



ENERGY EFFICIENCY IN CITY LOGISTICS SERVICES
FOR SMALL AND MID-SIZED EUROPEAN HISTORIC TOWNS



GUIDELINES DEVELOPING AND IMPLEMENTING A SUSTAINABLE URBAN LOGISTICS PLAN



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GUIDELINES

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PURPOSE OF THE SULP GUIDELINES

This document, based on various acts and papers produced in the last decade by the EU on Urban Mobility and Energy efficiency (not least the Urban Mobility Package - 2013, White Paper - 2011, Action Plan on Urban Mobility - 2009) and in particular on the EU guidelines for “Developing and Implementing a Sustainable Urban Mobility Plan”, aims to provide realistic and simple guidelines for city stakeholders and technicians, for developing a Sustainable Urban Logistics Plan (SULP) focused on the optimisation of urban freight logistics processes in order to reduce the related energy consumption and environmental impacts yielding its economic sustainability.

The present guidelines result from the work carried-out by the ENCLOSE partners in more than 2 years of project activities and, after setting the scenario and the concept of SULP, this document aims to present and discuss the methodology for implementing the SULP itself as part of the Sustainable Urban Mobility approach on a step-by-step basis, thus including operative working details, such as specific requirements and crucial actions to be carried out for setting up the urban logistics plan.

For each basic element of the methodology described in the following sections, a sample of the approach followed by a selected ENCLOSE towns is provided, including real examples and solutions implemented as well as the tools and the followed approach.

The ENCLOSE consortium is made of 9 towns and 7 different public/private entities (i.e. universities, technology research and energy agencies, independent consultancy companies, etc.) and since the beginning of project activities (May 2012), ENCLOSE partners have adopted an approach to urban freight distribution processes considering the point of view of

Public Authorities (at different levels - Municipality, Province and Region), as these are the main responsible for identifying the most suitable solutions to logistics issues and for defining the suitable regulation framework, by considering different interest groups (shop keepers, retailers, distributors, transport operators, trade and citizens associations, Chambers of commerce, etc.) and the impacts on the environment and other city aspects.

Therefore, these guidelines can represent a key tool for supporting city stakeholders and decision-makers in the SULP definition and in monitoring its implementation process. Moreover, these guidelines can be a valuable support also for other stakeholders and actors involved in freight processes at different levels (including private sector, transport operators, shopkeepers associations, etc.), by allowing them to well understand the mainstreams and rules followed by local Administrations in planning, choosing and implementing city logistics policies and actions.

The present guidelines do not provide universal city logistics solutions, but they supply a possible method for analysing freight distribution processes, defining and choosing among the possible measures and services in collaboration with other relevant actors and stakeholders. It is therefore crucial to tailor the approach and methods here described on specific local needs and peculiar characteristics.

Eventually, these guidelines can be considered as a living document that will be continually edited and integrated including any comments and inputs from readers. The present document will be updated within 12 months after publication, in order to include any useful information

received from other European Projects (mainly IEE projects), other European towns (i.e. those involved in EAHTR Association) and the general public (including practitioners and experts active in the fields tackled by ENCLOSE).



INTRODUCTION

European cities are forced to tackle a wide range of urban traffic problems: first of all the big challenge of reducing traffic congestions, CO₂ pollutant emissions, and energy consumption. According to the European Environment Agency, cities emit 69% of Europe's CO₂ and urban transport accounts for 70 % of the pollutants and 40 % of the greenhouse gas emissions from European road transport (European Environment Agency). On the other hand, cities have to guarantee to citizens not only the overall accessibility to the different city and transport services, but also an efficient urban freight distribution with respect to the economic and environmental factors. According to this, the Transport Policy White Paper set up the CO₂ free urban logistics as one of the 10 objectives to reach by the 2030.

Cities have to face the challenge of combining economic growth, competitiveness and sustainable urban development by taking into account the economic and technological changes that have been caused by globalisation processes. This challenge has an important impact on issues dealing with urban quality, such as a sustainable mobility, urban transport, and social, economic and environmental conditions.

Thanks to the application of specific technologies and local policies, and to the adoption of specific practices and solutions, European cities are in need to balance continuously their challenges and needs.

Cities are growing at a rapid pace with related increase in residential and business needs. The 70% of the population lives in cities, the majority of which in mid-sized

cities (around 2000 in Europe), resulting in high demand of services, in the related increasing movements of goods in the city, and in significant energy consumptions (75% of the energy is consumed by cities). Cities therefore play a key role for achieving the EU objective of 20% energy saving by 2020 and for developing a low carbon economy by 2050¹.

