
City partner:	Oslo
Research partner:	TOI
Motivation:	In many shopping centres drivers have to bring all items from common unloading areas to the individual shops This increases delivery times and congestion in the freight receipt areas. By introducing new logistics functions Steen & Strøm aim to reduce stoppage times for trucks and increase efficiency of in-house logistics.

System analysis

Legal and ethical issues

Which legal frameworks are relevant for this Living Lab system? Road Traffic Act, Planning and Building Act, Regulation plans on Municipal, local and zoning level

- *Are there expected legal issues in executing the Living Lab?* No
- *Are there expected ethical issues in executing the Living Lab? No*

Stakeholder/end user analysis

Medium-term goals or issues are of interests for all Living Lab partners mentioned earlier

Key goals will be more efficient in-house logistics, reverse logistics and waste management in the shopping centre. For transporters and LSPs, more efficient goods distribution and decreased time spent when delivering goods at the shopping centre.

Table 20: Stakeholder analysis

Other actors that are currently involved in your urban freight transport issues and solutions:	SINTEF, Posten, Bring, OHF, NLF, Volvo, Post Nord, SLUS, National road administration, Renault, NHO Logistikk og transport, LUKS, The research council of Norway, NTNU
Types of stakeholders impacted (who)	• Estate owner (who is also the initiator) • Receivers - shops, restaurants and other freight receivers located in the shopping centre • Transporters and Logistics Service Providers delivering freight to the centre and taking returns and waste out • Shippers of goods • Residents living close to the shopping centre • Local authorities • Possible operator of the internal logistics centre

System analysis

- *Trends and developments in policy (EU, national, regional);* From autumn 2015 a new City Council with new policy on transport and environment.
- *Trends and developments in client markets (i.e. retail, construction, waste, etc.);* Take-over bids in the market for shopping centres. New owners with new objectives and ideas.
- *Trends and developments in other relevant industries (i.e. infrastructure provider, vehicle manufacturers, etc.);* No
- *Running initiatives of interest groups, government bodies, etc.;* New regulations on Low emission Zones use of diesel cars etc.?
- *Technological innovations (i.e. trends in data sharing or on ICT equipment) No*

The new policy administration (autumn 2015) introduce a City Council Declaration. This declaration will be a leading document which could influence the implementation of the Living Lab in CITYLAB:

Risks analysis and mitigation measures

Implementation of the Living Lab (shopping centre) is in the planning phase, but there is a permission to build the shopping centre. There is still some planning left before they can start building the centre. Because Steen & Strom have the permission to build the shopping centre the risk for not fulfilling the Living Lab is low.

For implementing the Low Emission Zones in Oslo the municipality need a permission from the Government.

Design

Definition of the implementation cases

Shopping centres often represent challenges for logistics service providers, as individual retailers may be located far from the freight receipt area, and the norm is that truck drivers have to bring all items to the shop. In Norway, shopping centres represent around 30% of retail trade. Steen & Strøm AS is a Nordic branch of the Klépierre group. Steen & Strøm are planning a new shopping centre at Økern in Oslo. The goal of Steen & Strøm is to establish common functions for inbound and outbound freight flows the new Økern shopping centre. Previous demonstrations and analyses have suggested that such functions should be operationally and financially viable. The implementation will facilitate identification of consolidation opportunities for logistics service providers as well as off-hour deliveries as the transport leg and in-house transport leg in the shopping centre may be decoupled. The main characteristics of the Steen & Strøm implementation are given below.

The common logistics facilities will be a permanent solution. The commercial area covered by the solution will be ca 50.000 m^2.

Steen & Strøm AS is a Nordic branch of the Klépierre group. Steen & Strøm are planning a new shopping centre at Økern in Oslo. The goal of Steen & Strøm is to establish common functions for inbound and outbound freight flows the new Økern shopping centre.

In many shopping centres, truck drivers have to bring all items from common unloading areas to individual shops. This increases delivery times and congestion in the freight receipt areas. In-house manoeuvring of pallets by truck drivers also causes damage on buildings and creates safety issues because shoppers in some cases move in the same areas as the pallets are transported.

By introducing new logistics functions Steen & Strøm aim to reduce stoppage times for trucks and make the in-house logistics more efficient and safe, also introducing the possibility for better coordination and information within supply chains and possibilities for rationalisation of inbound and outbound flows.

Previous demonstrations and analyses have suggested that such functions should be operationally and financially viable. The implementation will facilitate identification of consolidation opportunities for logistics service providers as well as off-hour deliveries as the transport leg and in-house transport leg in the shopping centre may be decoupled.

"Fit" evaluation

- *Satisfy ambition of the Living Lab;* The proposed technology and way of organizing the Living lab is new and adapted to the needs of the new shopping centre.
- *Responds or address one of the goals and objectives of the Living Lab;* Yes
- *Is compliant with the needs of the users, customers and stakeholders;* Yes

Design of pre-selected cases

- Requirements for the Living Lab in- house logistic solution are needed for adapted infrastructure. This infrastructure includes one or several buffer storages close to the unloading ramps and in-house transport lanes. The in-house services will only be executed during opening hours of the shopping centre. There must be an own company to take care or the in-house logistics.
- To execute the services there are no need for specific education, maybe some experience connected to logistic services, no automation. No specific safety challenges.

Development of evaluation methodology

Monitoring must be done both before and after implementation of the Living Lab.

Expected impacts:	Experiences from the STRAIGHTSOL demonstration at Stovner centre suggests time savings of up to 15 minutes per pallet delivered.

Table 21: Expected impacts from implementation case

Key characteristics of the solution that can be evaluated by stakeholders (e.g. attributes of the service provided)	The indicators from the dashboards are taken into account. • Which stakeholder • Frequency of deliveries • Load carrying unit or package • Shipment size • Delivery times • Predictability and variability of delivery times • Supply chain visibility / information sharing • Costs (different cost categories and different actors involved) • Flexibility for receivers • Emissions • Noise • Vehicle types used • Number of vehicles (per type) • Vehicle kilometres per type • Load factor per type of vehicle • Waiting time per vehicle • Ideal time at depot Economic indicators • Operating revenues (for each industrial partner) • Operating costs (for each industrial partner) • Investment costs for each industrial partner) • Enforcement costs (for local authorities) • Customer satisfaction

	○ Punctuality of deliveries and pick ups ○ Deliveries and pick up in right quantity ○ Deliveries and pick-ups in right form ○ Supply chain visibility Societal indicators • Employee satisfaction • Traffic safety • Security
Expected sample size of stakeholders to be interviewed (**before** having experienced with the solution)	• Estate owner (who is also the initiator): **1** • Receivers - shops, restaurants and other freight receivers located in the shopping centre: **10-20** • Transporters and Logistics Service Providers delivering freight to the centre and taking returns and waste out: **5-10** • Shippers of goods **5-10** • Residents living close to the shopping centre: **Not yet clear** • Local authorities: **1** • Possible operator of the internal logistics centre: **1-2**
Expected sample size of stakeholders to be interviewed (**after** having experienced with the solution – will this be the same (or part) of those interviewed ex-ante?)	• Estate owner (who is also the initiator): **1** • Receivers – shops, restaurants and other freight receivers located in the shopping centre: **10-20** • Transporters and Logistics Service Providers delivering freight to the centre and taking returns and waste out: **5-10** • Shippers of goods: **5-10** • Residents living close to the shopping centre: **Not yet clear** • Local authorities: **1** • Possible operator of the internal logistics centre: **1-2**

Oslo implementation case roadmap

Table 22: Oslo roadmap

Preconditions for success, external dependencies and assumptions	*What are the relevant legal frameworks for the Living Lab system?* Road Traffic Act, Planning and Building Act, Regulation plans on Municipal, local and zoning level • *Are there legal issues during the execution of the Living Lab?* The above mentioned legal frameworks must be taken into account during the execution of the Living Lab. • *Which dependencies exist between the Living Lab system and its environment?* The above mentioned frameworks, people living in the surroundings and the industry. An own forum (Hovinbyen) including people living in the area is established to discuss and to have a dialog on how to develop the whole are where the shopping centre is established. The Living Lab is part of a project that will develop the neighbourhood of the city where the Living Lab is located. • *What are the critical quality factors?* Interest and acceptance for the new in-house organizing of logistics from shops, shop chains and LSP's. That the "right shops" will establish themselves in the new shopping centre. • *Which assumptions are made?* Dialogue with involved partners • *Are there ethical issues in executing the Living Lab?No*
Risks	• *What are the risks in Living Lab execution?* Not acceptance among transporters, shops, shop chains and LSP's • *What are the risks of stakeholder change?* Very little • *What are the technology related risks?* Limited • *What are safety and security risks?* Limited • *For each of the risks what are probabilities and effects and how can the risk be mitigated?* Work out a good business plan, a good presentation of the concept and a plan to solve disagreement on how to share costs and benefit.

Deliverables and milestones	• *What are the official Deliverables?* Better service, reduced costs and increased profit. • *What are the official milestones?* Negotiations between shops, transporters and LSP's. Opening of the new shopping centre. • *What additional Deliverables are needed for project control and reporting?* None • *What additional milestones are needed for project control? None*
Approach	• *How are the activities executed?* By Steen & Strom, Municipality of Oslo and TOI. • *Which methods are used, such as interviews, questionnaires, workshops, etc.?* All of them • *How do partners and activity teams interact?* Through interviews and Work Shops
Timeline and planning	• *What is the expected duration of all Living Lab phases and activity blocks?* 2020-2022 • *What dependencies influence the planning?* Acceptance of all plans from Municipality of Oslo • *Does the resulting timeline fit with the project timeline?* NO
Resources and their organisation	• *What are the partners' responsibilities in the execution?* Delivering data to the Living Lab • *Who are the critical people needed in the team?* Municipality of Oslo, Steen & Strom, LSP's and shops. • *What is critical technology needed?* No • *What other resources are needed?* No, not any specific • *Under which conditions can these resources be made available for the Living Lab?* From now until the end of the project
Budget and expected costs	• *What is the overall Living Lab budget and is it distributed correctly among partners so that it reflects their respective work?* The budget is distributed among the main partners: TOI, Municipality of Oslo and Steen & Strom • *How is the budget spending over time related to milestones and Deliverables?* Ok.
Monitoring, control, reporting and communication	• *How does the team work together?* Interviews, meetings and Workshops. • *Are sub-teams needed?* Yes • *Are there cultural/language barriers in the team?* No • *What are the procedures or protocols to communicate with partners?* Arrange meetings, Workshops and seminars • *What are the procedures or protocols to communicate with stakeholders?* Arrange meetings, Workshops and seminars together with the partners • *Which meetings are needed and used and when? (Telco's, face to face meetings)* Face to face meetings • *How do we report on meetings?* Written notes and minutes • *How do we resolve issues?* Discuss with partners • *How and to whom do we report issues?* Steen & Strom, Municipality of Oslo and project Coordinator

There have been delays in the engineering and the process of obtaining building permit from the city of Oslo, so the planned opening date of the centre has been altered. The centre is now expected to open by 2020. However, the role of CITYLAB in bringing co-creation into the design of the freight receipt remains the same.

Table 23: Oslo implementation plan

When?	What?
Dec 2015- Apr 2016	Planning of freight receipt areas and processes in the centre, involvement of relevant stakeholders
Jan 2016 – Mar 2016	Collection of data from similar shopping centres representing the "before situation"
Jan 2016 – Mar 2016	Collection of data from one similar shopping centre representing the "after situation"
Fixing plans for building permit	Q2/Q3 2016

Paris CITYLAB

Living Lab environment in Paris

Characteristics of freight transport system and policy framework

According to a recent urban freight survey (LAET, 2016), the Paris region experiences more than 800,000 deliveries and pick-ups every day, of which about a third originate from the city of Paris itself. As a major consumer market (12 million) and at the cross-roads of all major transport networks, the Paris region is the largest logistics hub for the rest of the country, and is the chosen location of a quarter of total warehousing areas of France.

The main challenges to Paris urban policy coming from urban freight are the following:

- Logistics sprawl. In 2011, two maps from IFSTTAR (Andriankaja, 2014) were published and generated reaction from policy makers. These maps (see Figure 15 below) identified the "flight" from the city dense areas to the far suburbs of freight terminals and logistics facilities, generating additional freight vehicle-kms on the urban and metropolitan roads, with an addition of 16,000 tons of CO_2 annual emissions when comparing the situation in the 1970s and the situation in 2010.
- Air pollution. Major episodes of severe NOx and PM emission episodes in Spring 2014 and Spring 2015 caught the general public and medias' attention in Paris, fuelling the political debate. Measures against access to oldest and most polluting vehicles have been implemented since then, and a Low Emission Zone with phased stricter environmental standards has been implemented starting in September 2015.

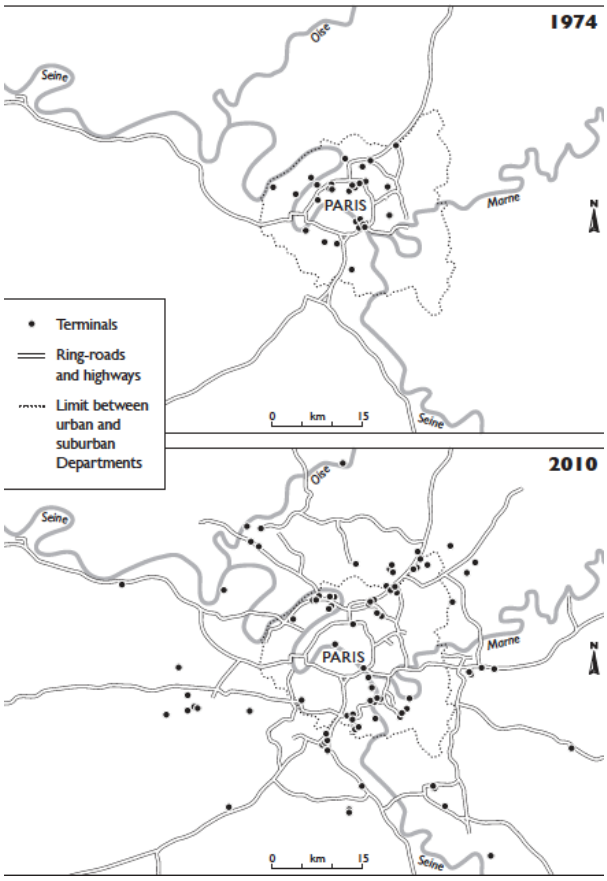


Figure 13: Location of parcel and express transport terminals in Paris, 1974-2010

Source: Andriankaja, 2014

Before the implementation of the first Paris LEZ (also one of the first in France) in 2015, in 2013, more than 80 organisations, institutions and associations in the area of urban freight transport had signed the Paris Charter for Sustainable Urban Logistics, committing themselves to progress in the field of urban logistics. This document represents the urban freight transport action plan for the city of Paris.

Other initiatives supporting the Paris urban freight transport policy are the following:

- "Sustainable Urban Logistics": the City of Paris launched a Request for Proposals for innovative city logistics projects in Spring 2015. 22 projects were selected and are now in the implementation phase, under a detailed evaluation process from the City of Paris and its Innovation agency, Paris&Co (http://expe.parisregionlab.com/projet/181).
- Air quality plan (2015): several measures impact UFT (traffic restrictions, financial assistance for households or companies buying electric vehicles…)
- Urban Zoning Plan for Paris (Plan Local d'Urbanisme, or PLU) with a strategy for urban logistics spaces. The current Zoning Plan (2006) will be updated in 2016, with a reinforced strategy for urban logistics spaces.
- Paris Climate Plan (2012)
- Regulations on transport and delivery of goods (January 2007)
- Charter of Good Practice for the transport and delivery of goods in Paris (signed in 2006), which was then reformulated and transformed into the Charter for Sustainable Logistics signed in 2013.

The Region of Paris has an important freight policy activity too, that can be identified throughout the three main master plans of the region:

- General Master Plan (Schema Directeur, or SDRIF) of 2013
- Air, Energy and Climate Master Plan (SRCAE) of 2012
- Sustainable Regional Mobility Plan (PDUIF) of 2014

In the CITYLAB project, we define a Living Lab as a dynamic test environment where complex innovations can be implemented. The freight quality partnership, consisting of the working groups established after the Charter for Sustainable Logistics was signed, falls within a scope of this Living Lab definition. The Charter includes a clear ambition and scope, and it identifies sixteen projects presenting the concrete initiatives for the logistics sector for a five year duration (2013 – 2017), with some strategies aiming at a longer term (2020 – 2030).

Table 24: Urban freight measures and activities in Paris

	Short description, date published	Web-link (if available)
UFT ambition (long-term, >7 years)	Reduce the overall emissions of the territory and activities from 75% in 2050 compared with 2004	http://www.paris.fr/municipalite/action-municipale/paris-pour-le-climat-2148
UFT goal (medium term, 2-7 years)	Overall goal (wish from city council, Fall 2014): 100% of deliveries to be non-diesel by 2020	
	Actual traffic restrictions: - Between 2017 and 2020, vehicles (including commercial vehicles) with classes 2, 3 and 4 stars, will be gradually banned. Only Euro 5 and 6 trucks and vans will be allowed by 2020 - Plans (not yet formalized) for the implementation of stricter limited traffic zones (almost pedestrian areas) in the central boroughs	http://www.paris.fr/actualites/lutte-contre-la-pollution-de-l-air-priorite-absolue-de-la-ville-de-paris-2111#favoriser-la-circulation-des-vehicules-propres-et-limiter-les-plus-polluants_2- Section « Favoriser la circulation des véhicules propres et limiter les plus polluants »
UFT targets (short term, < 2 years)	Overall goal (wish from city council, Fall 2014): 50% of delivery vehicles to be non-diesel by 2017	
	Actual traffic restrictions: - 1 September 2015: driving ban for HGVs buses (coaches and buses) of Class one (older than Oct 2001) - 1July 2016: driving ban for all Class 1 vehicles (incl. light commercial vehicles and private cars) - (2017-2020: stricter rules will be applying, covering all vehicles except Euro 5 and 6)	http://www.paris.fr/actualites/lutte-contre-la-pollution-de-l-air-priorite-absolue-de-la-ville-de-paris-2111#favoriser-la-circulation-des-vehicules-propres-et-limiter-les-plus-polluants_2 - Section « Favoriser la circulation des véhicules propres et limiter les plus polluants »

Urban freight transport issues are addressed in Paris through a set of measures and activities, summarized in Table 25 below.

Table 25: Urban freight measures and activities in Paris

	Short description
Measure 1	Sustainable City Logistics Charter of the 18th of September of 2013, including 16 projects: 1. Outline policy for urban logistics in Paris 2. Chapelle International Logistical Hotel 3. Developing Canal transport Port de l'Allier on the St Denis Canals 4. Trialling of Tramfret with an operator 5. Programme to develop logistics zones in leased car parks on land owned by social landlords

	6. Modernisation of delivery zones Inventing and trialling an information service dealing with the availability and reservation of delivery zones 7. Deploying a network of recharging terminals for electric vehicles in Paris 8. Developing fleets of electric vehicles (own account or subcontracted) 9. Agreement between the City of Paris and car transport firms about car carrier trailer traffic. Implementing the principles of the charter: consultation, environment, urban integration, economic dynamism. Signing of the agreement before the end of 2013. 10. Certification for low-noise night deliveries with Certibruit: certification of the entire transport chain - vehicles, sites, staff training + creation of a toll-free number. 11. Introduction of a system of parking space reservation for removals 12. ALUD: Trialling of a local pedestrian delivery service 13. Encouraging good practices for deliveries to small shopkeepers and own-account transport 14. Developing water-based urban logistics with a self-unloading boat. Port du Gros Caillou 15. E-commerce and home deliveries 16. 50% of last-mile deliveries performed by non-diesel vehicles by 2017
Measure 2	**Sustainable City Logistics Charter** of 18 September 2013, Project n°2: Develop models for logistics zones that are appropriate for the urban environment, combining logistics with other activities (offices, facilities, public utilities) – in Chapelle International. This new model needs to be created. The project for a logistics hotel at Chapelle International is one example, and provides a way of collecting realistic data. This concept will contribute to: - The economic viability of logistics centres with railway sidings, - The integration of this type of logistics facility within the urban environment (architectural quality, noise treatment, the movement of vehicles and pedestrians to access and, when necessary, cross the facility) - The diversity of the functions offered by the building (logistics activities, tertiary sector activities, shops, other activities, public gardens, public sports facilities), - Sharing land costs, - Networking with other facilities belonging to the urban logistics sector - Better management of regulatory constraints with regard to construction, urban planning and the environment. - This study will improve the acceptability of logistics hotels thus helping them to develop. It will also constitute a “toolbox” to assist the creation of other logistics hotels.
Measure 3	**Electro-mobility Plan** The City of Paris aims to improve air quality by introducing significant implementations (measures or projects), and it promotes electro mobility. A deployment plan for additional 700 public charging-points was announced in November 2012bythe Mayor of Paris. To enable both Parisians to access a charging station close to home, professions, delivery drivers, stores, etc. to recharge electric vehicles for their activities, this ambitious program consists in three complementary components. Deployments are at different stages of completion. - Expansion of existing Autolib’ stations (self-service electric cars system) to install 250 additional public charging-points. 300 public charging-points were already in operation in Autolib’ stations. - This first measure was decided through a deliberation from City Council adopted in Paris on 14 and 15 October 2014 (new agreement with Autolib' Metropole). - The implementation of a dozen of fast charging stations in gas stations located on public property of the City, mostly along the main city ring road, in close relationship with fuel distributors. The Goal is to create multi-energy stations. - The installation of a public network of charging stations preferentially positioned near delivery zones, allowing optimum use of these facilities with preferential access to residents overnight for an extended recharge, and more short duration recharge during the day, for professionals. Moreover, charging points are already installed in public car parks in Paris.

Measure 4	**Air quality plan (2015): traffic restrictions** - (see above) - Plans for increased limited traffic zones (almost pedestrian areas) in central neighbourhoods On Paris.fr : http://www.paris.fr/actualites/lutte-contre-la-pollution-de-l-air-priorite-absolue-de-la-ville-de-paris-2111#favoriser-la-circulation-des-vehicules-propres-et-limiter-les-plus-polluants_2 - Section « Favoriser la circulation des véhicules propres et limiter les plus polluants »
Measure 5	**Air quality plan (2015): financial assistance** Creating financial assistance to help professionals to replace their old thermal utility vehicle by a commercial vehicle "clean" (electric or CNG). On Paris.fr: http://www.paris.fr/actualites/lutte-contre-la-pollution-de-l-air-les-mesures-d-accompagnement-sont-lancees-2601- Section « Accompagnement pour les professionnels » City Council decision:http://a06.apps.paris.fr/a06/jsp/site/plugins/solr/modules/ods/DoDownload.jsp?id_document=122855&items_per_page=20&sort_name=&sort_order=&terms=2015%20DVD%20117&query=2015%20DVD%20117
Measure 6	The **Urban master plan** and zoning ordinance (PLU-plan local d'urbanisme) of 2006 has created the UGSU areas (=major urban services areas), which are areas for equipment and services necessary for the operation of the city. These zones are based on the following principles: - Land earmarked for transport (rail transport passengers and goods ...) - Rights of Way of ports on the banks of the Seine and canals; - Large allowances already allocated for such services: hospital areas, not affected mainly for long stays, fairgrounds, waste sorting centres, water tanks, deposits or tenders of large equipment, etc. The PLU of 2006 also imposed in its Article 12 the requirement to include off-loading areas within the following new buildings: - office building of over 2500 m^2 - retail or other commercial activity building of over 500 m^2 - warehouses - hotels of more than 150 rooms
Measure 7	**Sustainable City Logistics Charter** of 18 September 2013, Project n°5: Favouring micro urban logistics spaces through bid for tenders - Identification of potential Urban Logistics Zones on land owned by the City of Paris: (leased car parks or other areas) and social landlords (car parks, ground floors). - Identification of needs and market prices. - Drafting of a deployment programme for these logistical zones, based on the rate at which leases or tenancy agreements are renewed and which correspond to needs. - Bids for tenders: spaces rented out to best (most sustainable) logistics providers. About 8 of them in the City of Paris operating today.

Cooperation on urban freight transport

The main freight forum within Paris is the freight quality partnership created in the wake of the Paris Charter for Sustainable Urban Logistics. In 2013, more than 80 organisations, institutions and associations in the area of urban freight transport signed this Paris Charter for Sustainable Urban Logistics, committing themselves to progress in the field of urban logistics. In this framework today, various representative organisations (shippers, carriers, 3PLs, store-owners, etc.) regularly get together in several implementation working groups to work with the various departments of the Paris municipality

Another area of cooperation on urban freight are:

- within the framework of the MetroFreight Centre of Excellence (www.metrans.org/metrofreight)
- with various groups such as AFILOG (logistics providers' organization) or Club Demeter, working closely with city authorities on urban freight.