Urban freight transport, unlike passenger transport, is largely due to private businesses and works on a pure commercial basis. Urban freight transport is a vital part of the economy of cities, but results also in significant environmental impacts. Despite this, the urban freight distribution sector has received relatively limited attention from both researchers and policymakers. Data on urban freight distribution are in fact quite limited, but where available, trends can be recognised and urban freight transport seems to be characterised by road transport.

It has been estimated that freight transport accounts for round 10-18% of urban road traffic, but the share of emissions of freight vehicles could vary between 20% and 30% of total urban traffic emissions depending on the local situation.

The impacts of freight movement to/within cities suggest that city logistics should be a key priority for their evolving transportation networks, but this is not the case in most urban contexts. In fact, a proper planning for good distribution has largely been forgotten in many urban plans and policies²⁻³.

Based on gathered evidence, there is today a considerably growing consensus on the idea that more sustainable urban freight operations and significant benefits in terms

of energy efficiency can be achieved by an appropriate mix of different measures such as: urban consolidation centres, optimised urban freight transport and delivery plans, use of clean vehicles and low emission technologies, focused regulation framework, public incentive/qualification policies, last mile and value added services, integration of city logistics processes within the overall urban mobility planning and management. Thus, considering that a single model is not valid for all towns (in particular if those are small and medium in size) one of the main objectives of the ENCLOSE project has been to develop a realistic and usable methodology/framework for setting and defining the Sustainable Urban Logistics Plan (SULP). This methodology was used (and tested) by the 9 ENCLOSE towns for developing their local SULPs and is now available to use by other European cities, willing to address urban freight related issues in the framework of the overall urban mobility planning.

1 - http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/citiesoftomorrow/citiesoftomorrow_final.pdf

2 - Hall, P. & M. Hesse (2013). *Cities, Regions & Flows*. Routledge, New York

3 - Dablanc, L. (2009). *Freight Transport for Development Toolkit: Urban Freight*. World Bank Report, Washington.

URBAN MOBILITY GOVERNANCE

In the last decade, the role of cities in the economic development of Europe has strongly emerged, as showed by the wide range of initiatives and measures targeted for towns that have been undertaken not only in European countries, but also in third countries (including developing countries). As anticipated before, the 70% of the European population lives in urban areas and this percentage is expected to increase in the next years. Thus, the objective of making cities livable and competitive shall be one of the key priorities, as cities shall be one of the main driving forces of local and regional development.

Recently, both at European and international level, the concept of Smart City has quickly emerged, and the present document considers this concept with the broader meaning of “well functioning” city, able to tackle the issues affecting and producing significant impacts on the overall quality of life of citizens, such as energy consumption, pollution, health, social cohesion, efficient administration, accessibility and quality of Public Transport (PT) services.

For this reason, the concept of Smart City shall not be seen as a unique model to which all the different cities should refer to, but rather it should be considered as a multidisciplinary approach aiming, on the one hand, to the identification of real city requirements and, on the other hand, to the support in choosing, designing and implementing specific solutions and services, which are suitable to the needs of citizens and other actors belonging to the specific urban context.

In particular, based on gathered evidence, all the cities generally recognised as the most attractive, efficient and productive, show that a Smart City cannot exist without an efficient, integrated, collective, high-quality transport service in place (currently indicated also as “smart or intelligent mobility”).

Therefore, mobility is becoming one of the key priorities to be addressed by local policy-makers and city stakeholders and it is mainly based on the following concepts: integration of urban and transport planning, implementation of actions and measures for boosting Public Transport use.

A sustainable mobility governance should be based on different services that have been already identified and, in some cases, yet consolidated and available on the market. However, the majority of cities (and relevant stakeholders) are still in need to undertake significant actions in terms of need-analysis, solutions planning, application of rules and allocation of resources. In fact, an overall agreement among transport and mobility actors is essential, in order to tailor and customise the available solutions to specific city features and citizens needs, and to integrate the different services in order to achieve a unique and efficient mobility offer.

In the following illustration (which is not intended to be exhaustive) the main services and solutions available for mobility governance are shown.

Efficient solutions usually consist in a mix of measures involving infrastructures (i.e. parking areas or bays, reserved lanes, loading/unloading lots, etc.), regulations (i.e. LTZ, access time windows for freight vehicles, parking lots management, etc.), “green” services (i.e. bike sharing, car and van sharing, etc.), technologies/systems (ITS such as, for instance, traffic and access control systems, user information systems, integrated payment, etc.) in the overall operation and management scenarios. All these measures and services shall be integrated and efficiently designed by means of a proper action plan (known at European level with the acronym of SUMP – Sustainable Urban Mobility Plan), which is usually based on the paradigm “Avoid - Shift - Im-

prove”, that is to say:

- Avoid unnecessary travel by integrating land use and transport planning, based on public transport prioritised corridors, and improved communications;
- Shift travels to more efficient modalities and increased (green) transit options as public transport;
- Improve fuel and vehicle technologies.