Existing data and monitoring on urban freight

On a city level a variety of indicators is collected on traffic, which helps to monitor the development of urban freight transport system and its impacts. Additionally, the 2010-2014Paris Urban Freight Survey has collected and computed many indicators. A set of indicators currently available on freight traffic in Paris is presented below.

Table 26: Data sources for urban freight

Indicator	Details
Traffic counts	Data every three minutes from the control system of light traffic (called SURF 3) which is connected with permanent traffic counters located in major routes in Paris. Those data can be presented and aggregated on different format (every month, every year…). Collected annually: Paris transport and travel report
Split of freight vehicles	"License plates" survey: this survey references the vehicles circulating in Paris, specifying the type of vehicle, its Euro class, and the vehicle registration number. Last "license plates" survey: 2011 and November 2014. "Composition of traffic" survey: This survey is conducted by investigators stopping vehicles and drivers on spot and looking at the type of vehicles as well as some license plates. Last "composition of traffic" survey : November 2014 Both surveys are crossed for extrapolation traffic mix flowing in Paris. It is planned to conduct these surveys every year from 2016 during the monitoring of the implementation of air quality plan.
Tonnes of freight lifted in the city	Report from the Paris Chamber of Commerce, February 2010: The flow of goods and their proportion in the total traffic on the Paris region
Tonne-kilometres performed in the city	Simulation of tonnages and provenance of goods in Paris (January 2015). The objective of this study was to identify the flow of incoming and outgoing goods, Paris, by modes. Data SITRAM (Information System on Goods Transport), tonnages transported by road (only HGVs>3.5T), rail and river, collected by the Ministry of Ecology, Sustainable Development and Energy (General Commission of Sustainable Develop/ Service Observations and Statistics)
Freight modal split	Report from the Paris Chamber of Commerce, February 2010
Percentage lorries / vans	"License plates" survey and "composition of traffic" survey (see above)
Urban freight mobility	Urban Freight Survey of 2012 (made by LAET and Region of Ile-de-France) Provides many indicators, not all of them published yet– see below

As regards information on emissions and environment a set of indicators can be subtracted from the Airparif survey results (http://www.airparif.fr/) conducted annually.

These indicators are:

- (Estimates) on CO_2 emissions
- (Estimates) on local emissions (PM10, NOx, …)
- Air quality

These and other indicators are than reported in the Paris air quality report published annually. The Urban Freight Survey provides additional information on specific freight related emissions (not yet fully available).

Noise emissions are reported via Bruitparif website (http://www.bruitparif.fr/). Paris transport and travel report takes Bruitparif survey result.

Information on traffic safety is collected in the real time and is linked to police. Those data can be presented and aggregated on different format (every month, every year…). Paris transport and travel report takes the result.

For the spatial data Table 27 presents an overview of some indicators' availability:

Table 27: Spatial indicators

Indicator	Details
(Estimates) commercial activities in city (e.g. floor-space / FTE)	Available from City's other departments
Total non-residential floor-space in the city	Available from City's other departments
Total residential floor-space in the city	Available from City's other departments
(Estimates) logistics activities (in m2)	The City of Paris and the Paris Planning Agency (APUR) are working towards a logistics blueprint (called "schéma d'orientation logistique") that aims to assess the need for urban logistics space and potential sites to develop.
Estimates land use (residential area, commercial area, industrial area, etc.)	Available from City's other departments
Loading zones and bays (and usage)	On-street loading zones in the city of Paris: 9477 in 2013 Urban Freight Survey will provide detailed information on usage (ongoing)
Size of the city (in km2)	105.4 km²
Population of the city	2 234 105

Urban freight data currently available from the Paris Urban Freight Survey (regional level).

Table 28: Main results of urban freight survey (results are presented at the regional level, not at the Paris level only)

Total number of deliveries and pick-ups	800,000 deliveries or pick-ups every day for B2B operations (it is estimated that one third occur within or in/from Paris)
Freight vehicles	As a percentage of total deliveries and pick-ups: 4%: two and three wheelers (motor and non-motor) 26% private cars and small vans 31% vans 31% trucks other than articulated 8% articulated trucks
Own-account/third party	As a percentage of total deliveries and pick-ups: 51%: third party providers 49%: own-account transport, including: - 34% own-account shipper - 15% own-account receiver
Deliveries or pick-ups	As a percentage of total deliveries and pick-ups: 54% deliveries 35% shipments 11% both a delivery and a shipment for the same vehicle stop
Type of parking	As a percentage of total deliveries and pick-ups, and for Paris only: 64% van deliveries and 75% truck deliveries in illegal areas

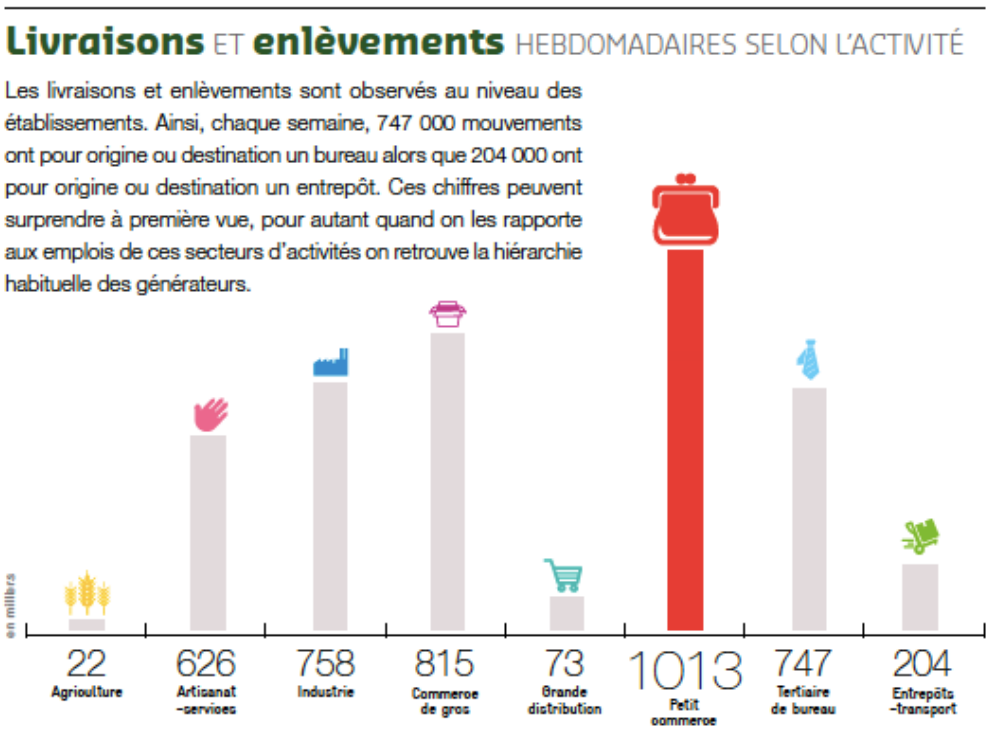


Figure 14: Number of deliveries and pick-ups (in thousands) per week for each type of activity in the Paris region

Source: LAET

Figure 16 above shows that retail from small stores ("petit commerce") makes up the largest share of deliveries and pick-ups in the Paris region (Ile-de-France), with 1,013,000 deliveries and pick-ups. Office deliveries ("tertiaire de bureau") are quite significant with 747,000 weekly. Mass retailing ("grande distribution" represents only 73,000 deliveries and pick-ups per week.

Focus of the Paris CITYLAB Living Lab

What is the Paris CITYLAB implementation case?

The municipality of Paris together with industrial partners has set up several implementation working groups as part of the 2013 Charter for sustainable urban logistics.

These groups cover the 16 projects defined in the Charter for Sustainable Logistics (2013, see above).

Two of these projects (project 2 and project 5) are looking at urban logistics terminals. Project 2 is about Chapelle International. Project 5 is about small urban logistics spaces.

The municipality and the region of Paris together with a logistics real estate developer is **developing a model for logistical zones and facilities, called logistics hotels**. Logistics hotels are appropriate for dense urban environments, combining logistics with other activities such as offices, retail and public services. CITYLAB Living Lab is focusing on two already existing "logistics hotels", at different stages of implementation: Chapelle, at construction phase (works began in September 2015) and Beaugrenelle at operating phase (opened in 2012).

What are the motivations for the Paris CITYLAB logistics hotels project?

The motivation of this CITYLAB Paris Living Lab project is to reduce negative consequences of logistics sprawl:

- Reduce negative impacts of deliveries especially emissions (CO_2, PM, NOx), noise and congestion at points of entrance to the dense urban area through consolidation and transfer to cleaner modes of transport.
- Provide efficient, modern logistics facilities to businesses serving the dense area of the Paris region.
- Increase mix of activities in specific areas of Paris: logistics activities, leisure, datacentre, shop/store, sport facilities, office spaces.
- Test new architecture, planning and urbanism concepts for the integration of logistics facilities in dense urban areas: form, acoustic, energy efficiency, integration of pedestrian flows.

Who will be in charge of the Paris CITYLAB implementation project?

The working groups' leaders from the city of Paris are the individuals representing the city of Paris in the CITYLAB project. IFSTTAR participates in several Charter's working groups, particularly the one related to logistics hotels, and takes an important part in the implementation and assessment of Chapelle International and Beaugrenelle within the working group (see details in Part 3).

Planning of the Paris Living Lab environment

Set Up

History and objectives

In the framework of the partnership, Paris City Hall hopes to bring together these actors who are essential for the life of the city in order to put in place regulatory, technical and organisational systems which will help create a positive dynamic.

This process was initiated as early as 2001 in the framework of the consultation with all the professional and institutional stakeholders that led to the drafting of the "Charter for good transport practices and freight deliveries in Paris" that was signed on 28 June 2006.

This first charter brought together 47 partners (shippers, senders and recipients, stakeholders from the rail and waterways sectors, delivering carriers, institutions, chambers of agriculture, skilled occupations, trade and industry) and marked a decisive first step. The charter was built around a number of important shared principles and specific commitments on the part of the different categories of partners, and is the expression of a shared desire to preserve the city's commercial activities while optimising and modernising the transport and delivery of freight in order to limit its adverse environmental impacts.

In this respect it was a pioneering process which generated a number of results such as the introduction of new regulations which are applied uniformly within Paris and which are based on environmental principles. A review of the 2006 charter has been conducted under the aegis of the monitoring committee consisting of Paris City Hall, Paris Police Headquarters, the chambers of agriculture, skilled occupations, trade and industry, and the relevant professions. All of the partners agreed that this collective commitment should be modified and include logistics that better meet urban, environmental and economic needs.

Four areas have been subjected to more thorough diagnosis in order to be more fully included in the new charter:

- monitoring, with the main goal of increasing compliance with Parisian regulations (monitoring observance of environmental principles and compliance with delivery zones);
- land use, in particular in order to develop Urban Logistics Zones;
- communication, in order to increase firms' awareness and foster public
- acceptance of transport activities;
- the region, in order to promote the use of logistics land and bring the activities of Paris into line with the policies of the region's local authorities.

The 2013 charter was the outcome of this work and these discussions. It set out to be more concrete, more operational and more incentivising, relying on greater involvement on the part of the signatories who undertake to develop or support projects which can assist the implementation of sustainable logistics.

Municipal policy with regard to urban freight transport sets out to:

- assist economic development;
- reduce the adverse environmental impacts of freight transport;
- encourage innovative initiatives;
- prepare and plan for any changes in municipal, national and European regulations in order to develop, with the industry, the ways and means of applying them.

The actions which resulted from the charter consist of projects. These put together the stakeholders involved, and are monitored and agreed by an operational monitoring body for the charter projects that bring together representatives of all the partners.

The Charter is in three parts:

1) The guiding principles of the Charter

- Developing urban logistics that fosters economic dynamism
- Developing environmentally friendly urban logistics
- Adopting a region-wide approach
- Acting within the framework of dynamic collective consultation
- Developing urban logistics which is better integrated within the city

2) Operational implementation of the guiding principles of the Charter

- Modifying the structures and facilities of urban logistics
- Logistics centres that are connected to regional networks
- Urban logistics facilities for serving districts
- Developing innovative sustainable logistics practices
- The organisation of logistics
- New services for private individuals and businesses
- Communication
- Training

3) An approach based on consultation and projects

16 projects, organized in “Project Sheets”, present the concrete initiatives for the logistics sector. In an Appendix to the Charter is a table that lists the 16 projects and describes the actions that the signatories undertake to carry out in the framework of the consultation process introduced by the charter within one year, this table being updated on a yearly basis.

Scope

The Paris Living Lab (the Charter and the 16 projects) relates to the whole city of Paris territory (municipality).

It is freight/logistics specific. Within the freight/logistics, it relates to all sectors. 80 to 100 industry and institutional representatives are included as stakeholders. All freight sectors are represented.

Living Lab Partners

16 different projects put together 16 different working groups, with stakeholders most interested in each particular project. Some stakeholders are in several groups, some are in one group only. An internal collaborative tool to share documents, has been established for each group.

Living Lab Public Private Partnership

All 16 project groups are fully public/private.

The Charter Steering Committee is represented by public and private organisations that have signed the Charter.

System analysis

Legal and ethical issues

Privacy law. Plate-reading cameras for traffic/parking rules enforcement are not widely available in France because of strict privacy laws.

Legal and regulatory issues. For logistics hotels, there are several legal issues to be expected in executing the Living Lab regarding building code legal issues (to accommodate industrial buildings within the Paris territory). The identification and addressing of these legal issues constitute one of the main focuses of the implementation phase of Chapelle, and of the evaluation phase of Beaugrenelle (see Part 3).

No ethical issue.

Stakeholder/end user analysis

Each project (working group) leads their own stakeholder/end user analysis.

System analysis

Each project (working group) leads their own system analysis.

Risks analysis and mitigation measures

Each project (working group) leads their own system analysis.

Design

Definition of the implementation cases

Implementation cases have been identified prior to the finalization of the Charter. See “history” sub section above.

“Fit” evaluation

Each project (working group) has made sure that their project fit the overall objective of the Charter.

Development of evaluation methodology

Each project (working group) has set their evaluation method and identified indicators.

Planning of Paris implementation cases

Both implementation cases of the Paris Living Lab are currently situated within the Implementation step of the Living Lab methodology. Figure 17 situates both implementation cases on the Living Lab cycle.

The planning phase was covered before the start of the CITYLAB project: the planning of the Paris two logistics hotels has actually taken place over the past ten years (2006-2016) with the following key steps:

- 2006 Signature of the first version of the Paris Charter for Sustainable Logistics
- 2006: Implementation of a new Paris Zoning Ordinance (PLU or Plan Local d'Urbanisme) including reserved areas for future logistics activities with rail access for inbound freight trips. Figure 10 illustrates the 2006 zoning principle favouring new logistics facilities within Paris.
- 2010: Bid for the Beaugrenelle logistics hotel from the City of Paris
- 2011 (July): Sogaris elected to the bid
- 2012: Opening of the Beaugrenelle logistics hotel
- 2012 (December): application for Chapelle building permit
- 2013: Signature of the second version of the Paris Charter for Sustainable Logistics, establishing 16 projects including project 2 about the Logistics Hotel in Chapelle International
- 2013: Application for “agreement” for industrial buildings in the Paris region
- 2014: Building permit obtained for Chapelle International logistics hotel
- 2014: application for rail safety agreement for Chapelle International
- 2014 (Nov-Dec): public enquiry for Chapelle International
- 2015 (September 4): Chapelle International is sold to Sogaris
- 2015 (September 7): start of work for Chapelle International.
- 2015 (December): signature of agreement with XPO and Eurorail acting as logistics providers and rail operator for Chapelle International.
- 2016 (planned March): publication of an updated Paris Zoning Ordinance reinforcing the promotion of urban logistics terminals and activities in Paris.
- 2017 (planned September): planned opening of Chapelle International

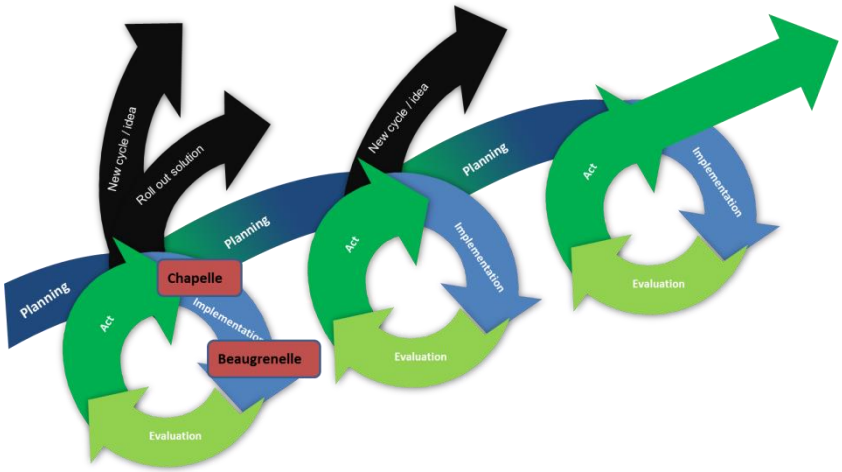


Figure 15: Paris implementation cases in the Living Lab cycle

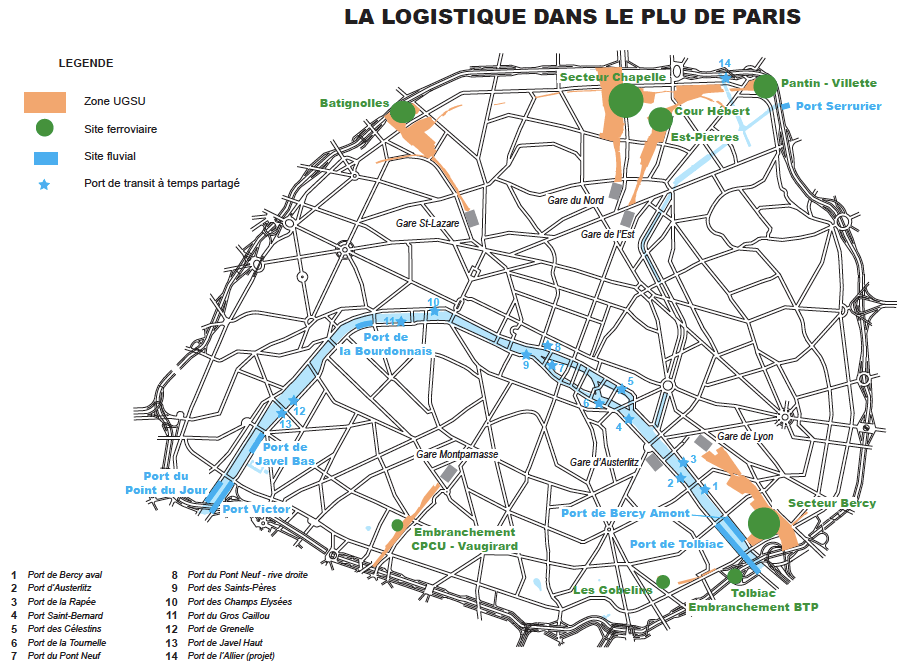


Figure 16: 2006 Paris Zoning Ordinance (PLU)

In green spots, areas reserved for future logistics activities with rail access

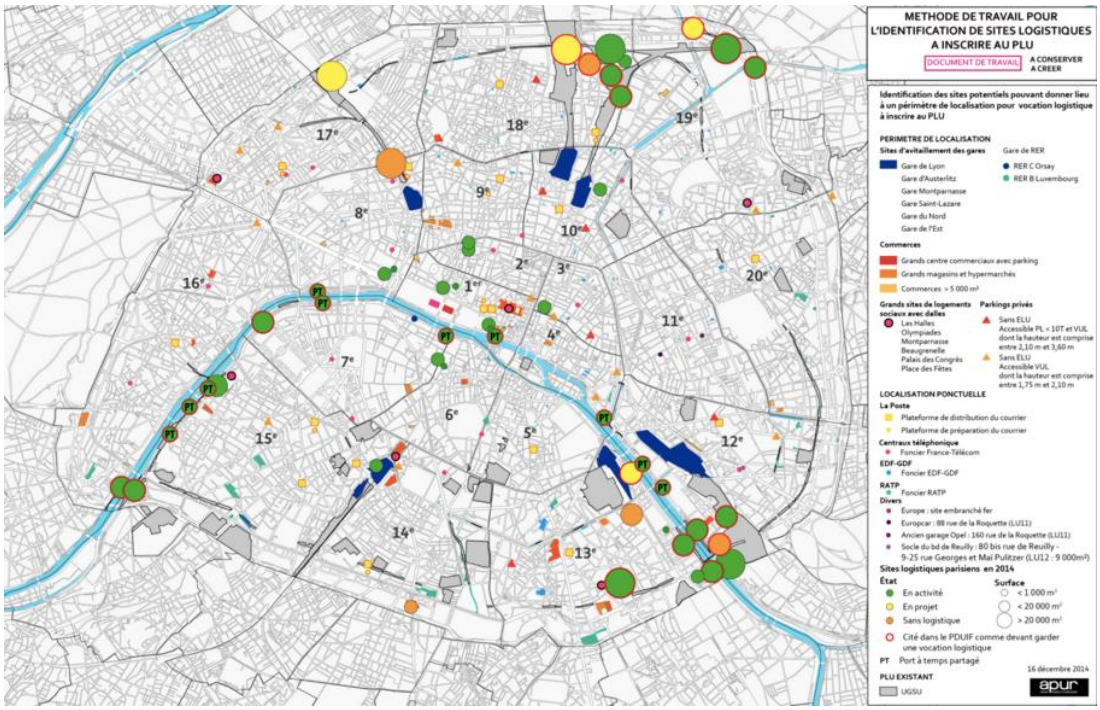


Figure 17: Proposed strategy for urban logistics terminals in the upcoming Paris zoning law

Source: map from APUR, released by Paris Department of Planning, December 2015

Referring to the Living Lab methodology (Deliverable 3.1), the Chapelle case is within a Preparation phase (2.1) and Beaugrenelle implementation case is in the Execution stage (2.2). Now that Beaugrenelle is in operation, economic and environmental impacts need to be

assessed. Chapelle International project has obtained the building permit (June 2014) and work has started. Detailed technical specifications have been fine-tuned.

An important step for finding clients (users of the facilities and transport operators) has been reached, with the signature of an agreement at the end of 2015 with Eurorail and Norbert Dentressangle (XPO) to develop rail shuttles between major logistics parks in the North of the Paris region, and the Chapelle logistics hotel.

The chapter below introduces the main critical issues for the planning phase of the Paris Living Lab, based on the overview of the documents mentioned above.

Set Up

Ambition

In order to deal with "logistics sprawl", the Paris administration aims at reintroducing logistics terminals in the dense areas. Two "logistics hotels" are assessed, at different stages of implementation

Table 29: Main policy priorities

What are the *main objectives / motivations / problems* (concerning urban freight transport) that are top priorities at this moment (concerning urban freight transport)?	General objectives: Efficiency of the urban supply chains based on five principles • Developing urban logistics that fosters economic dynamism • Developing environmentally friendly urban logistics • Adopting a region-wide approach • Acting within the framework of dynamic collective consultation • Developing urban logistics which is better integrated within the city Environmental concerns: air pollution (PM and NOx), noise, congestion, CO_2 emissions/carbon footprint Social issues and working conditions of urban delivery workers Road safety, conflicts between trucks and bicycles Main quantified objective: Achieving diesel-free last mile deliveries by 2020 in Paris.