This paradigm highlights that sole technology does not automatically solve problems. Moreover, it is essential to consider that no effective results can be achieved – and no “Smart or Intelligent Mobility” can exist – unless smart mobility governance, including efficient Public transport, is implemented.

The main axes of intervention involve services, infrastructures and measures depending on the city objectives and specific requirements such as, among the others:

- Qualification, extension and differentiation of Public Transport services (dedicated and priority corridors as BRT/BHLS, flexible services/demand responsive/feeder, etc.);
- Implementation of “Green Measures” (low emission zone, pedestrian zone, bike sharing, bike stations, collective taxi, car-sharing, car-pooling, etc.);
- Development of Urban logistics services (last mile distribution, consolidation centres, etc.);
- Integration of different modalities (parking houses-Public Transport, Public Transport-bikes, etc.) and services interoperability (integrated ticketing, etc.);
- Updating measures to the already existing regulations, being flexible to needs changing (route optimisation, time windows season adapting, tourist bus parking spaces during summer, etc.);
- In particular, as regards Small/Mid-sized Historic European Towns (SMHT, the target of the ENCLOSE project) the



above approach should take into account specific situations with respect to the large urban and metropolitan areas by considering that: Private car trips are up 70% of total (in some cases up 80%);

- Attractiveness of Public Transport is decreasing for citizens and demand for flexibility of mobility services is increasing;
- Freight distribution has significant impacts in historic city centres;
- Parking management plays a key role in mobility policies with negative impacts on urban conditions, if not properly planned and implemented;
- ITS Technology scenario for managing mobility process is quickly evolving (e.g. Access Control, traffic and transport information platforms, VMS, Intelligent Routing based on real-time traffic state or AVL-automatic vehicle location management systems used for fleet management);
- Cycle and pedestrians trips are increasing, as well as alternative “green mobility services”;
- The “political sensibility” for smart mobility services is emerging.

Thus, in SMH Towns the mobility governance approach should focus on the main axes below:

People: rethinking the PT offer (from the Operator/Authority and from the end-

Mobility Governance: services and measure



users' point of view) with new organisation and services and in the perspective of a cooperation and integration with other modalities;

Goods: development of logistics services to optimise the efficiency of urban freight distribution processes and face the main problems related to shop keepers and self-supply activities;

Parking: development of new parking schemes combined with flexible PT and other green services.

In this context, urban freight distribution

(or City logistics) is one of the key components of smart urban mobility governance contributing to the production of negative impacts on urban environment. City logistics should be planned and defined by City administrations for supporting sustainable freight distribution processes in terms of economic, environment and social equity/cohesion aspects. In this regards the relevance of Smart Cities' networks would facilitate the transfer of knowledge across national borders, creating a synergy between governments and academic partners, too.

CITY LOGISTICS IN SMALL AND MEDIUM EUROPEAN TOWNS

As pointed out in the previous sections, freight traffic flows are responsible for around 25% of the overall traffic congestion in urban areas. In small and medium historic towns, this situation is even more complex due to the peculiarities of such city context, such as old roads infrastructure, narrow streets, strict access regulations and the presence of valuable buildings, including heritage and historic assets. Historic towns can in fact experience high impacts (due to pollutant emission, noise, vibrations, safety hazards, etc.) and consequently high direct and external costs of logistics operation.

In the last years, whilst efforts and city logistics innovation projects have been undertaken in most European capitals and major cities, small and mid-sized towns, particularly those with historic centres, have been somehow lagging behind, as they have to face and overcome several peculiar barriers (e.g. shortage of resources, competences, organisational structures, institutional backing, etc.) to be able to effectively embrace innovation, adopt and implement appropriate plans and measures towards sustainable city logistics. Moreover, SMHTs also have to tackle additional issues related to their specific territorial, social and economic characteristics (e.g. difficult mobility and freight distribution flows, higher impacts of environmental pollution on citizens and quality of life, etc.) and show increasing demand for effective measures as well as large potentials for improvements of energy efficiency and sustainability of city logistics operations.

The need to address these issues is clearly recognised by the already mentioned White Paper, with two of its main objectives (among the 10 set up) dedicated to urban areas, and one specially devoted to

urban freight distribution processes targeting free CO₂ city logistics.