Table 30: Short term and long term goals and ambitions

Topic	Short term (what?)	Long-term ambition (in time)
Increased efficiency / load factor	For the benefits of all users and especially the delivery industry, decrease general congestion as well as congestion from loading/unloading Provide urban logistics spaces to the logistics industry Accommodate e-commerce deliveries in residential neighbourhoods	Regionally coordinated logistics master plan – regional map of urban logistics spaces For the benefits of all users and especially the delivery industry, decrease general congestion as well as congestion from loading/unloading Accommodate new consumer trends in residential neighbourhoods
Reduce time in city (loading unloading)	For the benefits of all users and especially the delivery industry, decrease general congestion as well as congestion from loading/unloading Better on-street and off-street loading and unloading areas	For the benefits of all users and especially the delivery industry, decrease general congestion as well as congestion from loading/unloading Better on-street and off-street loading and unloading areas
Global emissions	Decrease Paris urban freight carbon footprint Electric delivery vehicles Train and barges' operations Deliveries by foot	Decrease Paris urban freight carbon footprint Promote alternative delivery vehicles Train and barges' operations, cargo-tram (TramFret) Promote deliveries by foot
Air quality (and local emissions)	One of the main short and long-term objectives of the City Target old trucks and vans currently operating in the city	One of the main short and long-term objectives of the City 100% diesel-free last mile deliveries by 2020 Under the new energy transition national law, Paris has just launched a strategic plan with actions programs for the air quality. One of the main actions concerns traffic restrictions about old or pollutant vehicles (regarding to the Euro Standards vehicles).
Retime logistics activities (e.g. out of peak period)	Promote early morning deliveries Local tests carried out, attention to noise issues and working conditions	Promote early morning deliveries Local tests carried out, attention to noise issues and working conditions
Improve traffic safety	Training of truck drivers regarding truck/bikes conflicts	Increase pedestrian/bicycle users safety
Logistics sprawl	Keep some logistics activities and buildings within the city limits Accommodate logistics buildings at low impacts	Innovation in architecture and urban design for a better integration of freight facilities Regional master plan for clustering logistics activities
Clean delivery vehicles	Promoting electric recharging stations for delivery vehicles Promoting the use of electric and gas delivery vehicles Promoting alternative modes for deliveries	More efficient standards for accommodating alternative fuel delivery vehicles in city buildings

Scope

Both logistics hotels have a city wide scope, and a regional significance.

CITYLAB Participants

Industrial partner: SOGARIS logistics real estate developer and manager (capital owned by Paris and neighbouring governments). Sogaris is the initiator of logistics hotels in Paris.

City partner: City of Paris. As the Charter leader and as the main shareholder of Sogaris, the city of Paris is one of the main stakeholders of the logistics hotels projects. It has a hold of the zoning ordinance of Paris (Paris PLU), involved in logistics hotels building permits.

Research partner: IFSTTAR. IFSTTAR is engaged in the assessment project of logistics hotels. IFSTTAR is one of the 80 signing parties of the Charter. The institute participates in several of the Charter's working groups, including the one about logistics hotels.

Many other stakeholders are involved:
- transport operators that will be users of Chapelle: rail companies (Eurorail); one or several parcel transport companies
- transport operators that use Beaugrenelle: Chronopost
- logistics providers clients of the warehousing areas: one has confirmed (name undisclosed, for the CHR (cafés hotels restaurants) wholesaling sector.
- all the other clients of the Chapelle building (sports, education, offices, urban agriculture).

System analysis

Legal and ethical issues

For logistics hotels, there are several legal issues to be expected in executing the Living Lab regarding building code legal issues (to accommodate industrial buildings within the Paris territory). The identification and address of these legal issues constitute one of the main focus of the implementation phase of Chapelle, and of the evaluation phase of Beaugrenelle.

Stakeholder/end user analysis

Other partners involved are Parcel and express operators, large retailers serving Paris, French rail infrastructure manager (SNCF Reseau), freight rail operators (Fret SNCF, Eurorail), Planning and Zoning regulators, Fire and Safety administrations.

Definition of the implementation cases

Two cases were selected for Paris CITYLAB Living Lab

Case 1: Chapelle International

Chapelle International has a total project area of 2.4 hectares and 42,000 sq. m of building in the north of the city of Paris. Building permit obtained (June 2014). Opening projected for 2017-2018. Project is to become permanent. Associated parcel and express transport volumes are 2,200 pallets and 15,000 parcels a day, and diverse retail (pallets) equivalent of 80 trucks a day. Beaugrenelle has a total floor area of 3,028 sq. m. In operation since April 2013. Project to be permanent. In total 5,0000 deliveries are handled a day.
Chapelle International (Paris 18th arrondissement) has a mix use set of facilities over a total of 2.4 ha including two logistics operations: 1) Urban Space for Distribution (USD), accommodating parcel and express transport operations using clean vehicles for the last

miles; and 2) Urban Rail Terminal (URT) accommodating a rail terminal for consolidated deliveries of a large retail chain.

In Chapelle International, consolidation is expected to contribute to reduced vehicle movements in terms of 40 wagons (80 trailers or 160 urban trailers per day) and 114 vans delivery tour for parcels. The equivalent of a 40 wagon train per day represents about 1000 tons of CO_2 saved per year.

Table 31: Stakeholder analysis

Research partner	IFSTTAR
Implementation (city)	**Paris – Chapelle International**
Description of the innovative solution (max 200 words)	Logistics hotels. A logistics terminal is being built in the north of the city of Paris (Chapelle International area). It will be used as a cross-dock area for goods arriving by train and leaving via environmentally friendly delivery vehicles. The total project area is 2.4 hectares including 42,000 sq. m of building. The building permit was obtained in 2014 and the opening is projected for 2017-2018. Associated parcel and express transport volumes are 2,200 pallets and 15,000 parcels a day, and diverse retail (pallets) equivalent of 80 trucks a day.
Types of stakeholders impacted (who)	The project is managed by Sogaris, a real estate developer specialized in logistics activities. Stakeholders impacted are shippers and clients (as the supply chain to reach Paris will be transformed), as well as previous road carriers that were making the deliveries via regular diesel commercial vehicles. The city of Paris and its citizens at large will be impacted too, through a reduction of overall air pollution; noise may also be an impact, as neighbourhood households may be negatively impacted by freight trains arriving at the site.
Key characteristics of the solution that can be evaluated by stakeholders (e.g. attributes of the service provided)	Goods arriving to the terminal (in tons, pallets or number of parcels). Number of trains arriving to/departing from the terminal. Load factor of trains (arriving/departing). Number of trucks and vans departing from the terminal (and arriving to the terminal). Load factor of vans and trucks arriving/departing. Length of train routes and vans/trucks routes. CO_2, NOx and PM reductions comparing with previous situation. Level of service of deliveries
Expected sample size of stakeholders to be interviewed (**before** having experienced with the solution)	SOGARIS (3) Shippers and carriers involved (it will be a limited number, maybe 3 or 4). Establishments receiving goods (not possible to identify the numbers today) Logistics provider (not yet identified) (1) SOGARIS company (3) City of Paris (1) Other agencies (2)
Expected sample size of stakeholders to be interviewed (**after** having experienced with the solution – will this be the same (or part) of those interviewed ex-ante?)	SOGARIS (1) Shippers and carriers involved (it will be a limited number, maybe 3 or 4). Establishments receiving goods Logistics provider (1) SOGARIS company (1) City of Paris (1)

2: Beaugrenelle

Beaugrenelle (Paris 15th arrondissement), a 3000 sq. meter logistics facility opened in 2012 out of the conversion of a former parking facility. Operated by Chronopost express operator. Last mile deliveries are made by 10 electric vans and 20 diesel vans, with the objective of increasing the share of clean vans. The main characteristics of this implementation are summarised below.

In Beaugrenelle, consolidation will give increase load factors for final deliveries and improved flexibility and quality of service for final deliveries, as well as substitution of diesel vans by clean vehicles (electric or CNG). Finally, increased work safety and working conditions for final deliveries' operators are expected.

Table 32: Stakeholder analysis

Research partner	IFSTTAR
Implementation (city)	**Paris – Beaugrenelle**
Description of the innovative solution (max 200 words)	Logistics hotels. A logistics terminal has been operating since 2013 in the south of the city of Paris (Beaugrenelle area). It is used as a cross-dock area for parcels from Chronopost, being delivered via environmentally friendly delivery vehicles. Beaugrenelle has a total floor area of 3,028 sq. m. In total 5,0000 deliveries are handled a day.
Types of stakeholders impacted (who)	The project is managed by Sogaris, a real estate developer specialized in logistics activities, and Chronopost as the only user (tenant). Stakeholders impacted are previous road carriers that were making the deliveries via regular diesel commercial vehicles. Many of them are small companies that are contractors of Chronopost. The city of Paris and its citizens at large are impacted too, through a reduction of overall air pollution. Noise may also be an impact, as neighbourhood households could be negatively impacted by trucks arriving at the site. Levels of service have not been impacted (hours of deliveries, reliability, speed of delivery).
Key characteristics of the solution that can be evaluated by stakeholders (e.g. attributes of the service provided)	Parcels arriving at the terminal. Number of trucks arriving to/departing from the terminal. Number of vans departing from the terminal (and coming back to the terminal). Load factor of vans and trucks arriving/departing. Length of delivery routes. CO_2, NOx and PM reductions comparing with previous situation.
Expected sample size of stakeholders to be interviewed (**before** having experienced with the solution)	*Solution already implemented*
Expected sample size of stakeholders to be interviewed (**after** having experienced with the solution – will this be the same (or part) of those interviewed ex-ante?)	Chronopost company (1) SOGARIS company (1) City of Paris (1) If possible: contractors involved (sample of maybe 3 or 4).

On the City of Paris website, information about Beaugrenelle were recently uploaded: http://www.paris.fr/actualites/a-beaugrenelle-des-livraisons-100-renouvelables-3035
This includes **a movie explaining (in French) how Beaugrenelle logistics activities operate**.

Development of evaluation methodology

Chapelle International

What is evaluated: identification of the challenges met when building a complex urban logistics terminal (including rail access and accommodation of electric vehicle fleet). These challenges will be identified and described in the following areas: 1) Regulatory: building codes and ordinances, standards for safety issues and hazards. 2) Economic: business plan to manage a real estate investment in a sector with commonly low rental prices 3) Others: opposition from local residents, architecture and landscape issues.

These challenges will be listed and described since the start of the Chapelle project initiative (2006)

Stakeholders involved in the evaluation: City of Paris (Alexandre Tella, Anne Sophie Jamet), IFSTTAR (Laetitia Dablanc, Adeline Heitz, Leise Kelli de Oliveira, Thibault Namy, Richard N'Guyen).

Methodology:

1) Detailed interviews with Sogaris, including:
   - Head of strategy (C. Ripert)
   - Project manager for logistics hotels (P. Berger)
   - Manager of building site (A.M. Cardinale)

Interviews will take place at several stages of the building works (once a year during the duration of the CITYLAB project). First interview set February 19, 2016

2) Detailed interviews with city of Paris (outside of mobility agency) and other public agencies
   - Planning/zoning Department
   - Fire Department (Prefecture de Police)

3) Interviews with shippers and carriers involved, establishments receiving goods, logistics provider and rail company.

Interviews will be conducted in the Spring 2016.

Follow-up interviews will be conducted in the Spring 2017.

Beaugrenelle

What is evaluated: economic (volumes, revenue and benefits) and environmental (energy, CO_2, NOx, PM) performances of the Chronopost express transport operations within the Beaugrenelle logistics terminal.

Stakeholders involved in the evaluation: SOGARIS, City of Paris, and IFSTTAR.

Methodology

A detailed assessment is currently being conducted within the framework of an evaluation process attributed to a contractor (transport consultants).

Evaluation process has started in October 2015 and will last until the end of 2017. Indicators to be provided at a later stage.

Sub-contractors of Chronopost operating from the Beaugrenelle terminal will be interviewed if possible (these operators are notoriously difficult to convince to participate in surveys and interviews).

The Paris Urban freight survey of 2011-2014 is providing additional KPIs for urban freight monitoring in Paris (LAET, 2016).

CITYLAB case implementation plan

Chapelle:	
1)June 2014	*Building permit obtained*
2) Sept 4, 2015	Land acquisition from SNEF: Done
3) Sept 2015	First earthwork: Started. Excavations were finished by end of Jan 2016
4) December 2015	Choice of freight operator(s) and rail technique: Done
5) Spring 2017 (planned)	Delivery of roof to municipality
6) July 2017 (planned)	End of construction
7) Sept 2017 (planned)	Start of logistics operation

1) Finalize choice of freight operator (phase 4)
2) Obtain 10 M€ financial help to cover new cost of roof (since the City required tennis courts and urban agriculture on roof) (from phases 3 to 5)
3) Apply for a 'modifying building permit' (*permis de construire modificatif* or PCM) for data centre (phase 4)

Beaugrenelle: evaluation work has started (interviews with Chronopost)

References

Andriankaja, D. (2014) Le « desserrement logistique », quelle responsabilité dans l'augmentation des émissions de CO_2 des activités de messagerie? (*Logistics sprawl, what responsibility in CO_2 emissions from the parcel and express transport sector?*). PhD Thesis, University of Paris-East, June.

LAET (Laboratoire Amenagement, Economie, Transport) (2016) The French Urban Freight Surveys, Understanding and simulating goods movements. Presentation at the Freight Survey Subcommittee, *Transportation Research Board Annual Meeting*, Washington DC, USA, January 13.

Rome CITYLAB

Living Lab environment in Rome

Characteristics of freight transport system and policy framework

Rome Municipality, capital of Italy, counts 2,8 million of residents, distributed on a surface of 1,285 sq. km. Figure 20 shows the spatial characterization of the city.

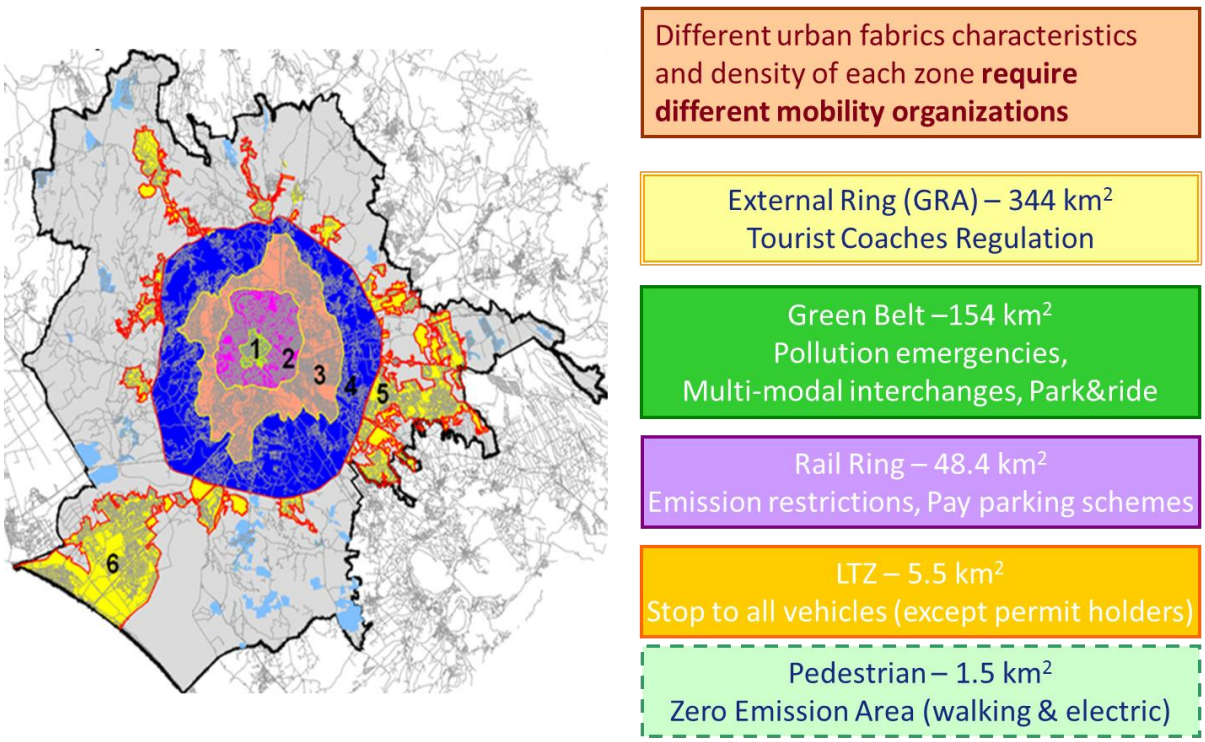


Figure 18: Spatial characterization of the city

The city is characterized mainly by wholesale, retail and professional activities; in terms of employees, those of the transportation and storage sectors represent almost 300 thousand units (10% of the total).

Rome already started to implement an **environmental policy** by encouraging the use of sustainable vehicles and discouraging obsolete vehicles, impeding the access to more pollutant categories and with a discount on permit's price to the lowest emission vehicles to enter into the freight LTZ (Limited Traffic Zone), mainly controlled by electronic gates.

Rome, as indicated from European Commission, in term of greenhouse gas emission reduction (60% by 2050 with respect to 1990) and to achieve the CO_2-free city logistics in major urban centres by 2030, will implement also the Living Lab to achieve urban freight distribution objectives.

Rome Municipality approved in 2014 (City Council) and in 2015 (Municipal Assembly) **the new Mobility Masterplan (NMM)** outlining Urban Sustainable Freight Distribution objective, containing the impacts of freight vehicles circulating through:

- Aggregation of transport operators;
- Increased load factor;
- Switching power supply of the freight vehicles;
- Rationalization of areas of goods loading / unloading.

The main master plan goal is to guarantee the accessibility of freight transport to the city centre, through:

- New access control (electronic gates) around a specific LTZ for freight distribution;
- Enlargement of the freight LTZ (rail-ring limit);
- New booking service to optimize parking areas;
- Timetable and pricing policy evaluation (based on types vehicles, and products category);
- Van-sharing policy promotion;
- Increasing load capacity vehicles and reducing unloaded trips;
- New transit points.

As recommended by the NMM, the new freight plan will be implemented, to reduce the impacts in term of pollution, emission and cost.
In particular, more attention have to be paid to the city centre, characterized by the narrow streets, old road infrastructure, so to preserve historical heritage.

Relevant publications have been focused on urban freight transport policy in Rome: Gatta and Marcucci (in press; 2015; 2014); Gatta et al. (2015); Marcucci et al. (2015); Nuzzolo and Comi (2015); Roma Capitale (2014); Region of Lazio (2009); Unioncamere Lazio (2007).

Table 33: Ambitions, goals and targets of the Rome freight strategy

	Short description, date published	Web-link (if available)
UFT ambition (long-term, >7 years)	The city aspires to a leading role in the international scene and should grow in two key areas: 1) large infrastructures making it a reference point in its own territory with respect to the movement of people, goods and information; 2) cultural characterization and production making it a rare, if not unique, place in the global landscape.	https://www.comune.roma.it/PCR/resources/cms/documents/seg_gen_10_PSS_VOLUME_I_web.pdf
UFT goal (medium term, 2-7 years)	New rules for access to the goods ZTL Interventions to rationalize the distribution of goods	
UFT targets (short term, < 2 years)	Permanent urban goods Distribution Centre	
UFT action plan	Freight and logistics plan of Rome Municipality	
UFT other policy document, i.e.:	New Mobility Masterplan (NMM)	https://www.agenziamobilita.roma.it/images/romamobilita/allegati/pgtu/PGTU_aprile_2015.pdf

Table 34: Measures of Rome transport policies relevant for urban logistics

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	New access control (electronic gates) around a specific LTZ for freight distribution
Measure 2	Enlargement of the freight LTZ (rail ring limit- 48 sq. km)
Measure 3	Timetable and pricing policy evaluation, based on the types of vehicles, and the category of products
Measure 4	Van-sharing policy promotion
Measure 5	Increasing the vehicles load capacity and reducing unloaded trips, through new transit points. Concerning the LTZ, CDU's will be reached by electric vehicles (zero emission zones)

Cooperation on urban freight transport

Rome has three already established Local Networks:

- Working table with logistics chain operators in the city centre of Rome;
- Working table with the producers of freight vehicles;
- Working table on the feasibility check to implement Urban Freight Terminals (UFTe).

A working table and two networks have been established with the main representative associations of the freight vehicle production sold in Italy and with the world of logistic chains operating in the Rome city centre. This effort led to the identification of their needs and to the signing of a joint Agreement Protocol between City Administration (CA) and stakeholders, approved with the Official Resolution OR 215/12.

Through the establishment of the working table on the feasibility check to implement an Urban Freight Terminal (UFTe) the process of defining the new rules was visited by stakeholders with representatives of the specific categories involved in the transport of goods. The task of this working table, directly impacted by the innovation trialling focus of Rome in SMARTSET is also monitoring the results: it continues to meet whenever there is evidence of needs of further information, or to solve problems.

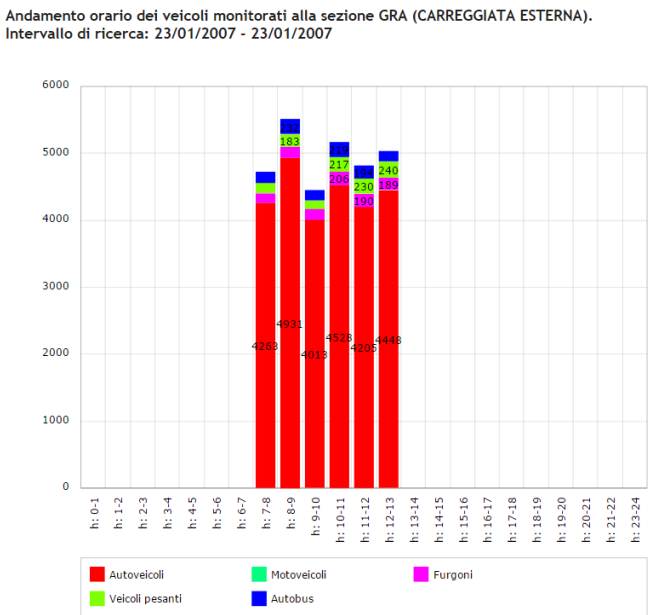
The Ministry of the Environment was involved in this activity because of bad air quality condition in Rome, They were already supporting sustainable mobility projects in urban areas and they made available incentives for funding for a pilot project for the feasibility check in implementing a UFTe serving the Rome City Centre the project is monitored by a working committee formed with the involvement of a Logistic Research Centre, the Union of Entrepreneurs, the Ministry of Environment and Rome Municipality, which is following developments in terms of UFTe feasibility plans including a possible business model to implement permanently it.

Table 35: Cooperation of stakeholders

Stakeholder involvement (and in what form, what geographical scope, what kind of communications, frequency, etc.)	1) Working table on the feasibility check to implement Urban Freight Terminals (UFTe): Environmental Minister, City Administration, Rome Mobility Agency – RSM, Union of industrialists and businesses in Lazio region, Centre for logistic studies linked to University of Rome 2) Working table with logistics chain operators in Rome: Italian Association of Merchants and Craftsmen Entrepreneurs, PMI association for Lazio Region, Italian General Confederation of Enterprises, the Professional Activities and Self-Employment, Union of Industrialists and businesses in Lazio region, Association of co-operative and credit banks, Enterprise networks for small and medium-sized enterprises, National Confederation of Crafts and Small and Medium Enterprises of Rome, League of Cooperatives and Mutual of region Lazio, Confederations Craft Business Rome, Confederations Crafts Of Transportation, Italian General Confederation Of Transport And Logistics, Confederation Transportation-Shipment-Logistics 3) Working table with associations of the producers of freight vehicles: UNRAE, ANFIA, Federauto, Romana Diesel, Rome Mobility Agency – RSM, City Administration, City Department in charge for mobility issues

Existing data and monitoring on urban freight

Table 36: Data monitoring: traffic

	Short description and results	How often collected and link or report available?)
Traffic counts (and how)	Manual counts and through radar and camera  Manual count	yearly
Split of freight vehicles (in city or nationally) by engine type (e.g. EURO norm)	City Rome: Euro 0: 17%; Euro1: 7%; Euro 2: 13%; Euro 3: 20% Euro 4: 24%; Euro 5: 18%; Euro 6: 0.3%. Metropolitan area: number of vehicles divided for euro norm and engine type	yearly

Vehicle km per year in the city (total by freight vehicles and non-freight, and split by vehicle type, e.g. artic HGV, rigid HGV, van, car, bus etc.).	Data available: Traffic counts of freight vehicles divided by capacity, in entrance to LTZ	yearly
Percentage lorries / vans	Available data (metropolitan area) – number of goods vehicles: until 3.5 tons. 247,250; over 3.5 tons. 40,088	yearly
Data on congestion	Index of congestion for Rome	
Freight modal split (road, rail, water in vehicle km, tonne-km or tonnes lifted)	Not available for Rome	
Data on enforcement (e.g. illegal parking, violation of low traffic zone, low emission zones, etc.)	Data collected by Local Police	yearly

Emissions and environment

Table 37: Data monitoring: emissions

	Short description and results	How often collected and link or report available?)
(Estimates) on CO_2 emissions	Rome: available also for different areas (LTZ, Rail ring, etc.)	yearly
(Estimates) on local emissions (PM10, NOx, …)	Rome (available also for different areas) PM10: 878 (tons per year) NOx: 13,365 (tons per year)	yearly
Air quality	Metropolitan area: annual average, monthly average and daily average of main pollutants, divided for air quality station Pollutant concentration	different periods available
Noise emissions	Not available	
Traffic safety	Accidents with freight vehicles involved: 924 Injured (freight vehicles): 182 Deaths (freight vehicles): 3	yearly

Provincia	Stazione	Benzene $\mu g/m^3$	CO mg/m^3	NO2 $\mu g/m^3$	NOX $\mu g/m^3$	O3 $\mu g/m^3$	PM10 $\mu g/m^3$	PM2,5 $\mu g/m^3$
	Arenula	-	-	44	83	28	25	10
	Preneste	-	-	44	75	34	28	-
	Francia	2.5	-	64	177	-	29	14
	Magna Grecia	-	-	59	112	-	27	-
	Cinecitta'	-	-	37	71	32	25	12
	Villa Ada	0.5	0.4	35	69	34	22	10
Roma	Guido	-	-	8	9	61	15	8
	Cavaliere	-	-	27	41	38	22	13
	Fermi	3.0	0.8	64	153	-	26	-
	Bufalotta	-	-	43	75	28	26	-
	Cipro	-	-	46	100	27	26	12
	Tiburtina	-	-	53	135	-	31	-
	Malagrotta	0.8	-	18	26	47	18	10

Spatial data

Table 38: Data monitoring spatial

	Short description and results	How often collected and link or report available?)
Estimates land use (residential area, commercial area, industrial area, etc.)	290 sq. km	
Size of the city (in km^2)	1,285 sq. km	yearly
Population of the city	2,872,000	yearly

Focus of the Rome CITYLAB Living Lab

The Living Lab in Rome can, at present, *de facto* be assimilated to its CITYLAB Living Lab. In fact all the activities taking place in Rome with respect to urban freight distribution are not conceived/implemented within a Living Lab framework. Under this circumstances it is extremely important to perform all Living Lab activities linked to the pilot project in great detail while at the same time, ensure the widest diffusion of the information and participation of all the relevant stakeholders. In fact it is the city's intention to use CITYLAB as a test case to showcase all the benefits derivable from the adoption of this innovative methodology allowing for the active participation and collaboration of all relevant stakeholders. The occasion CITYLAB offers to Rome will be used to acquire experience, knowledge with respect to the implementation management and assessment of the Living Lab methodology.