Freight distribution flows are strictly dependent on the organisation of the commercial sectors of the city and on the related needs of different actors involved in the logistics chain (transport operators, shopkeepers, HoReCa operator, etc.). Other significant flows are related to other urban processes/services, such as mail distribution, garbage collection, cleaning activities, emergencies, building sector, home service, etc.

City logistics is therefore a key element of the whole urban mobility governance with a specific peculiarity: it is regulated/influenced by local authorities (both at municipal and regional level), and organised and operated mostly by private actors/companies.

This peculiarity implies, at the town level, the need of efficient solutions for facing different and (often) conflicting interests of the various actors involved (Municipality, citizens, shopkeepers, transport operators, etc.).

Considering this, today, especially in Europe, there is a considerably growing consensus on the idea that more sustainable urban freight operations and significant benefits in terms of energy efficiency and GHG emissions reduction can be achieved by an appropriate mix of different measures such as, among the others:

- Urban Consolidation Centres (UCC);
- Optimised urban freight transport and delivery plans;
- "Green" vehicles and low/zero emission technologies;
- Clean fuels;
- Access and parking restrictions and public incentive policies;
- Last mile delivery and added value logistics services;

- Integration of city logistics processes within the overall management of urban mobility;
- Updating measures to the already existing regulations, being flexible to the changing needs (route optimisation, time windows season adapting, tourist bus parking spaces in summer season...).

Specific requirements, characteristics, limits and constraints affecting European SM (H) Towns are necessary elements, at city level, to set up a specific Sustainable Urban Logistics Plan (SULP) as a useful tool for identifying the main needs, and to plan and evaluate the possible solutions integrated with the overall Sustainable Urban Mobility Plans (SUMP).

To this aim the ENCLOSE Consortium, as one of its project key objectives, has developed an updated and detailed SULP methodology. The present guidelines have been developed following a participatory approach and the policy level involvement, and adopting a bottom-up perspective that starts from user's needs, operators/associations' requirements and towns' objectives.



SUSTAINABLE URBAN LOGISTICS PLAN (SULP)

As reported in the section above, the Sustainable Urban Logistics Plan (SULP) is a useful tool supporting Local Public decision-makers and stakeholders in “governing” city logistics measures and enhancing freight distribution processes towards economic, social environmental sustainability and efficiency. The plan involves strategies, measures and rules that can be adopted with a cooperative approach among different actors for reaching common objectives aimed at an overall urban sustainability.

In other words, a Sustainable Urban Logistics Plan is a strategic plan designed to satisfy freight mobility needs of people and business in cities and their surroundings, in order to achieve a better quality of environment and of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles.

The SULP must be considered as one of the main parts of Sustainable Urban Mobility Plan (SUMP) devoted to integrate urban logistics schemes/services/regulations in the overall mobility strategies and solutions.

Within ENCLOSE and based on its project activities implemented by partner cities, the SULP has proved to be a useful tool for tackling different issues, in particular: managing freight distribution processes and designing solutions able to satisfy urban freight mobility needs of people and business within a midterm horizon; defining the common vision and priority goals of the city, analysing and identifying the most suitable solutions and evaluating related impacts; building consensus on the possible set of solutions among different actors and Local Authorities involved in the City Logistics processes; defining a road map for the adoption of the plan at Institutional Level.

5.1 CONSISTENCY WITH THE REFERENCE CONTEXT

As for the SUMP, also the SULP should take into account the socio-economic, territorial and environmental objectives reported in local, Regional and National plans on both short and medium term perspectives.

Therefore, the SULP should be defined by taking into account the constraints and the indications of Territorial and Urban Plans, in compliance with infrastructure management and other municipal programs and plans (i.e. social and economic programs, environment and air quality plans, etc.). Moreover, at city level the SULP, besides being part of the SUMP, should comply with the other local plans and documents, such as Urban Traffic Plan, Urban Parking Plan, Urban Governance Plan, Climate Change Mitigation Plan, etc.

Mobility policies that may affect freight transport in urban areas must be consistent with the relevant territorial elements and with the demand for transport services from businesses in the urban area (i.e. incentives for electric cars/vehicles could produce significant positive impacts on the local environment). Such policies could be adopted only after having thoroughly and carefully evaluated their potential effects on the economy both at local level and in a larger territorial context. During the design and planning phase of the mobility policies, a continuous discussion and negotiation with, at least, the following actors shall be guaranteed:

- Representatives of all the actors involved in urban freight distribution processes;
- Neighbouring Municipalities or other Local Authorities that may be interested in the plan;
- Other interested public/private actors.

Specific agreements could be made in order to make these discussion forums official at the institutional level.

During the discussion, Regional Authorities shall support Municipalities in organising periodic meetings with logistics operators' associations, by means of institutional regional round tables meetings or by a specific Mobility Observatory useful for the definition of common guidelines.

In order to face the different aspects and issues of the urban freight distribution, SULP should affect different levels:

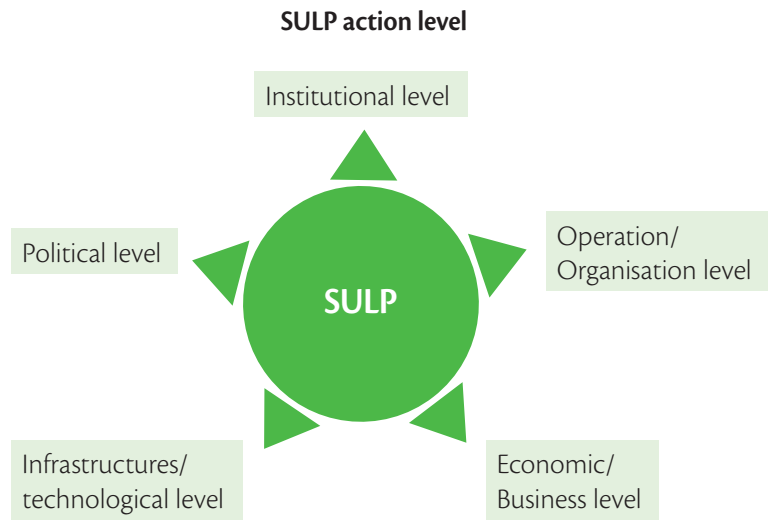
- Institutional level: legal framework, rules and conditions;
- Political level: consensus among different city actors and stakeholders (authorities, associations, operators, citizens groups, etc.);
- Operation/Organisation level: freight distribution schemes, base services, value-added services, operational procedures, integration in the mobility plan;
- Infrastructures/technological level: ICT platform, communication systems, innovative vans/vehicles, web services, etc;
- Economic/Business level: investment, operation cost, social/environment impacts, business model, etc.

As it will be better detailed in the following sections, a clear identification of the competences and appointment of (future) responsibilities among the involved stakeholders is a crucial factor to be duly considered both during the very definition of the SULP and, as a consequence, in the following implementation phase.

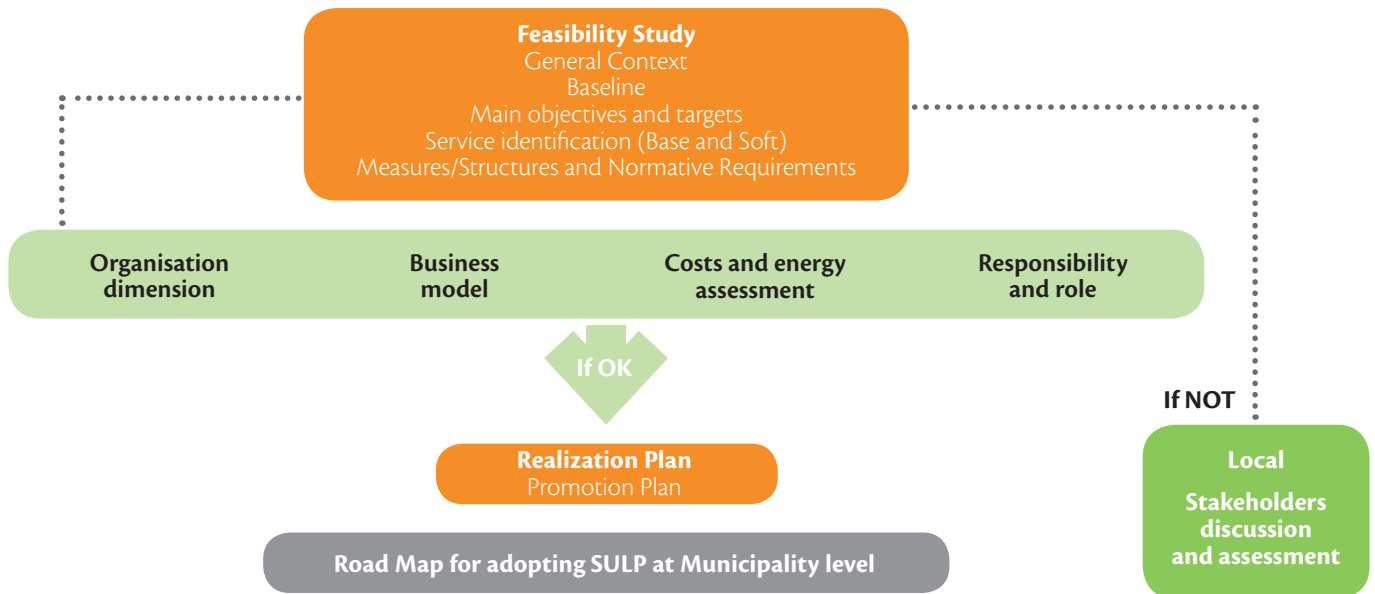
The methodology described in the following, aims to support city stakeholders in the definition and choice of the most suitable logistics services for the identified city requirements and the main mobility strategies (as defined in the SUMP).