The Rome CITYLAB Living Lab (RCLL) aims at performing a series of implementation cases using Living Lab methodology while taking advantage of these activities to stimulate the establishment of a full scope Living Lab environment for the city. In fact, we consider the opportunity provided by CITYLAB extremely important since it will expose potential Living Lab members at a full city scale to a reduced form (in terms of ambition not in terms of methodology) of the approach that could be adopted. This should in fact stimulate the future adoption and development of such a methodology that could act, on one side, as a catalyst with respect to the various activities/initiatives performed and, on the other, as an instrument to coordinate, systematise and bolster urban freight related shared policies and activities.

The RCLL addresses the issue of the integration of direct and reverse logistics flows. The concept idea is to minimize "empty trips". This goal will be achieved by delivering mail/parcels to the addressee and collecting goods/clean waste, either directly from the addressee or from a location close to the addressee, during the same transportation route, while ensuring information sharing throughout the whole logistic chain and the consequent optimization of operational processes. This will maximise vehicles load factors, reduce vehicle movements and thus reducing congestion and polluting emissions.

CITYLAB partners are involved in all the major active working groups dealing with urban freight distribution policy innovation in the city of Rome.

In more detail, RSM participates/coordinates in all the three initiatives previously described.

UR3 actively cooperates with Centre of Transport and Logistics at Sapienza University that is directly involved in the freight quality partnership initiatives bringing together the Union of industrialists and businesses in Lazio region, City Administration, Ministry of the Environment.

Additionally, it has already cooperated with Italian Association of Merchants and Craftsmen Entrepreneurs, local Confederation of Crafts and Small and Medium Enterprises of Rome, Confederations Crafts Of Transportation etc.

MEW is directly and actively involved with the Special Roman Commission on the Information System promoter of the Smart City Lab initiative for the city of Rome that aims to develop processes, ideas, systems capable of transforming Rome in an intelligent city taking advantage and enhancing its peculiarities thanks to the development of hi - tech connectivity, information, energy and public transport networks efficiency, as well as effective and well-organised urban freight distribution system.

PIT collaborates with local administration (e.g. CROSS project - Citizen Reinforcing Open Smart Synergies) and contributes to fostering smart city development by enabling the satisfaction of citizens' needs in several fields. In fact PIT's POLIS (Italian Post Living Innovative System) proposition includes seven areas of interests Health, Eco-Sustainability, Education, Entertainment, Security, Work and Citizenship.

Planning of the Rome Living Lab implementation case

Set Up

Ambition

The ambition of CITYLAB is to pursue two different objectives that are potentially in contrast. On one side RCLL aims at increasing the amount of recycling performed and on the other aims at minimizing the amount of CO_2 emissions due to the related transportation activities.

Scope

Due to the challenges the aim implicitly poses, the RCLL decided to focus its efforts geographically. The proposed solution will be tested in a small area of Rome with the opportunity/desire to spread in future this solution to other contexts thanks to PIT's delivery network that is extended throughout the whole Italy.

- *Main policy / city objective and the influence of city logistics on it*
  The project will have to duly take into account all the possibly correlated policies the city of Rome is about to develop as well as existing ones. In particular, the newly adopted GTMP envisages a tighter access restriction to specific areas as well as a geographical extension to a wider part of the city. Additionally, RCLL will have to consider the potential impact new legislation both at a national (Collegato Ambientale art. 5 - http://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.dataPubblicazioneGazzetta=2016-01-18&atto.codiceRedazionale=16G00006&elenco30giorni=true) and local level (Programma Attuativo Regionale 2007-2013 - http://www.regione.lazio.it/binary/rl_bilancio/tbl_normativa_svileconomico/Allegato_DGR_854_211008.pdf).

- *Logistics specification (e.g. sector specific, or vehicle specific, …)*
  The potential application of the concept developed is extremely wide. Any sector can in principle be interested/involved. While the vehicle type to be used in the pilot will depend on the freight category to be transported as well as on its volume, weight and amount, it will

always be used the least CO_2 emitting vehicle available under a stringent financial constraint (i.e. no dedicated public subsidies).

- *Shipment specification (e.g. goods type, conditioned goods or pallets, boxes, etc.)*
  The specific good type to be transported will be determined thanks to a joint evaluation by all stakeholders involved explicitly taking into account both the various regulatory constraints pertaining to each company/sector involved (e.g. work contract limits with respect to materials handling) and its relevance and future potential.

- *Users involved for execution of operations (including for example subcontractors)*
  The RCLL will take advantage at least in start-up phase only of the competences and capabilities of CITYLAB partners.

- *Users involved for planning of operations that are often outside the city (e.g. logistics service providers, shippers)*
  Since the pilot is characterized by a urban scale the only stakeholders to be involved are those that would have to transport the freight to recycling facilities.

CITYLAB Participants

Industry partners	Poste Italiane (PIT), MeWare (MEW)
City partner	City of Rome (RSM)
Research partner	University of Roma Tre (UR3)

RCLL participants

Owner: RSM

Stakeholder: RSM, UR3, MEW, PIT

User: UR3, MEW, PIT (also local retailers, private companies and citizens could be potentially involved depending on the type of freight to be transported).

Customer: RSM, UR3, MEW, PIT

System analysis

Legal and ethical issues

Relevant legal and ethical issues could in principle influence the development of RCLL concept. They are classified in two categories: political and technical.

Political issues:

Rome municipality is provided of regulatory tools regarding freight distribution, of which RCLL will take account for the implementation.

The main resolution regards the new bounder of freight Limited Traffic Zone (O.R. n.44/2007).

Follow the Operational Action Plan (OAP), approved by official resolution n.242/2011: City of Rome tool for emergency intervention for air pollution episodes based Regional Air Quality Recovery Plan (RAQRP) with provision on freight movements

Follow the definition of new rules for access to the distribution of goods in the City Centre providing also directives about some priority activities of the second phase, as summarized below (O.R. n. 245/2011 and n.300/2014).

Official Resolution n.86/2014, which issues new rules for the access to the LTZ with provision on freight movements and Official Resolution n.99/2014 “Roma Capitale” which reinforces and enlarges the Limited Traffic Zone (LTZ) in the city centre, also regarding freight movements.

Finally Official Resolution n.334/2015 and n.329/2014 regulating the perimeter of the LTZ area, establish a ban on access and movement to vehicles over 7.5t.

Technical issues:

The legal issues identified during the analysis phase concerning the security and privacy requirements that the final system has to satisfy. In particular in “D.Lgs del 30 Giugno 2003 n.1961” concerning the privacy and security in the IT communication in Italy must be respected and strongly considered during the design and implementation phases of the system.

The legal issues identified during the analysis phase are related to the general terms of service that govern the terms of the universal postal service by PIT; they decline the goal of the service in relation to the products, the processes for pickup and delivery of items and users' rights.

The transport of dangerous goods by road it is governed by the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), signed September 30, 1957 and ratified in Italy with Law 12 August 1962 No. 1839, currently updated version ADR 2015.

Stakeholder/end user analysis

RSM is both owner of the RCLL, monitoring the Living Lab development process, and customer, benefitting from the environmental positive results derived by the new solutions proposed. While participation and collaborative approaches are considered essential to achieving the objectives set, the local public administration has also to play a role in terms of “final decisions” to be made.

UR3 plays different roles in the RCLL. As a stakeholder, it supports the implementation process by providing research knowledge useful for both determining barriers/opportunities/prerequisites and assessing impacts and transferability potential. As a user, it could be involved in testing real-life solutions since it represents a large attractor with relevant reverse logistics issues to be tackled. As a customer, it could obtain both financial benefits and an optimal return on image from the implementation.

MEW is interested in designing and building a Decision Support System (DSS) that can help to maximize the loading factor of vehicles, minimize the number of travels for the delivery, and minimize the CO_2 emissions suggesting a short and more comfortable route for the deliveries, and also can exploit the reverse logistics principle in its suggested planning. The role of MEW in the RCLL is the technology enabler that supports the logistics and research stakeholders in the exploitation of business case identified.

PIT is interested in implementing a new smart approach to urban logistics through the adoption of ISO-modular units which provide functional integration between direct and reverse logistics. The integration represents the basis of a business model financially sustainable which uses the reverse logistics to reduce congestion and polluting emissions linked urban transport of clean waste. The role of PIT in the RCLL is the logistic operator.

System analysis

In what follows, the main aspects, potentially influencing RCLL implementation and results, are reported.

[1] http://www.camera.it/parlam/leggi/deleghe/03196dl.htm

Reverse Logistics issues

Reverse Logistics covers all the logistics activities related to recycling, substitution, reuse and disposal of materials (Stock 1992). It involves planning, implementing, and controlling an efficient, cost effective flow of raw materials, in-process inventory, finished goods, and pertinent information from consumption to retrieval or proper disposal of the product (Rogers and Tibben- Lembke, 1998).

The implementation of reverse logistics flows commonly produces both economic and environmental benefits.

The economic interest refers to the opportunity of recovering the value of goods transported, in the case of precious materials or sales returns, and increasing savings by reducing or avoiding supply and transformation costs.

The environmental interest is closely linked to corporate social responsibility and increasingly stringent legislative constraints that companies are required to comply in relation to the impact the products and services they offer can have on the environment.

Possible destinations of a return could be the replacement on the market, primary or secondary (outlet stores, online auctions), before or after the activity of re-processing (remanufacturing, reuse, repair, recycling) or disposal at landfills dedicated.

According to the document Delivering the Goods 21st Century Challenges To Urban Goods Transport (OECD, 2003), waste management is a major issue for the sustainability of urban areas. Many countries are facing problems related to the limited capacity of landfills and emissions from combustion. Such mass production of waste is not sustainable leading to an increased attention and effort to reduce, reuse and recycle waste. An efficient freight transport system should allow the collection of waste based on reuse and recycling, without causing road congestion.

Increasing efficiency and reducing the cost of Reverse Logistics (e.g. transportation costs) is fundamental for promoting recycling initiatives. Such costs can be reduced, for example, by transporting large amounts exploiting economies of scale.

Governments can facilitate the development of efficient Reverse Logistics systems by providing the necessary infrastructure and the dissemination and promotion of best practices.

Therefore, the goal is to plan a logistics system shared by much of the territorial chain, which reduces losses, doubling and overlapping of activities forward and reverse logistics (Reloader, 2015).

RCLL should be guided by the following principles:

- Identify optimal and efficient circle transportation route while reducing congestion and polluting emissions.
- Less vehicles are required for performing the same tasks.
- Assigning both delivery (mail/parcels) and collection during the same transportation route ensures logistic process optimization
- Use technologies to help the logistic operator :
    - to receive a notification of the appointment, that the customer books, for the withdraw of clean waste or specific citizens' services;
    - to plans the best route for mail/parcels delivery, optimizing loads and itineraries.

ICT issues

In the field of ICT there are two main innovation points driving the IT system design:

- The IoT (Internet of Things)2;
- The Cloud Computing;

The IoT[3,4] is one of the emerging thread in the ICT, in particular in the field of Infrastructure management, Environmental monitoring, and Transportation. The spreading of the mobile devices among the citizens and the low cost of some monitoring piece of hardware enables the exploitation of a large data sharing between different and heterogeneous IT systems.

Cloud Computing[5], also known as "on-demand computing", is a kind of Internet-based computing, where shared resources, data and information are provided to computers and other devices on-demand. The Cloud Computing is considered the next generation of the IT architectures.

The core of the Cloud Computing principles[6] are:

- Data Sharing;
- IT and Network Resource Sharing;
- Software as a Service or on Demand (SaaS);
- Platform as a Service or on Demand (Paas);
- Infrastructure as a Service or on Demand (IaaS).

Adopting these two approaches in the design of the IT system is crucial for building a system that can be easily integrated and used in the city environment without introducing big integration problems with the existing IT systems.

A focus on plastic caps recycling initiatives in Rome

The reference recycling regulatory framework in Rome does not explicit refer to plastic caps collection. However, there are some autonomous initiatives for selectively collecting plastic caps (Centro Mondialità Sviluppo Reciproco - http://www.cmsr.org; Area Alitalia Solidarity Onlus - http://www.areasolidarieta.it) due to both the related beneficence aspects and their intrinsic economic value (high-quality 100% recyclable plastic). These self-organized projects have led to non-optimized system of the collection process provoking an increase of CO_2-emissions/congestion and, in some cases, the ending of these valuable programs.

2 Luigi Atzori et al., The Internet of Things: A survery, Comput. Netw (2010)

3 Research Directions on the Adoption, Usage and Impact of the Internet of Things through the Use of Big Data Analytics, Frederick J. Riggins, Samuel Fosso Wamba. Conference Paper · Jan 2015

4 Internet of Things (IoT): A Literature Review Somayya Madakam, R. Ramaswamy, Siddharth Tripathi, Journal of Computer and Communications, 2015, 3, 164-173

5 Above the Clouds: A Berkeley View of Cloud Computing - Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, and Matei Zaharia - Berkeley Reliable Adaptive Distributed Systems Laboratory

6 Cloud Computing: Principles and Paradigms a cura di Rajkumar Buyya, James Broberg, Andrzej M. Goscinski (Book) (2010)

Risks analysis and mitigation measures

The RCLL has, at the present stage of the process, defined the following risks (where a=probability of the occurrence; b=severity; c=means of detection; d=mitigation measures):

1. Performance of the Decision Support System due to large datasets
   a. 20%;
   b. Medium;
   c. Response time of the DSS service that fulfil the planning, Monitoring of the physical IT resources during the elaboration phase;
   d. Mitigation measures: adding hardware resources to the system infrastructure, using the data grid for storing and elaborating the large datasets.

2. Connection problems between the different integrated systems and the Decision Support System
   a. 10%;
   b. Low;
   c. Keep alive policy of the established connections;
   d. Mitigation measures: reconnection policies and scheduled job for ensure data consistencies and reliability.

3. Heterogeneous services interfaces between the different systems involved in the living lab
   a. 70%;
   b. High;
   c. Incompatible service call and invocation between the involved systems
   d. Mitigation measures: definition of an integration layer that enables the data transformation and format standardization between the different systems involved in the living lab.

4. Hardware failures
   a. 5%;
   b. Low;
   c. The DSS services are down and there is no response from its exposed interfaces;
   d. Mitigation measures: duplicated machines that are used as a fault tolerance measure in Hardware failures and also Software failures that cause the stop of all systems' services.

5. Operational risks linked to IT processes and external events that might impact service level
   a. 98%
   b. High;
   c. Down full \ part of the appointment system and presence of critical events
   d. Risks will be mitigated through a system alert based on communication sharing between systems integrators and logistics operator. With respect to external events, the risks will be mitigated by defining a recovery plan that will be promptly notified by the operating structure logistics

6. Potential variation in stakeholders interest/involvement
   a. 10%;
   b. High;
   c. Participation at meetings and pro-active initiatives;
   d. Mitigation measures: counteract/develop new involvement and update motivations.

7. Financial profitability linked to the solution proposed
   a. 20%;
   b. Medium;
   c. Business model analysis;
   d. Mitigation measures: strengthen dissemination and participation to increase project profitability.

Design

Definition of the implementation cases

The implementation case is based on the assignment of a double task to postal operators: delivering mail/parcels to the addressee and collecting “clean waste” from the addressee during the same transportation route.

The main issue is to identify the most appropriate type of waste capable of satisfying: i) legal, ethical and technical constraints posed by the stakeholders involved; ii) the ambition set by the RCLL

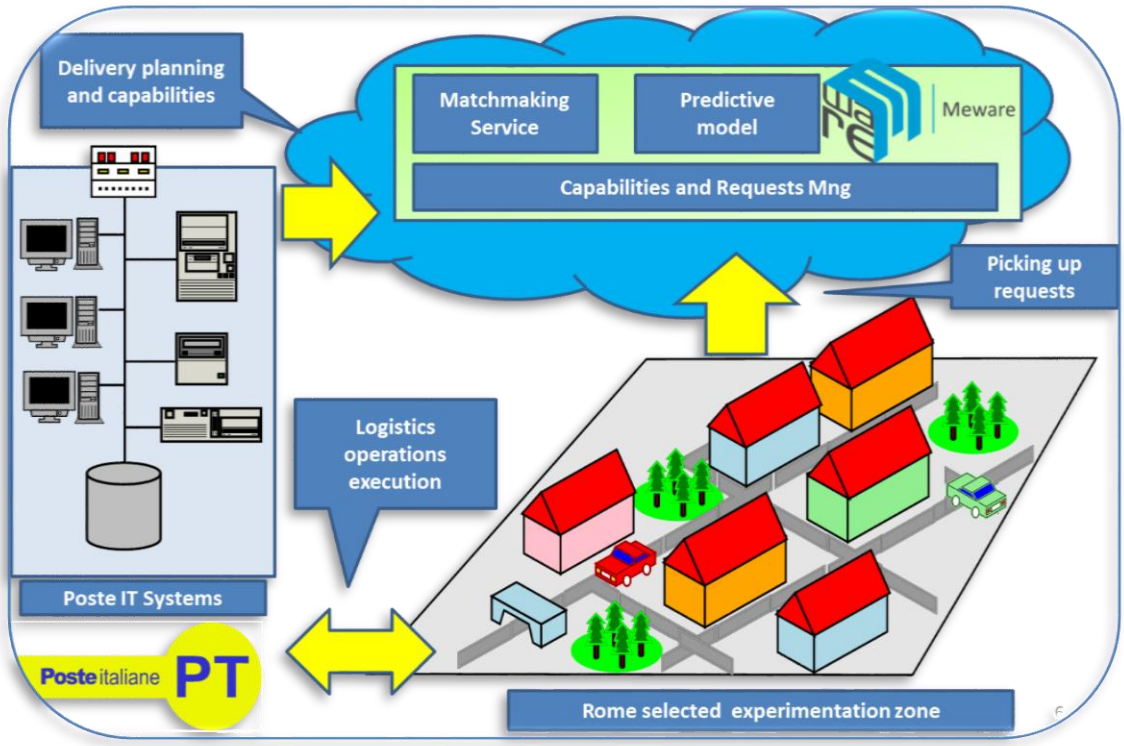


Figure 19: Concept of Rome implementation case

“Fit” evaluation

A group of retailers (various sectors) was involved in the RCLL to identify the types of waste they need to get rid of. A short list is reported below:

- toner
- batteries
- oil
- animal fat
- waste at high risk of infection (nails, paper stained with blood)
- electronic waste

Additionally, a group of citizens was involved in the RCLL to discover both the types of waste they need to get rid of and the services that PIT could offer them avoiding ad-hoc trip movements. A short list is here reported:

- toner
- batteries and electronic waste
- oil
- clothing
- medical prescriptions
- results of clinical analysis
- books from public libraries
- drugs (pharmaceutical logistics)
- tickets for theatres/concerts

All the solutions reported above were found to be unsatisfactory.

The RCLL found recycling plastic caps as the most appropriate solution capable of satisfying stakeholders’ legal/ethical/technical constraints and the RCLL ambition.

Design of pre-selected cases

The implementation case refers to a new system for collecting plastic caps with respect to the initiative promoted by the University of Roma Tre. The existing collection process can be described as follows: involved people bring plastic caps to a specific collection point (there are several collection points located in various buildings of the University) while others are asked to come, pick up and deliver plastic caps to the central collection point (located at the Rectorate). The general collection from peripheral collection points is signalled to the Mobility Manager of the University on a voluntary basis. Collection is performed on an ad-hoc procedure and constrained by actual availability of participants. Many trips are therefore purposed made with extremely low load factors.

The new system proposed by the RCLL can be described as follows: PIT, while delivering mail/parcels to the addressee (one of the various collection points), picks up plastic caps directly from the addressee during the same transportation route and delivers them to the central collection point. This integrated direct-reverse logistics will result in an optimized logistic process positively impacting congestion and polluting emissions.

Specific requirements are, at present, under discussion.

Development of evaluation methodology

Table 39: Evaluation of Rome implementation case

Used KPIs, monitoring approaches	• CO_2 emitted for Kg of plastic caps recycled • NOx emitted for Kg of plastic caps recycled • PM10 emitted for Kg of plastic caps recycled • Reduction in Kms driven • Load factor increase • Amount of profit/loss for stakeholders involved • Overall adoption rate

Rome Living Lab implementation plan

Table 40: Rome roadmap

Preconditions for success, external dependencies and assumptions	*The relevant legal issues for the Living Lab system are:* *1) Specific characteristics of the work contract for all the employees within stakeholders involved* *2) Hazardous material legislation* *3) Stocking restrictions in Universities* *The Living Lab is strictly linked to the overall motivation UR3 has to increase its green-university image.* *The critical quality factors for the success of the initiative relate to the compatibility of the solution/s proposed with the regular deployment of standard activities especially with respect to the number of collection points, type of recycling boxes (e.g. shape, colour, material, etc.), spatial dissemination, etc.* *The main assumptions relate to the fact that there are no dimension-specific changes in behaviour linked to project scale.* *No specific ethical issues are at present emerging with respect to Living Labs execution.*
Risks	*The main risks in Living Lab execution is due to the foreseen change in the motivation at the base of plastic cap collection. In fact, the optimization process will likely require a professional approach that PIT will be providing and consequently financial viability issues become extremely important which are not necessarily compatible with the charitable destination of the resources produced from the present collection initiative.* *The stakeholders involved are not likely to substantially modify their interests. However, the main risks pertain to the number of people actually participating to the collection process and the quantity of plastic caps they will be providing. In fact, there are two possible, while opposite, risk sources: 1) over participation – the system organized could not efficiently satisfy all the recycling trips needed; 2) under participation – the number of participants and the quantity of plastic caps collected are not enough to ensure a financial viability of the solution proposed.* *The technology related risks pertain to the adequate matching of the currently available technologies (e.g. RFID) and system requirements, service quality to be provided and quantity of caps to be recycled.* *The safety and security risks pertain both to the supervision and control of the collection spaces and boxes within university buildings as well as the stocking issues linked to room availability and fire protection rules to be guaranteed for an inflammable recycled item within buildings characterized by a constant and dense presence of students* *As it is for probabilities and effects and how can the risk be mitigated, please see "Risks analysis and mitigation measures" previously described.*

Deliverables and milestones	*D3.3, 3.4, 4.1, 4.2.*
Approach	*The activities are executed via: dedicated meetings and brainstorming; face-to-face interviews, questionnaire development and participation to open-door close-door workshops.* *Partners and activity teams members interact both via pre-timed meetings as well as upon specific requests arise from unforeseen problems. In presence, regular meetings are held along with skype meetings for low interaction issues.*
Timeline and planning	*See Table – "RCLL implementation plan" reported below*
Resources and their organisation	*The partners' responsibilities in the execution are distributed as follows:* *RSM is responsible for the overall Living Lab implementation and compatibility analysis with the city of Rome ambitions as well as in providing all the support needed for permits, regulations, etc.* *PIT will provide all the necessary instrumental material (e.g. vehicles), man power (e.g. mailman) and logistic knowledge and capabilities to perform and optimize plastic cap collection.* *MEW will contribute thanks to its previous participation in vehicle routing optimization system development and deployment as well as in IT-based logistic solutions.* *UR3 will provide both its behavioural analysis expertise contributing to questionnaire development and administration, data acquisition and estimation as well as guaranteeing the full cooperation as a test bed for a big attractor case.* *At present, there are no critical people/ technologies for Living Lab success.* *Depending on the amount of plastic caps that will be collected there could be a potential critical issue pertaining to the dimension of the stocking facilities to be made available by UR3. Contacts and discussions are under way to find viable solutions to this potential problem.*
Budget and expected costs	*The Living Lab budget and is it distribution among partners seems appropriate and reflects partners' respective work.*
Monitoring, control, reporting and communication	*The team is working well together and a collaborative spirit is characterizing all the initiatives taken. Sub-teams are discussed with respect to specific/technical issues to be addressed as part of possible solutions to be tested before evaluating their feasibility within the whole research team.* *There are no cultural or language barriers in the team.* *Communication among partners is performed via email, phone and personal face-to-face meetings that provide the best contribution in terms of added value among participants* *Each direct meeting gives rise to short summary written by the hosting institution.* *Agenda setting and issue resolution is always inspired by unanimity principles whenever possible. De facto, this has always been the case so far and no major controversies have arisen.*

Table 41: "RCLL implementation plan"

	Activity	Deadline
1.	Identification of project scope, functional requirement, non-functional requirement, and boundaries	31/02/2016
2.	Definition of a high level reference architecture of the RCLL implementation case	31/03/2016
3.	Results from the ex-ante behavioural analysis	30/04/2016
4.	Definition of the Use Cases	30/04/2016
5.	Implementation of a Solution based on the reference architecture	31/06/2016
6.	Test of the Implementation in the city of Rome	30/09/2016

References

- Gatta V, Marcucci E (in press), Stakeholder-specific data acquisition and urban freight policy evaluation: evidence, implications and new suggestions. TRANSPORT REVIEWS.
- Gatta V., Marcucci E., Scaccia L., (2015), On finite sample performance of confidence intervals methods for willingness to pay measures. TRANSPORTATION RESEARCH PART A: POLICY AND PRACTICE, vol. 82, p. 169-192, ISSN 0965-8564. http://dx.doi.org/10.1016/j.tra.2015.09.003.
- Gatta V., Marcucci E., (2015). Behavioural implications of non-linear effects on urban freight transport policies: The case of retailers and transport providers in Rome. CASE STUDY ON TRANSPORT POLICY, DOI: 10.1016/j.cstp.2015.08.001.
- Marcucci E, Gatta V, Scaccia L (2015). Urban freight, parking and pricing policies: an evaluation from a transport providers' perspective. TRANSPORTATION RESEARCH PART A: POLICY AND PRACTICE, vol. 74, p. 239-249, ISSN: 0965-8564.
- Gatta V, Marcucci E (2014), Urban Freight Transport Policy Changes: Improving Decision Makers' Awareness Via an Agent-Specific Approach, TRANSPORT POLICY, vol. 36, p. 248-252, ISSN: 0967-070X.
- Nuzzolo, Comi, (2015), "Urban Freight Transport Policies in Rome: Lessons Learned and the Road Ahead", Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 8:2, 133-147
- Roma Capitale, (2014), "General plan of urban traffic in the Rome capital region" [IT]
- Region of Lazio, (2009), « Regional Plan of Freight and Logistics », [IT]
- Unioncamere Lazio, (2007), « The Urban Distribution of Freight In Rome: criticality and requests », [IT].

Brussels CITYLAB

Living Lab environment in Brussels

Characteristics of freight transport system and policy framework

The fact that Brussels is the capital of Belgium and Europe and is centrally located in fairly large consumer markets attracts large freight flows. The Region is well connected to other important regions in north-west Europe through rail, water, air and road. Logistics suffer, however, from severe road traffic congestion with average time losses of 33% compared to free-flow traffic in 2014 (www.tomtom.com). In the long-term, this congestion endangers the supply of more than one million inhabitants, certainly in combination with an ever increasing demand for more flexible and just-in-time deliveries. Freight transport does not only suffer from congestion, it also contributes to it. Only about 6% of all vehicles on the road in the Region are freight vehicles, but on-street parking during loading and unloading operations considerably affects a fluid traffic flow. Together, they are responsible for 14% of all vehicle kilometres, but their proportionate burden on the environment and liveability is much higher: vans and trucks are responsible for one quarter of transport related CO_2 emissions and for about one third of NOx emissions in the Region (Brussel Mobiliteit, 2013; Lebeau & Macharis, 2014). Because of its low share in total traffic, urban freight transport has not been a priority to local policy makers. Because of the proportionally high impact of freight vehicles and the aim of the European Commission to achieve CO_2-free city logistics in major urban centres by 2030, there was a need to develop an integrated vision on freight transport and distribution for the Brussels-Capital Region and to take sets of measures and support freight transport solutions to come to more sustainable urban freight transport.

The Brussels-Capital Region is one of the three Belgian regions comprising 19 municipalities, one of which is the City of Brussels. Brussels is also the capital of both Belgium and the French and Flemish Community of Belgium. The Region has a population of 1.2 million and is part of a larger Brussels metropolitan area that has a population of over 1.8 million. The Brussels-Capital Region is the competent authority in matters as transport, economy, urban development and housing, environment, public works and energy policy and therefore is the appropriate authority level for urban freight transport policy making for Brussels. As a political authority, the 19 municipalities have a lot of autonomy to exercise power on their own territory. At the same time, they are subject to the control of the Government of the Capital-Region through the Local Authorities Administration. The municipalities can establish municipal regulations on very diverse matters (e.g. clean streets, planning permission, etc.) and can therefore also influence urban freight transport policy making.

In 2011, the Region took the initiative to develop a Strategic Plan for Goods Traffic which was in accordance with its mobility plan (dating from 2010). The freight plan was drafted together with the private sector: shippers as well as carriers and receivers. The points of view of the 19 municipalities were also taken into account. After a long consultation and adaptation process, the plan was accepted by the Government of the Capital-Region in July 2013. Actions are planned till 2020, but the objective is to review this plan every two years to keep it up-to-date and flexible. The plan contains 5 strategic axes for reaching these targets and for each axis dedicated measures are listed as well:

1. Organise a physical structure for urban distribution
2. Integrate urban distribution in land-use planning and logistics real estate decisions
3. Improve the efficiency of deliveries through operational measures
4. Collect data, support research and encourage innovation
5. Take the role of coordinator.

Table 42: Ambitions, goals and targets for urban freight transport in Brussels

<table>
<tr><th></th><th>Short description, date published</th><th>Web-link (if available)</th></tr>
<tr><td>UFT ambition (long-term, >7 years)</td><td>Long-term ambition for urban freight transport in the Brussels-Capital Region (Strategic Plan for Goods Traffic, 2013).
<table>
<tr><th>Year</th><th>Emissions reduction</th><th>Vehicles movements reduction</th></tr>
<tr><td>2020</td><td>-20%</td><td>-10%</td></tr>
<tr><td>2030</td><td>-50%</td><td>-20%</td></tr>
<tr><td>2050</td><td>-100%</td><td>-30%</td></tr>
</table></td><td>http://www.bruxellesmobilite.irisnet.be/articles/la-mobilite-de-demain/plan-transport-de-marchandises
(French or Dutch only, brochure available in English)</td></tr>
<tr><td>UFT goal (medium term, 2-7 years)</td><td>- Decrease and optimise freight vehicle movements inside and towards Brussels
- Induce a modal shift from road to water and rail and increased use of environmentally friendly vehicles for the last mile
- Simplify operations for carriers that are delivering in Brussels
These goals are translated into 36 actions that can be grouped around 5 main axes of intervention.
(Strategic Plan for Goods Traffic, 2013)</td><td>http://www.bruxellesmobilite.irisnet.be/articles/la-mobilite-de-demain/plan-transport-de-marchandises
(French or Dutch only, brochure available in English)</td></tr>
<tr><td>UFT targets (short term, < 2 years)</td><td>The Strategic Plan does not mention which of the 36 actions should get priority. The table below gives an overview of the measures that have been started or implemented since the implementation of the plan.
Today, considering the actions that already have been taken, the short term targets are:
- To improve the urban distribution structure
- To increase the use of the UCC
- To test new solution that respond to the recent expansion of the pedestrian area in the city centre
- To implement a recognition scheme for sustainable logistics operators
- To develop more Delivery Service Plans</td><td></td></tr>
<tr><td>UFT action plan</td><td>The Strategic Plan for Goods Traffic in the Brussels-Capital Region is the long-term action plan. The aim is to evaluate and revise the plan every 2 years.</td><td>http://www.bruxellesmobilite.irisnet.be/articles/la-mobilite-de-demain/plan-transport-de-marchandises
(French or Dutch only, brochure available in English)</td></tr>
</table>

The table below gives an overview of all measures recently taken by Brussels Mobility or planned for the near future.

Table 43: Overview existing measures urban freight transport in Brussels

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	Analysing freight flows in Brussels: In 20xx, a freight flows study was undertaken to better understand freight transport in Brussels. First, through a phone survey, 3000 entities located in Brussels (enterprises, schools, administrations, hospitals, shops, logistics service providers, etc.) were questioned about the freight volumes they receive and/or send out. Second, the FRETURB software was used to simulate goods transport in Brussels.
Measure 2	Inventory of the logistics real estate: In 2015, a study was done on to identify and evaluate real estate in Brussels.
Measure 3	Launch of an urban consolidation centre (UCC): In September 2014, with the support of the European LaMiLo project, an urban consolidation centre (UCC) was launched. The UCC was exploited by private partner CityDepot. After a six months trial and a positive evaluation, the UCC is now continuing its activities on 100% private basis.
Measure 4	Transport of (palletized) building materials by inland waterways: By means of a pallet shuttle barge, building materials are transported from outside Brussels to the port of Brussels.
Measure 5	Regional Mobility Committee on goods transport Several times per year, the Brussels-Capital Region invites a broad range of stakeholders (public, private and academic sector) to discuss important issues related to freight transport in Brussels.
Measure 6	Decriminalization of illegal parking on loading bays The Brussels-Capital Region changed the penalization system for illegal parking on loading bays by passenger cars and service vehicles. It is allowed not for anyone to park on a loading bay but you have to pay a set price of 100€ if you do, except when you are loading or unloading. By changing this regulation, penalizing illegal parking on these loading bays is no longer under the responsibility of the police (which has other priorities) but can be done by official parking attendants.
Measure 7	Belgian Road charging system for lorries From April 2016, all heavy goods vehicles of more than 3.5 tonnes will be subject to a road charging system and will have to pay a certain amount per kilometre they drive on Belgian motorways and a number of regional and municipal roads.
Measure 8	Off-hour deliveries Pilot project in 2014 with 2 retail chains with support of the European Straightsol project.
Measure 9	Delivery Servicing Plans In 2015, Delivery Servicing Plans were made for a bank and a university located in Brussels. Goal is to do this again in 2016 for additional organisations to improve the methodology.
Measure 10	A communication platform for smart city logistics From January 2015 on, within the project Urbanwise, a communication platform for smart city logistics will be developed. It will be an IT tool that can connect all actors in the Brussels freight transport context and where they can exchange information on the transportation services they need and/or offer.
Measure 11	A recognition scheme for sustainable transport operators The Brussels-Capital Region considers introducing a recognition scheme for sustainable transport operators. A study to look into all possible options and effects is about to start in 2016 (Syrop).

Some of the 19 municipalities in the Brussels-Capital Region also took some measures. It is difficult to get a full overview of all types of measures that are taken. One of those measures

can be short and long-term parking for lorries. Some other measures taken by municipalities are described below.

Table 44: Measures urban freight transport in separate municipalities in the Region

	Short description (including if available e.g. timeline and planning, expected impact, resources and expected costs, involved stakeholders, implementation and enforcement plan, web-link, results from evaluation or monitoring, etc.).
Measure 1	Expansion of the pedestrian area in the city centre – City of Brussels In June 2015, the existing pedestrian zone in the city centre was expanded. Its surface increased from 28 hectare to 50 hectare. This expansion also influenced urban distribution since deliveries in that area are only allowed between 4am and 11am. Next steps planned by the Brussels-Capital Region: 1. Consultation together with the regional agency in charge of commerce and the city of Brussels on the impact for local retailers and carriers as regards deliveries, especially during the refurbishment works. 2. Implementing during the refurbishment works a 'Nearby Delivery Area' which is a place close to the pedestrian zone where goods can be unloaded. The last-mile to the shops is then done by cargo bike or pallet truck without having to enter the area.
Measure 2	Study to outsource their central purchasing department to the Brussels UCC – City of Brussels The city of Brussels considers outsourcing transportation of goods from their central purchasing department to a logistics service provider. They are currently looking into that.

Cooperation on urban freight transport

The Brussels-Capital Region believes in collaboration with both public and private sectors to come to more sustainable urban freight transport. For all of the measures that were taken in the past two years, they collaborated with local stakeholders (e.g. the UCC, the off-hour deliveries test, etc.). It is their explicit aim to support innovative private initiatives (Action 9 in the Strategic Plan for Goods traffic).

In 2010, the Region started working on a strategic vision on how to guarantee continuity of urban deliveries while also minimizing the nuisance caused by these deliveries. They subcontracted a study to a consultancy consortium (Buck Consultants International and Espaces Mobilités). One of the explicit tasks of the consultants was to introduce a conciliation procedure since both the Region and most private actors (suppliers, carriers and receivers) were convinced of the benefits of finding solutions for more sustainable urban freight transport together. In a first stage, representatives of various sectors were interviewed (integrators DHL and TNT, chain of newspaper shops Press Shop, carrier for building materials Group Gobert, retail chain Carrefour, carrier of waste Net Brussels and international music distributor European Music Distribution. These interviews provided better insight in both the transport behaviour in these sectors and the challenges these distributors are facing. The aim of the interviews was not to analyse existing and expected distribution needs in great detail. They did help, however, to give direction to the participatory workshops that were about to follow.

In 2000, the Brussels-Capital Region founded a Regional Mobility Committee. The aim of the committee is to come up with recommendations and advice concerning mobility in Brussels for the regional minister of transport and his private office. It was considered useful to create a specific branch of this existing conciliation platform to also discuss urban freight transport in Brussels (and not only passenger transport). In 2011, four participative workshops took place to which a wide range of private and public stakeholders were invited. On average, about forty people from various sectors participated (shippers, retailers, logistics service providers, government agencies, employer's associations, trade associations, organisations representing citizens, environmental organisations and universities). Prior to the workshops, the participants

were asked to write down their comments to the draft measures suggested by the consultants. During the workshops, these comments were discussed. The first three workshops each addressed one specific topic: consolidation of freight flows, consolidation infrastructure and last mile deliveries. During the fourth workshop, the results of the first three were discussed once more and the participants were asked to prioritize between the different measures that came out of the conciliation process.

Since that start in 2011 with 4 dedicated workshops, about two to three times per year, the mobility department of the Region organises a Mobility Committee on urban freight transport inviting all relevant stakeholders to participate. The recommendations of the Committee do not have binding power. Each time, a different topic is addressed. The last four sessions, for example, discussed the road charging system that will be introduced in April 2016, the effects of the expanded pedestrian zone on freight transport and deliveries in the area, the evaluation of the 6 month pilot test of the UCC and the evaluation of the off-hour deliveries test that took place in Brussels in 2014. Depending on the topic that is addressed, about 30 to 40 people are present during each Committee.

Existing data and monitoring on urban freight

How the Brussels' urban freight transport system develops and how it impacts society is monitored through a variety of indicators. Concerning the traffic situation in the Brussels Capital Region, information on the following indicators is available from official sources (Brussels Mobility):

- Traffic counts;
- Split of freight vehicles (based on actual traffic counts and estimations through FRETURB);
- Vehicle km per year in the city (based on estimations through FRETURB);
- (Average) journey distances for freight vehicles (based on estimations through FRETURB);
- Percentage lorries / vans (based on actual traffic counts and estimation through FRETURB)Percentage lorries / vans (based on estimation through FRETURB);
- (Estimates on) logistics activities (in m^2).

The Belgian Institute for Traffic Safety also has data on traffic safety and is able to distinguish between different types of vehicles.

Information on emissions and environment is provided on the website of the environmental department of the Brussels-Capital Region called Brussels Environment (http://www.environnement.brussels). The available data is not based on actual measurements but was estimated through a model that was built by Brussels Environment. The model also does not make the distinction between passenger and freight transport.

These are the available data:

- (Estimates on) CO_2 emissions;
- (Estimates on) local emissions (PM10, NOx, …);
- Air quality;
- Noise emissions.

The Brussels Institute for statistics and analysis (http://www.statistics.irisnet.be) also provides information on spatial issues in Brussels, specifically:

- (Estimates on) commercial activities in the city (e.g. floor-space / FTE);
- Total non-residential floor-space in the city;
- Estimates land use (residential area, commercial area, industrial area, etc.);

- Size of the city (in km^2);
- Population of the city.

The Brussels living lab can profit from researchers collecting data on freight flows in Brussels as part of different research projects such as Lamilo, CO3, Straightsol, Pulse, etc. The mobility department of the Region asked the “Centre d’études sociologiques” of the Brussels Saint-Louis University to summarize all available data and information from administrations and universities on urban transport and mobility in Brussels. Recently, they published their fourth release which deals with freight transport (Strale et al., 2015).

Focus of the Brussels CITYLAB Living Lab

There already is an urban freight partnership in Brussels: the Regional Mobility Committee. This Committee already adopted many of the aspects of a Living Lab. The goal is to do that even more during the course of CITYLAB.

It is the ambition to perform one implementation case using the Living Lab methodology (the one of PGBS). The Living Lab implementation focuses on increasing load factors by unlocking free capacity to cost-efficiently supply consumer goods to small independent retailers and reduce generated impacts of distribution and shopping. Currently the majority of the store owners go to the wholesaler with their own vehicle. The goal of the Living Lab implementation is to supply these stores in different parts of the Brussels Capital Region with free transportation capacity from different service-driven companies. Several companies have daily delivery and/or service trips and need to design-in free capacity in both their vehicles and the delivery network because they are often service-driven and need to execute specific delivery tours regardless of being fully loaded. Through Citylab, PGBS as a shipper wants to understand if using free transportation capacity by an already present-in-the city service-driven company can be an alternative compared to other supply modes (3PL’s, shop owners buy packages themselves, distributors …). As is elaborated under ‘Design’ in the next section, different implementations are going to be tried. The aim is to involve 20-30 stores and supply them in different ways. One owner of free capacity delivers to these stores a couple of months, after which another company takes over. This allows testing different ways of supplying as well as adjusting the implementation if necessary. Due to the complexity of the new distribution set-up, initially only PGBS products are included in the free capacity. If successful, collaboration with other manufacturers will be sought in a later stage to increase the load factor more.

Planning of the Brussels Living Lab environment

Set Up

Ambition

Brussels has the tradition to ask other actors involved in urban mobility for their advice and feedback, notably by means of their Regional Mobility Committee. This is also the case for freight transport related issues since 2011. It is not a Freight Quality Partnership but it is a well-functioning consultation body. This Regional Mobility Committee on urban freight transport can be considered as a living lab, especially because this consultation body was used to formulate the ambition, scope and measures in the Strategic Plan for Goods Traffic. Also today, the Committee still meets two to three times per year to discuss current problems and possible solutions. They have found a certain rhythm in their meetings and it would seem awkward to ask them once again what the ambitions should be of the measures that are taken in Brussels in the field of urban freight transport. They already had to answer that question several times. That is why we will consider the objectives that were formulated in the Strategic Plan for Goods Traffic as the objectives of the Brussels Living Lab. These objectives can be found in the table on pages 13 and 14 of this document.

Scope

The geographic scope of the Brussels Living Lab is the entire Brussels-Capital Region. It was the government of that Region that took the initiative to involve all actors for its Strategic Plan. The reason to no longer only tackle passenger transport issues but also freight transport issues originated from the observation that traffic in Brussels is slowing down and that freight transport is also contributing to that. No specific sector, vehicles or types of goods are targeted by the Strategic Plan. Together, it means that the scope of this Living Lab is not very specific. That is also reflected in the topics that are treated during the Regional Mobility Committee as well as in the participants to these committees. On average, about thirty people participate from various sectors (shippers, retailers, logistics service providers, government agencies, employer's associations, trade associations, organisations representing citizens, environmental organisations and universities). Following this Mobility Committee, the Strategic Plan and the work of Brussels Mobility, multiple measures have been implemented. Each time, that is done in a smaller living lab environment. None of the measures were taken by one single actor, each time they cooperated to develop a better and more sustainable solution.

Living Lab Partners

Table 45: Brussels Living Lab partners

Owner	Brussels-Capital Region (Minister of Transport and Brussels Mobility)
Other living lab participants	Vrije Universiteit Brussels (VUB)
Users	Receivers in Brussels (independent receivers, receivers part of a chain, individuals) Logistics service providers (carriers and warehouse operators that are located in Brussels) and/or have to deliver in Brussels) Shippers (shippers located in or close to Brussels and senders that want to have something delivered in Brussels) Forwarders (forwarders that have to have something delivered or picked up in Brussels Port of Brussels (logistics facilitator regarding waterways and road transport) (possibly)
Customers	Citizens Consumers Tourists/visitors Commuters The 19 municipalities of the Brussels-Capital Region and the Association of the City and Municipalities of Brussels Brussels-Capital Region Citydev (the Regional agency in charge of urbanistic development) Impulse.brussels (the Regional agency for enterprises) Atrium (the Regional commerce agency)
Stakeholders	There have been so many implementations that it is impossible to list them all (see the measures that were listed on pages 14 and 15 of this document. At the same time, the living lab scope is very wide here. For each implementation, a new smaller living lab environment is created.

Living Lab Public Private Partnership

Since 2011, about two to three times per year, the mobility department of the Region organizes a Mobility Committee on urban freight transport inviting all relevant stakeholders (public, private and academic sector) to discuss important issues related to freight transport in Brussels. On average, about 30 to 40 people from various sectors participated (shippers, retailers, logistics service providers, government agencies, employer's associations, trade associations, organisations representing citizens, environmental organisations and universities). The recommendations of the Committee do not have binding power. They are, however, taken into account by the authorities when shaping their policies, measures and solutions. Apart from that, each solution tested and/or implemented by the authorities was developed and implemented together with private actors. For each of the measures in the freight plan that they made progress on, they started a new partnership with relevant private actors.

System analysis

Legal and ethical issues

The aim of the Brussels Living Lab is to develop solutions and measures together with all stakeholders. This is done during the Mobility Committee. After each Mobility Committee, a meeting report is written by people from Brussels Mobility. They send the report to all participants of the meeting. The recommendations done by the members of the Mobility Committee are incorporated in this meeting report. These recommendations are not binding, however, which means there is no real legal framework for this Living Lab system.

A relevant legal issue is the complicated statutory framework. The Brussels-Capital Region is one of the three Belgian regions comprising 19 municipalities, one of which is the City of Brussels. Brussels is also the capital of both Belgium and the French and Flemish Community of Belgium. It means that there are multiple authority levels of legislation (federal, regional and local).

No ethical issues are expected in executing the Brussels Living Lab.

Stakeholder/end user analysis

Table 46: Stakeholder/end users Brussels Living Lab

Category of stakeholder	Stakeholders	Main interest in context of urban freight transport
Supply chain stakeholders	Shippers and forwarders (that have to have something delivered or picked up in Brussels)	Delivery and collection of goods at the lowest cost and optimal service while meeting the needs of their customers. Higher sales. Corporate sustainability.
	Logistics service providers (carriers and warehouse operators located in Brussels) and/or have to deliver in Brussels)	Low cost but high quality transport/warehouse operations and satisfaction of the interests of the shippers and receivers. Efficiently loaded vehicles. Corporate sustainability. Less congestion. More revenues.
	Receivers (independent receivers, receivers part of a chain)	High quality deliveries (on time, short lead-time, convenient). Low transport costs. Low inventory costs. Low out-of-stock rate. Attractive shopping/living environment. Corporate sustainability.
	Consumers (brick and mortar)	Availability of a variety of goods in nearby shops in the city centre.
	Consumers (online)	High quality deliveries (on time, short lead-time, convenient). Low transport costs.