The methodology workflow is represented in the figure below. The graph shows

the main steps of the methodology: the analysis of city requirements and the definition of logistics baseline, the identification of the most suitable logistics measures and services, the description of each measure/service considering the results of the feasibility analysis (organisation and operating dimensions, costs analysis, impacts, responsibilities, regulation framework, etc.). Eventually, the involvement of actors and stakeholders in the evaluation and acceptance of measures, the promotion and dissemination campaign and the road map for the potential adoption by the Municipality/City authorities are indicated.



Main aspects of Sustainable Urban Logistic Plans Structure





LOGISTICS SERVICES: NEEDS, CHALLENGES AND BENEFITS

Logistics needs and requirements are rather different from town to town due to specific local characteristics, for example the size of the city, the dimension and structure of the inner centre, the existence of specific facilities and the urban road network, the shops and products, etc. Therefore, It is not possible to identify a “one for all” solution, but it is essential to define several options based on specific towns features, characteristics and identified needs.

During the ENCLOSE project activities, the most suitable logistics solutions for 9 European SMHTs have been identified in terms of challenges, opportunities and priorities. Firstly, a set of possible options and solutions paths was identified by carrying-out a review on the existing European situation. In parallel, specific needs of the 9 ENCLOSE towns have provided priorities in terms of importance, complexity of solutions, assessed/potential benefits and main issues and challenges to be faced. Then, a framework was defined focusing on the goals to be achieved and on the possible solutions to be adopted by the ENCLOSE towns, both for developing in a “smart” way the specific measures for urban freight process management and for involving different local stakeholders in policy and decision-making processes.

A cross-site assessment of needs and priorities of the ENCLOSE Towns has been carried-out for identifying the key high-level requirements common to all ENCLOSE sites. Needs/Requirements are grouped into the 4 investigation categories – socio-economic, commercial, operational, technical – and, for each site, the corresponding priority level has been assigned as follows: strong interest (■■■■), fair interest (■■■), moderate interest (■■) as showed in Table 1 below. The main issues / priorities outlined by the ENCLOSE towns were the following:

- Implementing more sustainable city logistics solutions to contribute to the reduction of traffic impacts in the historic centres: forerunner towns already have in place specific measures in this sense and they consider them as key goals in their urban mobility policies. Providing more sustainable city logistics entails the objective of increasing the quality of life of the urban centre;
- Increasing the competitiveness of the commerce and retail system and of connected business services with a more sustainable city logistics. Based on own experiences, the ENCLOSE pilot towns are also very focused on the definition of business models enabling a substantial reduction of the

operating costs;

- Improving the regulation for accessing the urban centre: this is considered relevant due to the direct involvement of Local Authorities and the perception that they can act directly (i.e. formulating new rules by-local law) and quickly (as the enforcement is under their duties), achieving immediate benefits.

From the technical point of view, towns are very interested in technology, allowing an easy management of the whole operation/logistics cycle. However, integration of smart logistics policies in the overall Sustainable Urban Mobility Planning (SUMP) mitigates to some extent the need to use technological approaches. Thus, the common approach “buy technology and solve the problem”, that has become a trend in the transport and mobility context, can be reconsidered as a half-truth: technology surely helps transport and mobility management, but it cannot solve problems without an accurate revision of mobility/logistics urban planning.

In parallel, an analysis of best practice existing in Europe, particularly regarding small and mid-sized towns, was performed, highlighting measures with the highest potential for the ENCLOSE towns (and for European SMHTs in general).