Resource supply stakeholders	Infrastructure providers (Brussels Capital Region)	Cost recovery and infrastructure performance. Accessibility and use of infrastructure. Less hindrance because of parked vehicles for (un)loading.
Public authorities	Brussels-Capital Region	Attractive city for inhabitants and visitors, with minimum inconvenience from freight transport, while also having an effective and efficient transport operation. Reduction in the number of unnecessary vehicle movements. Attractive business climate. Social political acceptance of measures.
Other stakeholders	Other economic actors located in the urban area (manufacturers, service providers, etc.)	Site accessibility and on-time deliveries.
	Residents	Minimum inconvenience caused by UFT
	Visitors/tourists	Minimum inconvenience from UFT and a wide variety of products in the shops.

Source: Own input, MDS Transmodal Limited (2012), STRAIGHTSOL (2012)

System analysis

On a European level, 71.6% of urban freight movements are done by road (European Commission, 2014). Only a minority of the road vehicles used for freight transport is alternatively powered (Schoemaker et al., 2006) which means freight transport emits considerable amounts of global and local pollutants. In this light, different goals have been formulated at the European level including the ambition to reach CO_2-free city logistics in 2030 (European Commission, 2013). At the level of the Brussels-Capital Region, within their Strategic Plan for Goods Traffic, similar long-term goals were adopted as well (reduce emissions by 50% and vehicle movements by 20% by 2030).

Reaching these goals is challenging since the demand for urban freight transport is still increasing due to various commercial trends (Verlinde, 2015):

- General
  - Continuously increasing consumer demands give rise to a constantly changing assortment of a wide variety of goods that has to be provided
  - Non-core activities within the supply chain are outsourced and supply chains become increasingly integrated which leads to many different cooperating private actors in freight transport.
- E-commerce and home delivery
  - By 2025, 20% of retail will happen through online channels increasing the demand for parcel deliveries. Shipments will become smaller and more frequent.
  - This growth in e-commerce and home deliveries will change the urban freight flow patterns and therefore urban freight transport. The impact of these changes remains uncertain and depends on whether consumers will change their travel behaviour because of their increased online purchase behaviour and whether the trips of express couriers will be further rationalised because of the higher volumes.

  - In the case of home deliveries, there are large flows of returned product which will require major reverse logistics operations.
- Retail
  - Traditionally, the retail business was dominated by smaller family-run or regionally targeted stores but this market is increasingly being taken over by retail groups. This trend leads to larger vehicles and efficiency gains caused by the increase of goods from retailer-controlled distribution centres.
  - The past years, many out-of-town shopping centres were built. There is a backward trend, however, towards smaller store formats due to the popularity of the urban lifestyle and the wish to shop locally.
  - Because of the growth of e-commerce and home deliveries, the retail model will evolve from a Single/Multiple Channel model to an Integrated Cross Channel model demanding for more delivery options
  - Trend towards longer opening hours and Sunday openings. Together with just-in-time systems, reductions in stock level and smaller store formats this will lead to even more frequent and smaller deliveries.
- Hotels, Restaurants and Cafés (HoReCa)
  - The HoReCa sector has been growing strongly.
  - Despite the presence of some large multi-national chains, the industry remains dominated by small family- run restaurants, bars and hotels.
  - Orders are usually rather small and deliveries are often required on a just-in-time basis.
- Construction
  - Growing number of construction developments leads to increasing demand for delivery operations serving construction sites.
  - Construction sites are located throughout the city, also in already congested areas or sensitive locations (e.g. pedestrian areas or heritage locations). This leads to additional hindrance, especially when large trucks are needed to do the deliveries.
- Waste
  - Increase in the collection of recyclable waste leads to more freight vehicle trips.

Especially in Brussels, it is challenging to meet the increased demand since congestion levels already are rather high (average delays of 33% (tomtom, 2015)).

Short and long-term policy measures taken by the Brussels-Capital Region are listed above in the document. Relevant to mention again is the Belgian Road charging system for trucks that starts in April 2016. Because of the fully automated system, a lot of data will be available on urban freight transport in Brussels.

Risks analysis and mitigation measures

For the Brussels Living Lab, two main risks can be identified:

- First, there is the risk of the changing political context. The approach on how to deal with urban freight transport depends on how important this topic is to the political parties that are in power and to how important this topic is to the Minister of Transport. Depending on that, more or less budget will be made available for transport and mobility in general and for urban freight transport. The probability of having a changed political constellation in the near future is always high. On the other hand, mobility problems in Brussels are severe and important to the general public and local enterprises meaning we can assume that further action will be taken. It is very difficult to anticipate on this.
- Second, there is a risk of low stakeholder, user or customer involvement because of the relatively low power of the members of the Mobility Committee. The Brussels-Capital Region is not obliged to take into account the recommendations of the Mobility Committee. Because of that, there is a severe risk of lack of support for the Living Lab by stakeholders in the long-term. This aspect could be monitored by discussing on a regular basis how the stakeholders relate to the Mobility Committee and its work.

Design

Definition of the implementation cases

In the Strategic Plan for Goods Traffic, a list of relevant implementation cases was already developed. On some implementation cases the progress was made already. Apart from that, the Living Lab can also support other implementation cases. One of these cases is the pilot of PGBS.

"Fit" evaluation

When the Strategic Plan for Goods Traffic was drafted, the members of the Regional Mobility Committee were asked to come up with comments on the measures that were proposed in the draft version of the Strategic Plan. Their comments were processed in the final version of the plan. This plan still is the basis for the measures and initiatives that are taken or supported by the Brussels-Capital Region. As you can see in the table on page 14, various measures were already implemented. Since then, other opportunities occurred and will keep popping up. There might be new interesting measure or initiatives or maybe the old ones are still very relevant. To find out how the stakeholders think about this, the topic of the Regional Mobility Committee of 20 January 2016 was how to prioritize among different measures and initiatives. The participants were grouped into discussion groups of 4 people. Each group was asked to list all interventions they could think off that would benefit urban freight transport in Brussels. To structure the discussion, we used the 4 A's of sustainable city logistics: Awareness, Act & Shift, Avoidance and Anticipation of new technologies (Macharis and Kin, 2016). After the discussion within the groups, the participants were asked to explain their ideas and these ideas were then listed in a way the whole group could see them. Afterwards, each individual was asked to put these ideas on a grid with two axes (feasibility and impact) with the idea that the Brussels-Capital Region should give priority to ideas that score high on both indicators. The outcomes of this workshop are not available yet but could be added to this document later on.

Development of evaluation methodology

Since the goal of this Living Lab process is to involve all stakeholders in the decision making process on urban freight transport in Brussels, so far, no indicators to evaluate results of implementation cases were used. For each implementation done by the Brussels-Capital Region (together with its private partners), an evaluation was done. For this Living Lab, the main focus should be on identifying indicators to evaluate the Living Lab process. So far, how the freight section of the Regional Mobility Committee works was never evaluated. This is a suitable topic for one of the next meetings of the Committee.

Brussels Living Lab roadmap

Table 47: Brussels roadmap

Preconditions for success, external dependencies and assumptions	• *Legal framework: The jurisdiction of the different authority levels in Brussels.*
	• *Legal framework: The Mobility Plan of the Brussels-Capital Region and the non-binding Strategic Plan for Goods Traffic.*
	• *No legal issues are expected.*
	• *Critical quality factors:*
	  ○ *The recommendations of the Regional Mobility Committee are taken into account by policy makers.*
	  ○ *Local authority makers keep their partly focus on urban freight transport and not only on passenger transport.*
	• *Dependencies between the Living Lab system and its environment:*
	  ○ *Important emission goals were set by European and Regional authorities.*
	  ○ *Urban deliveries will be increasingly challenging in the future (congestion, fragmentation, rules set by local authorities)*
	• *No ethical issues*

Risks	• *Main risks:*
	  ○ *Decreased political support for addressing urban freight transport issues. Effect would be high; difficult to mitigate.*
	  ○ *Decreased interaction by stakeholders because they have no real decision power in the Regional Mobility Committee. Effect would be high; solution would be to address this topic with the stakeholders.*

Deliverables and milestones	• *Official Deliverable: meeting report of the Regional Mobility Committee.* • *No official milestones, ongoing process.*
Approach	• *Two or three meetings per year.* • *Workshops, discussion tables, etc.*
Timeline and planning	• *Ongoing process*

Resources and their organisation	• *It is the responsibility of Brussels Mobility to organize the Regional Mobility Committee. They also provide the resources.*
	• *Critical people needed in the team:*
	  ○ *Participation of representatives of the Minister of Transport*
	  ○ *Representatives of all stakeholder groups.*

Budget and expected costs	• *Not budgeted*
Monitoring, control, reporting and communication	• *The Living Lab approach mainly consists of open discussions between stakeholders. No need for sub-teams. The idea is to confront the views of the different stakeholders. Brussels Mobility reports on each gathering. This reporting is open for comments to all participants.*

Planning of the Brussels Living Lab implementation case

Set Up

Ambition

The ambition of this project is to increase load factors by unlocking free transportation capacity in the city to cost- and service-efficiently supply consumer goods to small independent retailers. Through Citylab, PGBS as a shipper wants to understand if using free transportation capacity by an already present-in-the city service-driven company can be an alternative compared to other supply modes (3PL's, shop owners buy packages themselves, distributors …)

Scope

The Living Lab implementation takes place throughout different municipalities in the Brussels Capital Region. Which neighbourhoods are included depends on the concentration of small independent retailers that are willing to participate (will become clear during a later phase of the project). Most probably multiple neighbourhoods are included. Regarding the logistics specification, the Living Lab implementation focuses on the movement of (low value) fast moving consumer goods (FMCG). The transport of these goods is shifted from the inefficiently loaded vehicles of the shop owners themselves to different modes of service-driven companies such as vans, cars, public transport and/or (cargo)bikes. The FMCG are mostly transported in case packs and loose items, and are non-conditioned. Users that are involved for the execution of the operations are:

- PGBS as the manufacturer and shipper
- ODTH as 3PL that is subcontracted by PGBS to arrange the ordering, shipping and billing. It also operates the company shop on behalf of PGBS and provides the software (i.e. online shop)
- Shop owners who have to change their (ordering) behaviour
- Owners of free capacity: different service-driven companies who offer their free capacity and carry out last-mile deliveries to the shops

The customers of the living lab are the shop owners as receivers who benefit from more convenient deliveries since they do not have to go to the wholesaler themselves any more. Depending on the willingness to participate, it is planned to involve 20-30 shop owners. Another group of customers are the owners of free transportation capacity who have additional volume and revenues. It is planned to involve at least two owners of free capacity. Next to being the owner, PGBS is also a customer of the living lab because it establishes direct contact with the store owner with the aim to increase the visibility of their products, more frequent replenishment and/or higher sales. Other organisations that are necessary to make the implementation happen are Atrium and Brussels Mobility. Ideally other manufacturers are also involved in order to increase the transported volume.

CITYLAB Participants

PGBS, VUB and Brussels Capital Region have committed to support the experiments. PGBS will work with both its supply chain research group (SNIC), its local business units and local 3PL's to explore how to best execute the trials.

Companies with free capacity or willing to also distribute their goods to small stores are already approached such as Febelco, bpost and Initial, for which the decision to participate in the experiment is being expected soon. During the living lab, others will also be contacted.

Table 48: CITYLAB Participants Living Lab implementation Brussels

Owner	PGBS (Industry partner)
Other living lab participants	Vrije Universiteit Brussels (VUB) (Research partner) PGBS Supply Network Innovation Center (SNIC) (Industry and Research partner) Brussels Capital Region (City partner)
Users	PGBS (shipper), including ODTH (3PL) Small independent store owners (receivers) Owners of free transportation capacity (transport operators)
Customers	PGBS (shipper)

	Small independent store owners (receivers) Owners of free transportation capacity (transport operators) Consumers
Stakeholders	PGBS VUB Brussels Capital Region (including Brussels Mobility) Owners of free transportation capacity Small independent store owners ODTH Atrium (external party; Chamber of Commerce) Logistics service providers Wholesaler / Retailer (possibly) Distributors (possibly) Other manufacturers (possibly) Port of Brussels (logistics facilitator regarding waterways and road transport) (possibly) 19 municipalities and the Association of the City and the Municipalities of Brussels Consumers Residents Visitors/tourists

System analysis

Legal and ethical issues

The expected legal issues in executing the living lab are confidentiality (i.e. contact details, prices, data sharing) which are considered to be minor. There are no expected ethical issues.

Stakeholder/end user analysis

The key characteristics of the solution that can be evaluated by stakeholders (e.g. attributes of the service provided) are:

- Supply cost towards small independent stores
- Quality of the supply of small independent stores
- Feasibility of integrating deliveries to small independent stores into the operations of the owner of free capacity (Do different types of service companies have same or different experiences? Is such a model sustainable in the long-term and if not, what needs to be developed to make it sustainable (e.g. software integration,…)?).
- Cost/benefit ratio of integrating deliveries to small independent stores into the operations of the owner of free capacity
- Feasibility of integrating deliveries to small independent stores into the operations of PGBS (note: to a certain extend as PGBS uses the company shop and not the official PGBS operational systems)
- Cost/benefit ratio of integrating deliveries to small independent stores into the operations of PGBS as it concerns a new supply model which can be compared to other existing models such as e.g. use a parcel deliverer.
- Shelf presence/sales of PGBS products in small independent stores
- Service towards small independent stores and contact with independent stores from PGBS
- Acceptance of the solution by shop owners. Understanding of pros and cons.
- Ideal delivery lead time

- Ideal delivery frequency

Aspects of the analysis are elaborated in the attached data plan which belongs to the evaluation methodology.

Table 49: Overview of Brussels Living Lab stakeholders and their main interests

Category of stakeholder	Stakeholders	Main interest in context of urban freight transport
Supply chain stakeholders	PGBS	Delivery and collection of goods at the lowest cost and optimal service while meeting the needs of their customers. Higher sales. Higher in-store visibility. More direct contact with receiver. Create brand loyalty.
	Transport operators (owners of free capacity)	Low cost but high quality transport operations and satisfaction of the interests of the shippers and receivers. Efficiently loaded vehicles. Greener image. Less congestion. Additional revenues. Feasibility of integrating products to small independent stores in its operations
	Receivers (small independent store owners)	On time delivery of products, with a short lead-time. Low transport costs. Using their private car less More time available to do work in the shop. Lowest out-of-stock as possible. Convenient deliveries.
	Consumers	Availability of a variety of goods in nearby shops in the city centre.
Resource supply stakeholders	Infrastructure providers (Brussels Capital Region)	Cost recovery and infrastructure performance. Accessibility and use of infrastructure. Less hindrance because of parked vehicles for (un)loading.
Public authorities	Local government	Attractive city for inhabitants and visitors, with minimum inconvenience from freight transport, while also having an effective and efficient transport operation. Reduction in the number of unnecessary vehicle movements. Attractive business climate.

	Atrium	Improved business environment for small independent store owners.
Other stakeholders	Other economic actors located in the urban area (manufacturers, service providers, etc.)	Site accessibility and on-time deliveries.
	Residents	Minimum inconvenience caused by UFT
	Visitors/tourists	Minimum inconvenience from UFT and a wide variety of products in the shops.

Source: Own input and MDS Transmodal Limited (2012)

System analysis

The Living Lab implementation focuses on deliveries of (low value) FMCG to small independent retailers. These stores do often have limited space, little or no storage room and are single store-owner operated. Contrary to organized retail deliveries, small independent retailers are characterized by low volumes, many delivery points and low vehicle efficiency. Worldwide the number of these small independent stores is estimated to be 50 million (Blanco & Fransoo, 2013). The majority of these stores are located in emerging economies in Latin America and Asia. In the past in Europe there has been a trend from such small independently owned stores to organized retail, mostly in out-of-town shopping centres. Recently a backward trend towards smaller store formats can be detected because of the popularity of an urban lifestyle and the demand to shop locally (Verlinde, 2015). Although the size of this retail channel remains smaller than in many emerging economies, it is estimated that in the Brussels Capital Region there are between 900 and 1000 of such small shops (shopinbrussels, 2015). Surveys in Brussels reveal that the majority of the store owners go to the wholesaler with their own vehicle. A limited number is supplied by distributors (see **Feil! Fant ikke referansekilden.**). Exact numbers are not available for Brussels, but a study in the Dutch city of Nijmegen indicates that the load factor of shop owners using their own vehicle to supply is less than 25% (Buck Consultants International, 2005). Irregular and fragmented trips by the store owners to the wholesaler lead to an unnecessary pressure on the road network. For the manufacturer this way of supplying leads to the absence of contact with the store owner, insecurity regarding shelf presence and possibly lost sales when its product is out of stock.

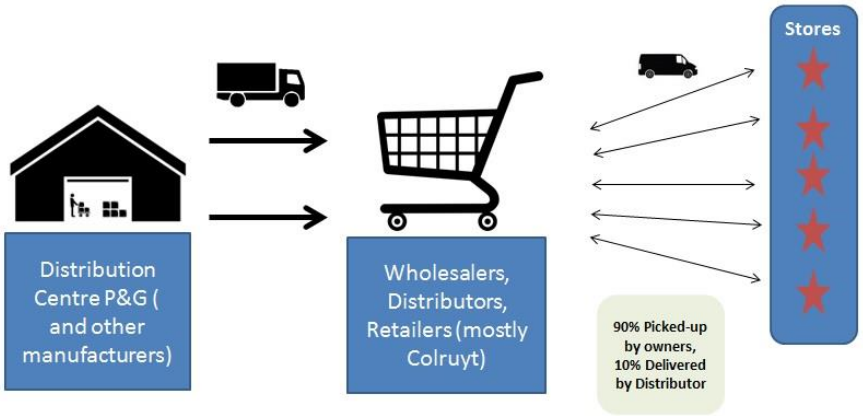


Figure 20: Current supply chain-set up

Several other initiatives that could be linked to the living lab in Brussels are currently running. In June 2015 a pedestrian zone has been introduced in the city centre. This severely

complicates deliveries to retailers in this area. In order to mitigate the negative impact of UFT and increase the efficiency different consolidation initiatives are active. CityDepot runs an urban consolidation centre and is located in the port of Brussels. Another consolidation centre is run by Bubblepost who deploy electrically-driven cargobikes.

The technological innovation which is of particular importance for the living lab allows data sharing. First, a PGBS online shop has to be established to allow the store owners to place their orders online. Payment of the products also goes online. Hereafter the ordered products, delivery addresses and dates have to be shared with the owner of free capacity who has to integrate it in its route planning.

Risks analysis and mitigation measures

The main risk of the Living Lab is user involvement, specifically the shop owners and the businesses with spare capacity. Surveys in the past indicated that shop owners primarily care about the price of a product and neither about the brand, nor alternative (innovative) ways of being supplied. If the same product of another manufacturer is available at a lower price there is the probability they will sell this. Therefore their willingness to order PGBS products online primarily depends on the price that has to be paid. At the same time the price has to be competitive. For the Living Lab this holds that it is unknown how many store owners eventually use the new service and for how long. Store visits currently take place (December 2015- April 2016). The probability of occurrence of this risk is moderate. The target of the Living Lab implementation is to involve 20-30 stores. First store checks indicate that several store owners are open to join the project. Therefore the probability that no stores join is very low. Moreover, if only a few stores join, this already provides an important learning opportunity.

The owners of free capacity are widely varying companies but their common characteristic is that offering a logistics service as a 3PL is not their core business. These companies are, nevertheless, operational on (congested) urban roads and face the UFT problems on a daily basis. The target is to involve at least two different service-driven companies. Due to the high variety of service-driven companies in Brussels the probability that not sufficient companies are involved is low. Moreover, first talks indicate that several companies are open to join. There is, nevertheless a risk that companies which committed themselves can also withdraw prematurely or stop because of other priorities. The main challenge remains to fit the deliveries to the stores in their routing and to adjust the operations of the employees so that they also deliver to the stores (i.e. aligning supply chains). Similar to the involvement of the stores, this can be detected in the beginning. In the worst case, running initiatives can be used as a back-up option to deliver to the store owners anyway (e.g. consolidation). In this regard Bubblepost, CityDepot and Ecopostale have already been contacted and are in if they are necessary.

The wholesaler and possibly retailers – as customers of PGBS and current supplier of the stores – have to be informed that the Living Lab is running.

Operational risks of the Living Lab mainly relate to the flows of the new distribution model; physical, financial and information (Mentzer et al., 2001). The exact set-up of the new distribution model is not fixed yet and depends to a large extent on the participating owners of free transportation capacity. At the same time this means that the Living Lab is flexible. The different possibilities and the related risks are elaborated below. There is a small risk that internally in PGBS the commercial department does not comply with the product assortment, prices and/or use of an online shop.

Due to the complexity of the new distribution set-up, initially only PGBS products are included in the free capacity. It is clear that by only including these products, the owner of the store still has to go to the wholesaler and there will be no decrease in the number of vehicle kilometres. The probability that only PGBS products are included remains high. Whether other manufacturers can be involved only becomes clear after the Living Lab implementation is

running for several months. If successful, collaboration with other manufacturers will be sought in a later stage.

Design

Definition of the implementation cases

The idea of PGBS is to increase load factors by unlocking free capacity to cost-efficiently supply consumer goods to small urban stores and reduce generated impacts of distribution and shopping. The transport capacity considered will be from different service-driven companies. Several companies have daily delivery and/or service trips and need to design-in free capacity in both their vehicles and the delivery network because they are often service-driven and need to execute specific delivery tours regardless of being fully loaded. Consumer goods replenishment to small stores could afford a longer lead-time and as such could ”piggy-back” on this free capacity provided the size. Nowadays, in consumer goods however, it has become common practice for all actors to promise short order to delivery lead times and for producers to drive large minimum order quantities to enable efficient dedicated drops. These quantities usually exceed the needs of the individual small store. Therefore these stores organize their replenishments via pick-ups at a retailer or wholesaler organized by the store and in some cases through ordering via a remote distributor, who tries to meet a certain service promise.

Independent small stores will be enabled to order small replenishment quantities suitable for their store. PGBS will explore how these small replenishment quantities, thanks to their size and absence of tight service requirements can increase vehicle efficiency (higher load factors, shorter vehicle dwell times, multiple drops/destination) into the current fleets of service-driven companies that have existing free vehicle capacity in the city (such as postal distribution, hygiene services, pharmacy deliveries). It is, nevertheless expected that the small stores would like to be delivered in 24-48h. PGBS plans to involve a dedicated assortment (the part that is relevant for small stores) towards small retail stores in the Brussels Capital Region and will look to involve other manufacturers and different companies that have free vehicle capacity in the city.

“Fit” evaluation

As described in more detail below, the aim is to test different set-ups of supplying the targeted 20-30 stores, meaning that different owners of free capacity are involved. In practice this means that supply towards the involved stores is taken care of by one service-driven company for a couple of months after which another company takes over. This allows testing different ways of supplying as well as adjusting the implementation if necessary. Different forms of free capacity are available. The focus is on involving different service-driven companies that do not have logistics as a core business (e.g. Febelco). Since delivering to small stores is already a change from the current way these stores are supplied, it is also planned to involve a company that provides ‘green’ logistics services (e.g. Bubblepost). This can serve as a benchmark. By involving such a company different set-ups can also be tried by for instance supplying with cargobikes but also by using public transport. A company like this is better equipped to adjust operations. Finally parameters can change between different set-ups (e.g. lead time, frequency of deliveries).

By setting-up different implementations in this way the following can be achieved:

- Learning-by-doing; how do users (PGBS, owners of free capacity and stores) experience the implementation and respond to their needs;
- Living Lab Cycle with different set-ups whereby each set-up can be evaluated, act accordingly and a new set-up can be planned and implemented;
- Especially for the service-driven companies; detect the differences in the organisation/feasibility/service/costs;

- Identify the differences in the different tested set-ups for the users (e.g. feasibility, costs).

Design of pre-selected cases

The Living Lab implementation in Brussels consists of different implementation cases. In essence it can be defined more concrete by specifying the three flows in the distribution model (Mentzer et al., 2001). First of all, the information flow includes placing the orders, processing these and sharing the order and delivery addresses with the owner of free capacity. Currently PGBS employees have the possibility to order products online at the PGBS company shop which is located in Mechelen. Hereafter products are delivered from Mechelen to the Brussels Innovation Center (BIC) of PGBS (approximately 20km). This online shop will be adjusted with accounts specifically for the store owners who can order their products from a dedicated assortment online. A requirement is therefore that the shop owners have a computer, tablet or smartphone at their disposal to place the orders. The assortment and prices of the products differ from those offered to employees. PGBS receives these orders after which the data can be shared with a specific owner of free capacity. The financial flow between the different stakeholders is first of all composed of the payment from the shop owners to PGBS. This will be organized online through the online shop where the owners see the price of the products and the delivery cost. The information flow is visualized in **Feil! Fant ikke referansekilden.**. In this small-scale experiment PGBS tries to avoid payments but learn what the real cost would be for the owner of free capacity so it can be compared with the traditional 3PL (e.g., what are the actual costs and potential revenues for a company such as Febelco).

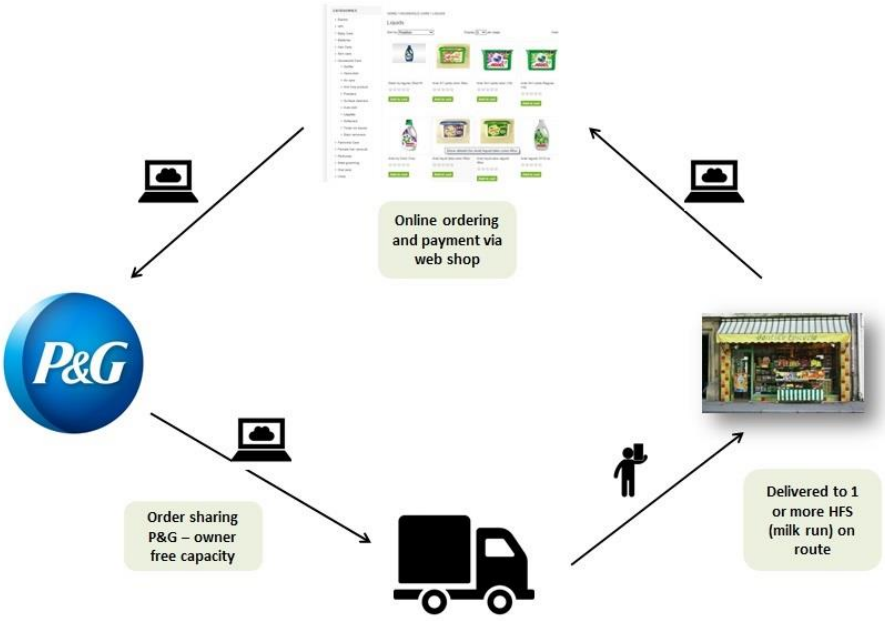


Figure 21: Information flow in Living Lab Implementation (current thinking)

With regard to the physical flow, or the transport of the goods, different implementations are going to be tried. These implementations, or supply chain set-ups, depend on the involved owners of free capacity. The first possibility is that PGBS transports the ordered products together with those of the employees to BIC in Brussels after which the owner of free capacity picks them up to start the delivery round. If the depot or office of the owner of free capacity is located conveniently vis-à-vis the company shop, this company can pick the products in

Mechelen after which it can start the deliveries during its own trip. Thirdly, the products can be delivered by PGBS from Mechelen to the depot or office of the owner of free capacity. Depending on the lead time, products can also be stored for some days at the depot of the owner of free capacity so it can optimize its vehicle trips further. Ideally, different of these set-ups are tested. This depends, first of all, on the location of the small independent retailers that would like to participate. The pedestrian zone in the centre of Brussels has been largely extended, only allowing deliveries until 11am. Involving this area in the pilot is therefore interesting. At the same the concentration of small stores is higher in certain neighbourhoods, which has an effect on the impact of the Living Lab as deliveries can be more optimized. The geographical characteristics and any possible traffic restrictions therefore depend on the neighbourhoods in which the participating shops are located. In case a certain number of store owners participate, it is interesting to test different set-ups towards these stores, meaning that deliveries with one service-driven company are carried out after which another is involved for a couple of months. Consequently this perfectly fits into the idea of a Living Lab whereby an idea is planned, implemented, evaluated and based hereupon action is undertaken. The modal choice also depends on the specific company; e.g. small van, car, public transport, cargo bike. Even though different set-ups are tried, eventually all products go from the DC of PGBS to either PGBS BIC, are picked-up by owner of free capacity or are transported to the depot of the owner of free capacity after which these are delivered to the stores (figure below).

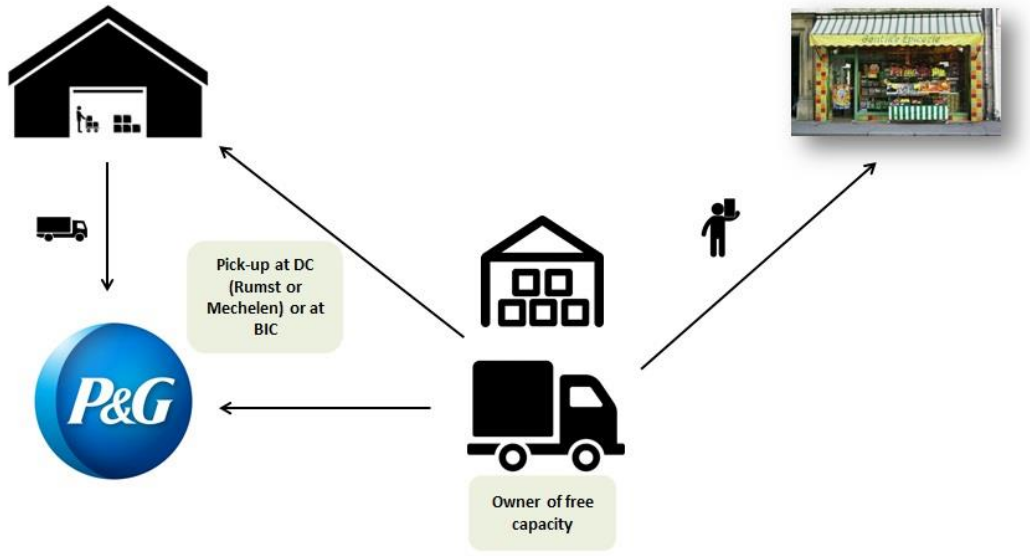


Figure 22: Physical flow in Living Lab Implementation (current thinking)

Initially only including PGBS products is a limitation of the pilot. However, by testing this set-up it becomes clear whether involving other manufacturers is viable or if the current set-up whereby the majority of the store owners goes to the wholesaler themselves is the most convenient. The intended benefits of the Living Lab implementation are different per stakeholder. The most relevant ones for the actual implementation are those of PGBS (e.g. more direct contact with receiver), the owners of free capacity (e.g. higher load factor) and the store owners (e.g. lowest out-of-stock as possible). The attached data plan gives an overview of the data needs for the selected indicators.

Development of evaluation methodology

A data plan is attached. In the data plan cells are marked yellow if data has to be collected before, after or both. Also the users to which each indicator applies is marked. Different indicators are descriptive and already included in this Deliverable.
The data plan is elaborate and composes the ideal evaluation. It, nevertheless, has to be taken into account that not all data can be collected.

CITYLAB case implementation plan

Table 50: Key questions when creating LLIP

Preconditions for success, external dependencies and assumptions	• No particular legal framework relevant; legal issues mainly relate to confidentiality • Involvement of the different stakeholders; both owners of free transportation capacity, store owners and PGBS • There are no ethical issues
Risks	• User involvement: shop owners and owners free transportation capacity (low) • Risk of stakeholder change relates to the owners of free transportation. Since the aim is to test different set-ups, a change is not considered a risk for the implementation. • Technology related risks 1: how to fit the deliveries to the stores in the routing of service-driven companies (aligning supply chains). This risk is low because when a company is involved it means that it can deliver products. • Technology related risk 2: the possibility of store owners to order products via an online shop. This risk is low because store checks indicate that most store owners have a laptop, tablet or smartphone. • Technology related risk 3: establish an online shop. This risk is low since they already existing online shop for PGBS employees has to be adapted. • Risk that the commercial department of PGBS does not comply with the product assortment, price and/or use of online shop. The risk is low since prior to the start of Citylab the department has been informed and have committed their cooperation • Risk that the store owner still has to go to the wholesaler because only PGBS products are included in the free transportation capacity. Due to the complexity of the set-up the risk is high that no other manufacturers are included and eventually vkm are not decreased. The implementation yields important insights whether this eventually possibly in order to avoid trips by the store owners at all.
Deliverables and milestones	• It concerns a dynamic experiment which is planned to run for 18 months but is dependent on user involvement. Official Deliverables and milestones are therefore not planned.
Approach	• Execution of activities is described in 'Design of pre-selected cases'. The time line is shown below. • For the methods used; see attached data plan • Partners and activity teams interact through regular meetings
Timeline and planning	• Expected duration of Living Lab phases is shown in the table below. The period for the execution of the Living Lab Implementation depends on its progress as described above. • Planning is influenced by user involvement, alignment supply chain and technologies • The timeline fits with the project timeline. For the execution of the Living Lab Implementation 18 months are planned.
Resources and their organisation	• PGBS is responsible for the execution and collaborates with several owners of free transportation capacity. Additionally stores are involved. • At SNIC two persons are responsible and connect to the necessary people within PGBS to set-up the implementation

	• During the Living Lab Implementation one person within PGBS will be responsible to monitor the pilot daily and functions as a contact person for the involved stakeholders • Critical technology necessary is an online shop and data sharing to align supply chains. • Resources ODTH: set-up and update online shop, picking, sorting and delivering orders • Resources owners of free capacity: vehicles, planning software (for routing) and some personnel hours for planning and delivering • The availability of resources within PGBS, ODTH and owners of free capacity are currently being checked.
Budget and expected costs	• The budget for PGBS is solely for personnel costs. For the implementation the costs are assessed and budget is trying to be made available. • The budget spending over time is unclear because it concerns a dynamic experiment as is elaborated above.
Monitoring, control, reporting and communication	• PGBS (with owners free capacity and shops) in the lead in close collaboration with Brussels Mobility and the VUB • Sub-teams are not necessary • Between the partners no cultural or language barriers exist. The same applies to communication with the owners of free capacity. • First store-checks indicate that minor language barriers might apply in communication towards the store owners. • The partners communicate on a regular basis (weekly face to face between PGBS-VUB) • PGBS is in the lead of the implementation and VUB takes care of the overall supervision. • Prior and during the implementation a SNIC and VUB person communicate with the owners of free capacity through face to face meetings, email and phone. • Prior to the start of the implementation the store owners are invited for an informative session on which questions can be asked. • During the implementation the PGBS person responsible for monitoring is the spokesperson for the store owners and is reachable via email and telephone. • Any other stakeholders (e.g. ODTH) are contacted if necessary and regularly updated (e.g. Atrium). • Any issues are documented because these are considered as lessons.

Table 51: Planning Living Lab implementation Brussels

When?	What?
June-Nov 2015	Define new supply chain set-ups
June-Oct 2015	List companies with free transportation capacity
June-Nov 2015	Map small independent retailers in Brussels
Oct-Feb 2015/16	Contact companies with free transportation capacity
Oct-Dec 2015	Estimate required transportation capacity
Sep-Apr 2015/16	Align new supply chain set-ups
Dec-Jan 2015/16	Store checks regarding product assortment and pricing
Dec-Apr 2015/16	First communication and involvement small independent retailers
Dec-Feb 2015/16	Pricing set-up
Nov-… 2015/16	Exploring collaboration possibilities with other manufacturers
May or Sep…2016/17	Execution Citylab Implementations Brussels

References

Blanco, E. E., & Fransoo, J. C. (2013). Reaching 50 million nanostores: retail distribution in emerging megacities.

Brussel Mobiliteit (2013). Strategisch plan voor het goederenvervoer in het Brussels Hoofdstedelijk Gewest; Versie door de Brusselse Hoofdstedelijke Regering goedgekeurd op 11 juli 2013. Retrieved from: http://www.mobielbrussel.irisnet.be/articles/de-mobiliteit-van-morgen/goederenvervoerplan.

Buck Consultants International. (2005). 0-meting Vervoersbewegingen Binnenstad Nijmegen".

European Commission. (2013). Together towards competitive and resource-efficient urban mobility. SWD (2013) 524 final. doi:SWD(2013) 527

European Commission (2014). EU Transport in figures – Statistical pocketbook 2014. Luxemburg: Publications Office of the European Union.

Lebeau, P, Macharis, C. (2014). Freight transport in Brussels and its impact on road traffic. Brussels: Brussels Studies. Retrieved from: http://www.brusselsstudies.be/medias/publications/BruS80EN.pdf.

Macharis, C., & Kin, B. (2016). The 4 A's of Sustainable City Distribution: Innovative Solutions and Challenges ahead. Submitted to the International Journal of Sustainable Transportation.

MDS Transmodal. (2012). DG MOVE European Commission: Study on Urban Freight Transport.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, Nancy, W., Smith, C. D., & Zacharia, Z. G. (2001). Defining Supply Chain Management. Journal of Business Logistics, 22(2), 1–25.

Schoemaker, J, Allen. J, Huschebeck, M. And Monigl, J. (2006). Quantification of Urban Freight Transport Effects I, BESTUFS Deliverable report 5.1, BESTUFS project.

ShopinBrussels. (2015). Retrieved from: http://www.shopinbrussels.be/NL.

STRAIGHTSOL. (2012). Deliverable 3.2. Report on Stakeholders, criteria and weights.

Strale, M., Lebeau, P., Wayens, B, Hubert, M., Macharis, C. (2015). Goederentransport en logistiek in Brussel: stand van zaken en vooruitzichten. Brussels: Brussel Mobiliteit. Retrieved from: http://www.mobielbrussel.irisnet.be/static/attachments/articles/na/730/BXLCAP1_1409%20Observatoire%20de%20la%20Mobilite%EF%BF%BD%EF%BF%BD_LOW__.pdf.

Tomtom. (2015). Tomtom Traffic Index. Measuring Congestion Worldwide. Retrieved from: https://www.tomtom.com/nl_nl/trafficindex/#/list

Verlinde, S. (2015). Promising but challenging urban freight transport solutions : freight flow consolidation and off-hour deliveries. Vrije Universiteit Brussel; Universiteit Gent.

Rotterdam CITYLAB

Living Lab environment in Rotterdam

Characteristics of freight transport system and policy framework

Rotterdam is a modern city that whit good accessibility for traffic, including trucks and vans. The major issue Rotterdam faces in relation to urban freight transport concerns the contribution of freight vehicles to the pollutant emissions and as a result issues in air quality. Urban freight transport accounts for almost half the emission of harmful substances by mobility. The long-term Rotterdam Urban Vision[7] emphasizes the need for a liveable city, which implies good air quality and also no (serious) nuisance from freight traffic.

Different measures, such as an environmental zone for trucks and a truck ban from one of the most pollutant streets, the 's Gravendijkwal, are already in place to decrease the negative impacts from urban freight transport on the air quality in Rotterdam. Next, Rotterdam enrolled the Ecostars program, that can be described as a recognition scheme for transport companies (both for freight and people). The aim of the program is to improve the air quality in Rotterdam and the surroundings and to help transport companies reduce the use of fuel. At the moment (January 2016) more than 10,000 vehicles have a Ecostar certificate (see for more information: http://ecostars-rotterdam.nl/ in Dutch).

Beginning of 2014, as a result of the joined cooperation of both TNO (core research partner) and the city of Rotterdam (core city) in the VREF Center of Excellence for Sustainable Urban Freight Systems[8], TNO and Rotterdam discussed how to further continue on making urban freight transport in the city of Rotterdam more sustainable. Parallel in time on a national level in the Netherlands, agreements were made between the national government and other partners (e.g. companies, other authorities, NGOs, etc.) in order to become reduce energy use (and become more sustainable). One of these so-called 'Green deals' was on zero emission city logistics (i.e. GDZES) and included the opportunity to develop local living labs that contribute to finding solutions that can lead to zero emission city logistics. As a result of the cooperation between Rotterdam and TNO, and the fact that the discussions between partners in the GDZES took quite some time and did not result in an agreement soon, the first steps for establishing a city logistics living lab in Rotterdam were taken in the form of a local Rotterdam Green Deal, called GD010ZES.

The first step for a City Logistics Living Lab in Rotterdam started with developing roadmap. This roadmap, and the corresponding ambition: zero emission city logistics in the city centre of Rotterdam by 2020 is the result of the cooperation between the city of Rotterdam, research institute TNO, and logistics front runners following from the Ecostars program in Rotterdam in (and around Rotterdam): Getru Holding B.V., Klok Containers B.V., Post-Kogeko Logistics B.V., Roadrunner Koeriersdiensten B.V., G. van der Heijden & Zn. B.V. and later DHL.

The roadmap contains four lines of action:

1. Technics: aiming at collectively buying electric (zero emission) trucks, developing the necessary charging infrastructure, and improving the development of vehicles (together with manufactures). One of the first actions here is to further invest the possibilities for larger (serial plug-in hybrid) trucks.
2. Smart Logistics: aiming at developing local bundling and decoupling points, and fit for use vehicles.

[7] http://www.rotterdam.nl/DSV/Document/Stadsvisie/432312_Leaflet.pdf

[8] VREF CoE SUFS, see https://coe-sufs.org/

3. Driver behavioural: emphasis on fuel-efficient driving (start) and monitor vehicles and drivers and establish feedback on performance in game form.
4. Regulation and stimulation: where local authorities together with front-runners look at positive incentives for zero-emission vehicles and regulatory measures like further developing low emission zones.

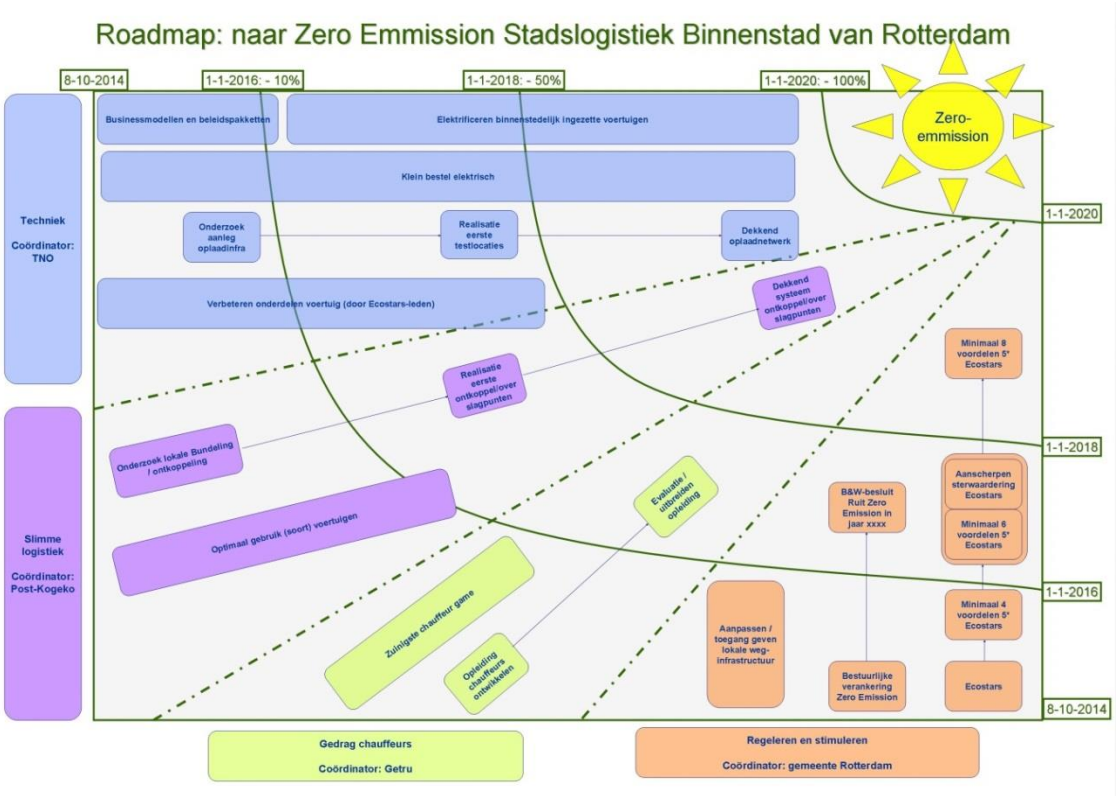


Figure 23: Roadmap for GD010ZES (local Rotterdam Green Deal)

The roadmap and the corresponding ambition were signed by the front-runners, the city of Rotterdam and TNO at the end of 2014 (see Figure 26).

Figure 24: Signing of the Rotterdam Green Deal on Zero Emission City Logistics (GD010ZES)

This roadmap, GD010ZES[9], is the first start of a larger program that is called 'Stadslogistiek Rotterdam[10]'. The roadmap, although depicted in Dutch below, contains four lines of action: technics, smart logistics, driver behaviour and regulation and stimulation. The City logistics living lab CITYLAB in Rotterdam continues on this partnership and aims at developing it further, together with the local stakeholders. Meanwhile, the interest in sustainable urban freight transport, a sustainable city and the improvement of the air quality increased after the local elections a new board in 2014.

GD010ZES' lines of actions, as well as the other measures taken and programs in this green deal are discussed in more detail later in this document. All together the combined approach (for the full Rotterdam city logistics living lab) is called: "**Stadslogistiek010**". The website: http://www.010greendeal.nl provides details. The combined approach still includes the four lines of action, but the form is slightly changed: the matrix in **Feil! Fant ikke referansekilden.** shows the different actions / action lines that are currently running in the Rotterdam city logistics living lab. The y-axis shows the action lines that are initiated or lead by (local) industry partners. This lines correspond with the action lines earlier described in the GD010ZES roadmap. The x-axis shows the activities undertaken, initiated or lead by the city of Rotterdam. Next to only working on stimulation and regulations, as was planned in the earlier stage, the Rotterdam also actively works on data and monitoring of the effects and the urban freight transport, the communication and information are also activities undertaken in this Rotterdam living lab. This matrix better represent that stimulation and regulation aims at affecting all three other action lines (technology, logistics and behaviour). This is also the case for the other lines that are depicted as initiated or lead by the city. For individual measures, it is sometimes not entirely clear where it fits, as very often it is on one of the cross-sections (as is discussed later in the section 'Urban freight transport data, current efforts and next plans').

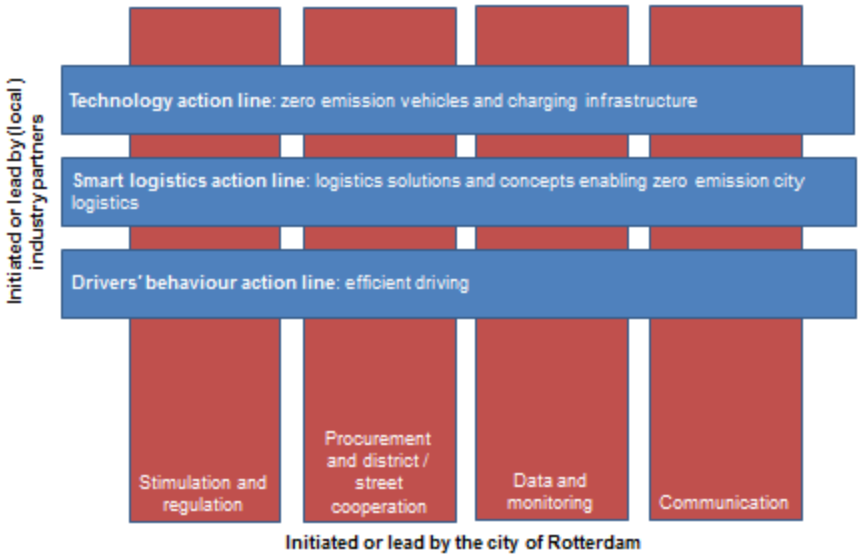


Figure 25: Action lines in Stadslogistiek010

[9] Green Deal 010 (010 is the area code for Rotterdam) Zero Emission City Logistics.

[10] Translated: City Logistics Rotterdam

Stadslogistiek010 fits in the broader strategy of Rotterdam, called the Stadsvisie (translated in English Rotterdam Urban vision) and the strategy for the city centre 'City Lounge)[11]. The shorter term and specific urban freight ambitions are formulated in the earlier mentioned roadmap. Within this roadmap, shorter term activities (less than 2 years) are defined together with partners. The measures taken by Rotterdam include, next to the actions in the 4 action lines, also include the Ecostars program, the extension of the environmental zone (so that passenger cars and vans are included), procurement initiatives, street / district approach and communication and platform building activities. All measures are discussed shortly in the table below (and more extensive later in this document). The aim is that these activities (which will be discussed in the section 'Urban freight transport data, current efforts and next plans') contribute to the quickening of zero emission freight transport in Rotterdam.

Cooperation on urban freight transport

Cooperation takes place in several ways and with different actors. A freight partnership is established in the Green Deal. Next, the city of Rotterdam cooperates with other cities, regions, and companies depending on the partnerships that are necessary to do the activities described in the table above.