Mobility Governance: services and measure

	Key needs & reqts.	Lucca	Trond.	Den'B.	Burgos	Almad.	Dund.	Alba I.	Serres	Balch.
Socio-economic	Reducing traffic impacts in the historical centre	■■■	■■■	■■■	■	■	■■■	■■	■■	■■■
	Increasing livability of urban environment	■■■	■	■	■■	■■	■■	■■	■■	■■
	Enhancing local economic development	■■			■■	■■	■■	■■	■■	■■
Commercial	Generate benefits on competitivn. & business	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■
	Optimise logistics operations	■■■	■■■	■■	■■	■■	■■	■■	■■	■■
	Reduce costs, improve knowidg of delivery cost	■■■	■■■	■■■	■■	■■	■■■	■■	■■■	■
Operational	Improved city access regulations	■■■	■■■	■■■	■■	■■	■■	■■	■■■	■■■
	Support adoption/use of sustainable vehicles	■■	■■	■■	■■	■■			■■	
	Measures supporting transp. operators market.	■■	■	■	■	■	■■	■	■■	■
Technical	Systems to optimise fleet and delivery operations	■■■	■■■	■■	■■	■	■■	■	■■■	■■■
	Systems to optimise logistics operations	■■■	■■■	■■■	■■■	■■	■■	■■	■	■■
	Improved integration of logistics in urb. mobility	■■■	■■	■■	■■	■	■■	■■■	■■■	■■

SOLUTION'S PORTFOLIO FOR SMALL AND MID-SIZED HISTORIC TOWN

A selection of key solutions were identified in order to tackle the needs of small/mid-sized historic towns:

1. **Urban Consolidation Centres (UCC)** represent one of the most common and successful measures implemented in European SMHTs, with several remarkable experiences recorded in Italy (Vicenza, Lucca, Padua, Parma, Modena), France (La Rochelle), Switzerland (Thun), UK (Bristol, Southampton) and in The Netherlands.

The required investment, which may be high in relation to the physical infrastructures and technical installations involved, pays off in terms of benefits for the urban environment and services for the population: optimisation of vehicle loading and optimisation of routing, reduction of the number of trips, etc. However, in most cases, the (strong) support from the local administration is necessary to ensure financial sustainability of UCC operations.

Overall, critical factors shall be considered for any transferability investigation in ENCLOSE sites: build-up of consensus around the "UCC project", among all the key stakeholder categories involved (freight transport service providers, shops and retail operators, citizens associations, etc.); identification of the best position and accessibility of the UCC (e.g. proximity to the main road network, city access areas, etc.);

Definition of the role of public authorities and of supporting regulations fostering UCC take off (restrictions, incentives, impacts on the market, etc.).

An analysis of the key aspects (in terms of challenges and benefits) about different approaches to urban logistics consolidation centers was done comparing Lucca's solution (LuccaPort) with the solution implemented in s'Hertogenbosh (Binnestad

-Service) for potential transfer to the other ENCLOSE towns.

2. The implementation of **Low Emission Zones (LEZ)** is also an emerging measure in European cities and towns (e.g. Bologna, London, Maastricht, Prague, Randstad, Rotterdam, Utrecht, etc.). This measure is naturally linked to other city policies, plans or measures, such as Air Quality Plans, Controlled Access Zones, etc.

Access to the LEZ and transits may be controlled by ITS equipped barriers of tollbooths, or simply advised without any special control infrastructure/technology. Pricing and enforcement systems may be also applied, e.g. through fixed and mobile cameras system.

The positive impacts and benefits of LEZs are generally significant, leading to air quality improvements due to the reduced traffic emissions in terms of particulate matter (PM10) and other pollutants (O₃, CO, NO_x, SO_x etc.). On the other hand, several obstacles may be faced before and during their introduction: the consultation process with the involved stakeholders may be long (and often controversial), the costs of enforcement may be high for authorities, etc.

3. The introduction of **"eco-vehicles", particularly Fully Electric and Plug-in Hybrid Vehicles (FEVs, PHEVs)** for city logistics operations is becoming a viable option for local administrations and logistics service providers addressing sustainability policies and objectives.

In most cases electric vehicles are vans and small trucks (up to 3,5 ton), but also other types of FEVs that started to be used for operating last mile service, and several forms of B2C services as well cargo cycles (used, for instance, in the Petite Reine

scheme in Rouen, FR, or Gnewt Cargo scheme in London, UK). Besides last mile services, FEVs are used to support sustainable self-supply transport (for shops, businesses and citizens) for example with van sharing schemes.

Overall, the surveyed best-practice operating FEVs have shown that electric vehicles bring clear benefits as regards the abatement of exhausted gases, CO₂, and noise emissions. Not least, FEVs are easily accepted by the public and providing a positive "image" which may be an important support factor for the introduction of new sustainable logistics services in a site.