The GD010ZES established a freight partnership in which 6 companies represent Rotterdam's transport companies, i.e. DHL, G. van der Heijden & Zn, Post-Kogeko, RoadRunner, Klok Logistics, and Getru. The partnership is completed with the City of Rotterdam and research institute TNO. The objective of this freight partnership is to develop, test and run the four action lines in the Green Deal. The partners come together at least 4 times a year, chaired by TNO. Intentionally, the partnership is kept at a small number, as the idea is that the meetings are to discuss ideas and progress. All partners that are in were invited (as high-scoring Ecostar member) to represent a larger group of companies. Workshops are organized (see 9-2) to reach a larger group of companies, next more companies are contacted to cooperate in projects in order to make the urban freight transport system more sustainable (however, these companies are not part of the core freight partnership).

Next, cooperation takes place in several levels in order to make things happen, e.g.:

- Cooperation with G4 (big 4 cities in the Netherlands; i.e. Amsterdam, The Hague, Rotterdam and Utrecht) to discuss and influence the Ministry of Infrastructure and Environment in the plans for EFVs and GDZES, as well as to be a larger and more influential group in the discussion to for example vehicle manufacturers.
- Cooperation in the region with The Hague and surrounding municipalities, to cooperate in logistics initiatives bigger than the city of Rotterdam alone as well as to fine tune policies within the region.
- Cooperation with branch organisations EVO and TLN (as well as internally with the VerkeersOnderneming[12]) to organize workshops and run the BeterBenutten program.
- With companies: to facilitate and support the implementation of zero emission city logistics initiatives and demonstrations as well as to provide privileges where necessary to support the business case of companies using EFVs.

[11] See for more information: http://www.rotterdam.nl/tekst:binnenstad_citylounge and http://www.rotterdam.nl/stadsvisie.

[12] De Verkeersonderneming is the implementing agency for the 'Beter Benutten' ('Better Usage') programme by the Ministry of Infrastructure and Environment in the Rotterdam region. De Verkeersonderneming is the cooperation organisation of the municipality of Rotterdam, the Rotterdam city region, Port of Rotterdam Authority and the Ministry of Infrastructure and Environment/Rijkswaterstaat.

- Ecostars program: ECOSTARS is an recognition scheme for transport companies. The target is to increase air quality and reduce the fuel usage. See for more information http://ecostars-rotterdam.nl/.
- Cooperation with and in the Dutch national Green Deal Zero Emission City Logistics

Existing data and monitoring on urban freight transport

Different data is available for Rotterdam; what exactly happens with regard to logistics and freight transport in the city centre is currently not totally covered. Several initiatives (in which the city of Rotterdam and TNO cooperate) provide data to make have a better picture of what is actually happening in the city (centre), these initiatives are part of the Rotterdam Living Lab.

In short: data is available from Rotterdam's traffic model. Next, a wagenpark (fleet park) scan in which for a cordon all licence plates of entering vehicles (both passenger, van and trucks) were scanned for at least 3 days at the end of 2015. Based on this data (static information for only a limited time), data is available on the fleet that is currently entering Rotterdam's city centre and the composition of this fleet (e.g. euro norm, age of the vehicles, amounts, economic activity of truck / van owner), etc. These data will be available in 2016 via the Stadsdashboard (that is developed by TNO and Rotterdam). Next, this dashboard will also provide an actual estimate (based on several sensors) of the traffic situation in real time.

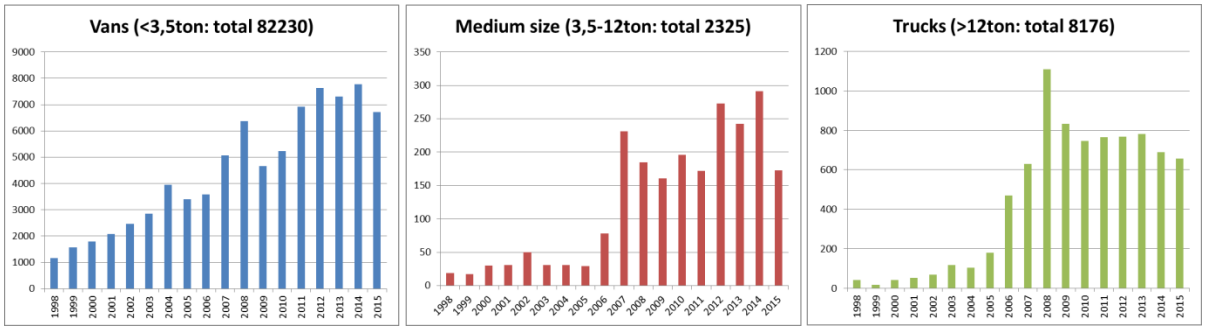


Figure 26: Examples of data from fleet scan: number of commercial vehicles scanned and age of the vehicles

Next, emissions on both CO_2 emissions and local emissions (i.e. PM10, NOx) are calculated based on the traffic models and traffic counts. Air quality indicators (i.e. concentration NO_2, PM and CE) are available via the national monitoring tool National Air Quality Cooperation Programme (NSL), see https://www.nsl-monitoring.nl/viewer/ (and select Rotterdam).

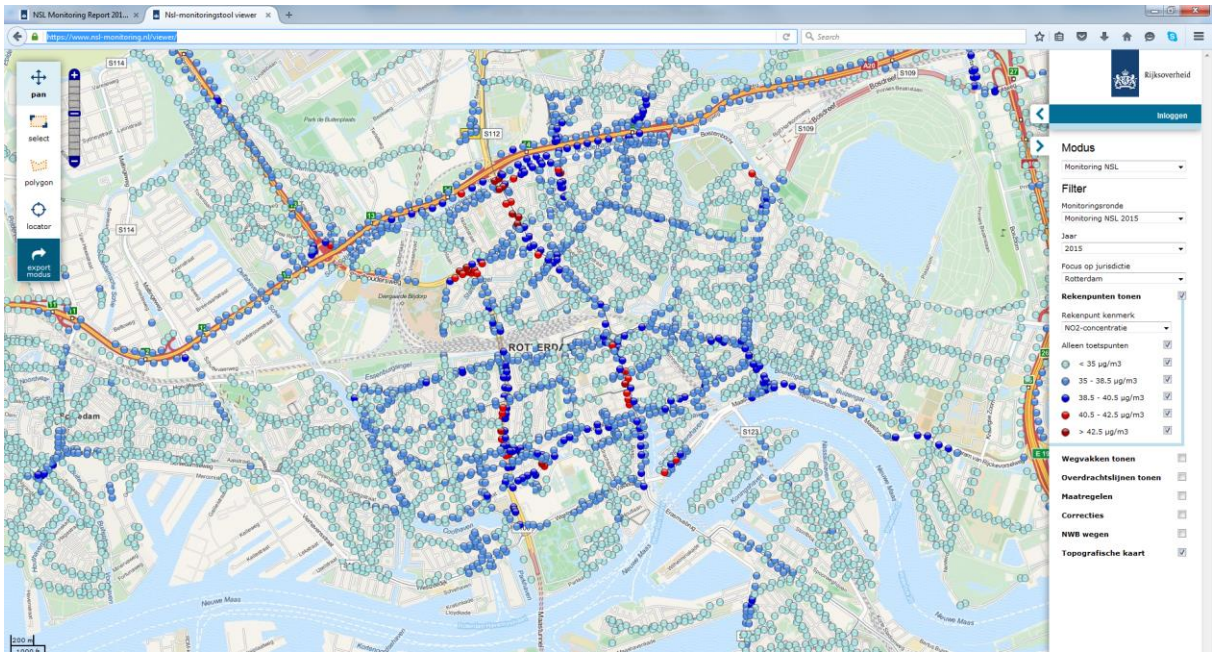


Figure 27: NO_2 concentration for Rotterdam city centre (NSL, 2015)

Urban freight transport data, current efforts and next plans

In the next six months data is collected and visualized to provide a better view of the urban freight transport activities that take place in the city centre of Rotterdam. A fleet scan is executed (covering points in Rotterdam) as a baseline measurement for the current vehicle fleet, before the extension of the environmental zone will be in place. At the same time, a cordon count is made around the city centre of Rotterdam to count and characterize the freight and logistics activities. The idea of this cordon count is that the license plates of all incoming commercial vehicles (vans and trucks) are scanned by cameras. For these vehicles elements on their emissions (EURO norm), vehicle type (van, medium-, or large truck) and the economic category (SBI codes, the Dutch variant based on the International Standard Industrial Classification of All Economic Activities, abbreviated: ISIC) the owners are active in.

These results are displayed on the Rotterdam City Dashboard (next to semi real time traffic data).

Next to just visualizing the data of these vehicle fleets scanned data, we examine other sources, such as the use of logistics data of Statistics Netherlands as well as vehicle and operational data that can be retrieved from companies joining the GD010ZES or the game for the most efficient driver of Rotterdam.

Based on these data, in the future, we should estimate a good city logistics model for Rotterdam , that enables to ex ante predict the impact of new measures and demonstrations, as well as that enables to evaluate (ex post) the actual effects of these measures and demonstrations. This last step is not yet planned, but will be executed after the dashboard is finished and when budget is available.

Focus of the Rotterdam CITYLAB Living Lab

The living lab focuses on the city centre of Rotterdam, as this is set by the ambition for zero emission city logistics in Rotterdam's city centre. In CITYLAB there is no implementation case specified for the Rotterdam living lab. But outside the CITYLAB project various implementations (i.e. initiatives and policy measures) are being established due to the fact that

Rotterdam started working as a living lab. The most telling examples are the start-up of a new transport company offering zero emission last mile logistics for several large retail chains in Rotterdam. This start-up company looked for these customers in order to start operating zero emission city logistics, and at the same time have a reasonable business case. Another example is the attempt for policy privileges for zero emission transport, i.e. 'emission free is regulation free'. Next, the attention for the topic due to the GD010ZES (local green deal for Rotterdam in which the ambition for zero emission city logistics was formulated) also resulted in an increase in funds for the issue; both due to more specified directed proposals on the topic as well as more attention and as a result more funds to make actions happen in this domain. An example is the increased and improved data collection effort in order to better know what is actually the current urban logistics in the city and what the effects are of the different vehicles operating (in for example emissions and the impact on local air quality).

Planning of the Rotterdam Living Lab environment

Set Up

Ambition

The ambition was set to zero emission city logistics for the Rotterdam city centre by 2020.

Scope

The scope can be described as:

- *Area:* the city centre
- *Main policy / city objective and the influence of city logistics on it:* zero emission city logistics
- *Logistics specification:* all commercial vehicles (under condition that a zero emission alternative is technically and economically available)
- *Shipment specification:* all goods transported (under condition that a zero emission alternative is technically and economically available)
- *Users involved for execution of operations:* cooperation with users and industry associations (in workshops, Ecostars and Green Deal), as well as from the role of procurement.

Living Lab Partners

Partners in the Green Deal are: DHL, G. van der Heijden & Zn, Post-Kogeko, RoadRunner, Klok Logistics, and Getru and TNO and Rotterdam. Other partnerships exist in this living lab, for example FREVUE partners UPS, TNT and Heineken. And also partners are actively sought via workshops, Beter Benutten, and Ecostars. The living lab partners that are actively sought are all in the form of users.

Living Lab Public Private Partnership

The GD010ZES public private partnership formed the start of the living lab that is currently being developed. Still this partnership is also in development, discussion take place on what the role of the partnership can and should, on which conditions new partners could be allowed in the group of front-runners and if it would be useful to start other partnerships, e.g. for using procurement as a way to enable and increase zero emission logistics and to copy good examples to other large freight attractors, it could be useful to start a partnership with procurers from large freight attractors, next to the partnership with transport companies that currently exists.

System analysis

Legal and ethical issues

Legal and ethical issues are not specifically identified.

Stakeholder/end user analysis

One of the roles the group of front-runners in the GD010ZES is to reflect on the actions and activities in the living lab, in order to understand the issues from transport industry and take these in account. No specific stakeholder / end user analysis is performed.

System analysis

For the first half of 2016 a system analysis is planned concerning the availability of electric vehicles (specified per type: large, medium and small) as well as the production capacity of manufacturers and the expected price developments. Next also the 'user' side is analysed: who is interested in purchasing electric vehicles and what is the market potential based on the currently existing fleet in Rotterdam compared to the average vehicle replacement cycles.

Next, trends are followed via and in FREVUE as well as the national Green Deal on Zero Emission City Logistics.

Risks analysis and mitigation measures

No strategy formulated on risk and mitigation.

Design

Definition of the implementation cases

Several implementation cases (or measures) are defined and executed. In a weekly meeting, new opportunities are discussed. The measures were described earlier in this document.

There are no CITYLAB implementation cases planned in Rotterdam. All earlier described implementation cases and measures are financed and management outside the CITYLAB project. A Dutch implementation case is planned in Amsterdam, i.e. the floating depot, as this implementation fits the characteristics (e.g. canals) of Amsterdam better than that of Rotterdam.

Roadmap Rotterdam Citylab ('Stadslogistiek010)'

The main ambition of the Stadslogistiek 010, Rotterdam's city logistics living lab, is zero emission logistics in the city centre by 2020. The approach is taken, from an organisational and funding perspective, is different than for regular projects: one of the activities in this living lab is to find and organize projects and implementations that contribute to the ambition. So not all activities are planned yet for the coming years, and the aim is to find funding in all different forms for projects and or implementations that fit the Stadslogistiek 010 roadmap, next to the available funds from for example the Dutch programs BeterBenutten and the investments of the city Rotterdam itself. Examples are: (co)funding from the Dutch authorities in implementations for zero emission city logistics, (co)funding from Horizon 2020 programs and projects that do actually contribute to the aims of the larger Rotterdam city logistics living lab.

The next section presents an overview of currently undertaken projects. Note, in the CITYLAB there is no specific implementation planned for the city of Rotterdam. The Dutch implementation – PostNL's floating depot – will operate in Amsterdam (as it better fits Amsterdam's characteristics).

However, in Rotterdam many other implementations are planned (as earlier discussed) and will be planned and executed (depending on cooperating companies, available budgets, etc.) in Rotterdam's city logistics approach, i.e.:

1. FREVUE demonstrations where companies demonstrate the use of (relatively large) electric freight vehicles in city logistics operations. Companies (TNT, UPS, Heineken, RoadRunner) cooperate with the city of Rotterdam and TNO in the Rotterdam demonstration FP7 project.
2. Examine charging infrastructure requirements for larger electric freight vehicle deployment by TNO and Rotterdam in cooperation with MSc students from universities
3. Examine (latent) demand for EFVs (electric freight vehicles) in Rotterdam and the Netherlands (Rotterdam in cooperation with TNO and shippers and transport companies) and support zero emission transport initiatives (Rotterdam in cooperation with Baartmans / City distribution Rotterdam)
4. Examine possibilities for subsidies and financial possibilities to quicken the use of EFVs by improving a better TCO for EFVs in time (Rotterdam)
5. Market examination: what can be expected to be on the market and what is the expected market development (for large, medium and small electric and plug in hybrid vans and trucks) in costs, range, production capability (TNO in cooperation with manufacturers)
6. Actively approach logistics providers (in Ecostars) and develop smart logistics solutions that make transition to off-peak hours possible as well as transition to low or no emission city logistics (Rotterdam in cooperation with Ecostars awarded transport companies). Ecostars – continuously - http://ecostars-rotterdam.nl/ ECOSTARS is an recognition scheme for transport companies. The target is to increase air quality and reduce the fuel usage.
7. Market place for cleaner mobility and logistics (Rotterdam, Verkeersonderneming in cooperation with shippers and transport companies)
8. Examine and establishment of LOPs (Local Decoupling Points) with EVO (interest group of own transport companies) as well as the Rotterdam university for applied science.
9. Develop the drivers' game to support efficient driving, i.e. the most efficient driver of Rotterdam (CGI, based on DHL project together with the city of Rotterdam and the Dutch Topsector for Logistics)
10. Improve knowledge of vans in city of Rotterdam and influence their presence (move vans from peak to off-peak hours), in 'Beter Benutten' program together with the VerkeersOnderneming (VO) and van drivers and companies using vans.
11. Develop privilege policy framework (emission free is restriction free) to support the business case for electric freight vehicles in city logistics (Rotterdam in cooperation with shippers and carriers active in Rotterdam)
12. Environmental zones – as long as needed; in the inner city and the latest port expansion Maasvlakte 2, the city introduced an environmental zone for heavy trucks. From January 2016 the city expands the inner city environmental zone, and introduces the regulation for vans and cars.
13. Include zero emission logistics in procurement: reduce the carbon footprint of own transport (city of Rotterdam, in cooperation with TNO, and proposal via Horizon 2020 an Dutch Topsector for Logistics))
14. Reduce the carbon footprint of transport directly order by city or Rotterdam (city of Rotterdam, in cooperation with TNO, and proposal via Horizon 2020 an Dutch Topsector for Logistics)

15. Reduce the carbon footprint of indirect transport procured via goods or services (city of Rotterdam in cooperation with large freight attractors in the city , in cooperation with TNO, and proposal via Horizon 2020 an Dutch Topsector for Logistics))
16. Develop site specific sustainability plan for specific areas, start with Schouwburgplein project – to develop way of working – in which ordering behaviour is geared for and with local companies at the specific areas (city of Rotterdam, TNO, Schouwburg, local café, theatres and shopkeepers, also supported in Horizon 2020 proposal)
17. Develop portal to inform and communicate between city, companies active and interested in the Rotterdam living lab:, i.e. www.010greendeal.nl (city of Rotterdam)
18. Meetings (workshops) with logistics service providers, transport companies, and city authorities (together with VO, EVO, TLN, City of Rotterdam).
19. Develop and continue freight partnership with logistics front-runners (transport companies together with the city of Rotterdam and TNO); this will be extended to a group with partners responsible for freight movements (shippers and large freight attractors in the city, city of Rotterdam together with TNO).
20. Improve insight in what is actually urban freight status in the city: fleet scan and coupling to logistics activities (city of Rotterdam together with TNO)
21. Develop the Rotterdam city dashboard to visualize and communicate logistics activities in the city and show effects of actions.

Figure 30 shows hoe these 21 actions are positioned in the different action lines for the Rotterdam living lab. Next, more activities are planned and will done if funding is found and if these activities contribute to the aims of the Rotterdam city logistics living lab these activities will be planned and executed. The activities mentioned above are discussed and monitored on a weekly basis with a core team from the city of Rotterdam and TNO. For the different activities a planning is made and activities are evaluated based on the planning, in case outcomes provide reasons for changes, these are discussed and if necessary adaptations are made.

On a regular and in the different actions the core team is in contact with the other relevant participants.

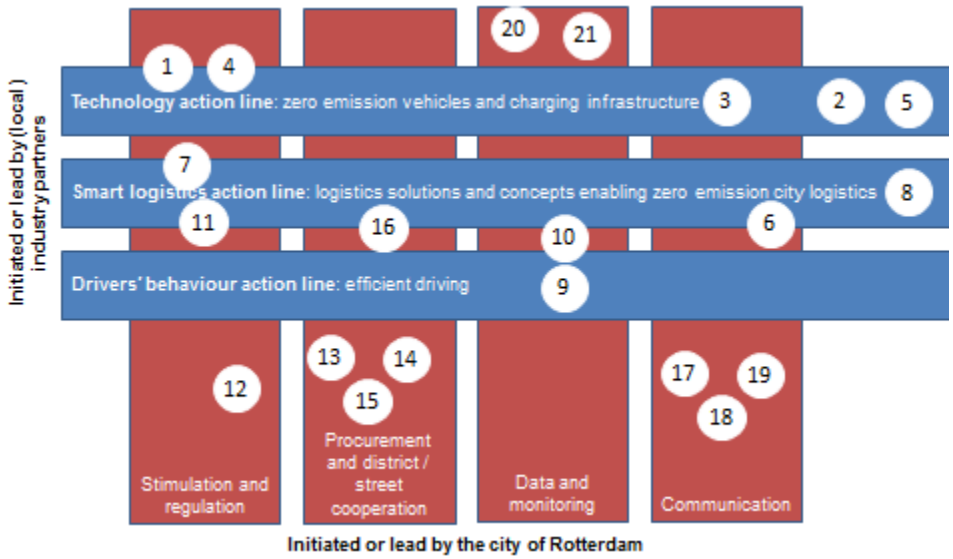


Figure 28: Position of activities in action lines in Rotterdam city logistics living lab

Another way to visualise these activities can be found in Figure 31. This roadmap distinguishes between three reasons for actually doing the activity: increase the effects (this implies actions

that aim at new technologies, logistics, or policy or IT usage, so called innovations), increase the mass (the number of participants using the innovations mentioned in 'the effects' so called implementations), and to increase the available data and monitoring activities and abilities in the city.

For the activities we see different forms in how close these are to implementation, starting from i) research and development, ii) demonstrations, iii) policy and regulation, to iv) market implementations. The relation between some of the activities is show in Figure 7 by the vertical lines connecting the activities.

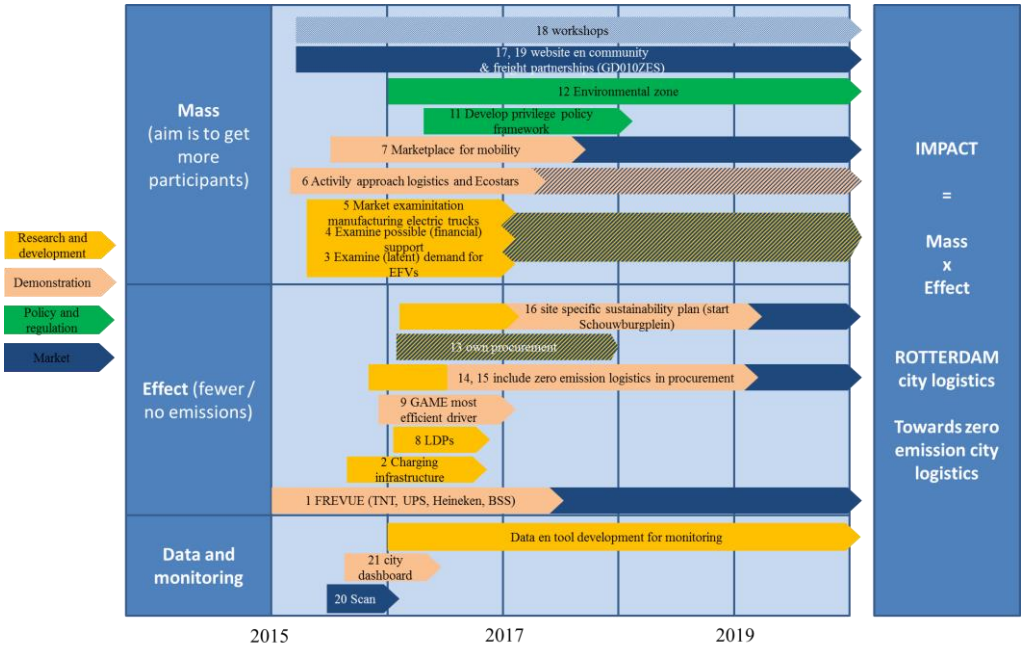


Figure 29: Rotterdam CITYLAB roadmap ('Stadslogistiek010) for coming years

The roadmap in Figure 31 gives an overview of the planned measures and implementations, the status (research, demonstration, policy and market phase), as well as the timing and some connections between these activities.

This roadmap distinguishes three areas:

- Data and monitoring
- Effect, includes measures and implementations that mainly focus on reducing emissions or even go to zero emission logistics in the city centre
- Mass, including measures and implementations that mainly focus on increasing the number of partners using the measures / implementations that result in lower emissions.

This distinction is based on the idea that impact can be described as follows:

Impact = Mass * Effect.

This implies to achieve real impact (which is defined in this CITYLAB as 'zero emission city logistics in the city centre of Rotterdam', we have to work on measures that result in the desired effect (i.e. zero emission) and that we have to work on a large community that can implement these measures.

Next, the data collection and monitoring is a separate line of activities, as it does not add to the impact, but is necessary to show the impacts that are achieved at all.

This roadmap is dynamic and will be revised based on insights, available budgets and other outcomes of the activities planned for 2016.

The idea of the Rotterdam CITYLAB is that during the project new implementations are planned, budgets are looked for (either research projects, or other available budgets) and specified for making the ambition – zero emission city logistics in the city centre of Rotterdam – possible. So acquiring both ideas and budgets for new and extra implementations is part of the activities we undertake in the Rotterdam CITYLAB.

"Fit" evaluation

The fit analysis that is currently deployed is to evaluate whether a measure or implementation contributes to the ambition of zero emission city logistics.

Development of evaluation methodology

The development of the evaluation methodology is ongoing; party this is part of WP5 in CITYLAB, partly this will be developed in the city dashboard currently under construction.