During the ENCLOSE project, services operated in the forerunner towns of Lucca and Trondheim were investigated for potential transferability of FEV-based schemes in other sites. The surveyed best practice show the importance of adapting or introducing new administrative measures and regulations to properly support FEV-based schemes in urban logistics operational and organisational context. Moreover, during the ENCLOSE project, a detailed analysis was carried out by AUSTRIATECH for defining the specific features of FEVs for meeting the requirements of city logistics and in particular the needs and objectives of transport operators. A specific report was delivered about European cities that have successfully introduced electric vehicles into their logistics fleets with a specific focus on: regulation, incentives and options defined for facilitating the modification of infrastructure by cities and companies¹. Moreover, an overview of the state of the art about the existing low emission vehicles was carried out¹.

4. **ITS and technologies** have gained a

1 - "Electric Fleets in Urban Logistics Improving urban freight efficiency in small and medium-sized historic towns". ENCLOSE Project report, AUSTRIATECH, Wien April 2014



crucial role in the implementation of advanced city logistics solutions. More than 50% of surveyed best practices involves the use of ITS and other technical tools, from load and delivery planning software, to fleet monitoring systems, track-and-trace solutions, vehicle occupancy/transit detection technologies, automated vehicle identification (e.g. number plate reading), monitoring and enforcement systems and others.

The introduction of ITS and ICT services to optimise logistics operation, fleet management and delivery scheduling has been also expressed as a main technological requirement by ENCLOSE towns.

5. The importance of the *integration* between new urban logistics measures and urban and mobility planning has clearly emerged in the surveyed European best practices.

The relationships more frequently identified in ENCLOSE survey concern:

- The location of the Urban Consolida-

tion Centre and its integration within the overall urban (and regional) transport network;

- The location of other urban logistics infrastructures such as a “Proximity Logistics Spaces”, dedicated freight load/unload areas, etc.;
- The development of Urban Mobility Plans, Freight Distribution Plans, Low Emission Zones, etc.

The integration of sustainable urban logistics plans in the broader context of urban planning represents a strategic issue for ENCLOSE cities both in the design and in the implementation of a particular sustainable logistics measure.

Summing up, a few key facts describing the actual situation about city logistics at European level can be usefully mentioned:

- City Logistics development is an ongoing process;
- There is quite a long history with many good examples and some failures (also useful as references);

- There are many solutions, different schemes and services;
- A “one model fits all” towns does not exist. On the contrary, local objectives and requirements must be analysed and should drive the implemented solution/model;
- A fundamental role is played by Local Public Administrations;
- It is essential to identify and clearly allocate responsibilities among the involved actors and stakeholders;
- It is important to share knowledge and experiences with other sites;
- In some cases a “simple” measure (i.e. enforcement of measures already in force) can be an actual and effective step ahead;
- The definition of a realistic and robust budget plan on a long and short/medium perspective is important for the sustainability of the action;
- The business model remains an “open issue”.

“SOFT AND HARD” MEASURES REFERENCE CONTEXT

ENCLOSE project defines two different levels of solutions implemented at local level, tackling urban logistics issues:

- “Soft” measures: measures not requiring high-value investments, that may produce complex and significant impacts (i.e. measures as new/enhanced regulation dealing with restriction of access to the historic centre or to parking rules for freight vehicles, etc.);

- “Hard” (or pilot) measures: measures requiring significant investments, structures and specific organisation and operational dimensions.

ENCLOSE follower Towns have implemented different soft measures taking into account their own local objectives and requirements. These measures have been defined also on the basis of the experiences of ENCLOSE Pilot Towns and taking into

account the emerging reference context in the European cities and projects funded by different EU Programmes.

The following table provides some examples of the two categories of measures, Soft (S) and Hard (H), based on the type of action adopted and on the involved stakeholders:

Soft (S) and Hard (H) measures context

Service Measure	Key Actor Interested Actors	Type S/H		Requirements NOTES
Regulatory changes	Municipality Associations Transport operators	S	By-laws	Changing the rules on vehicle engines and fuel, time windows, load factor, certification (example Copenhagen)
Load consolidation	Municipality and/or Logistics Platform Manager, Transport operators Association, etc.	H	- Logistics Infrastructure - ICT Platform - Eco-fleet	Lucca Port - Consolidation centres - Trans-shipment centres - Freight terminals/transit points - Public logistics terminals - Urban platforms - Off-site stock room/logistics support centres, collection points
Last-mile delivery	Municipality and/or Transport Association, etc. Transport operators	H	- Logistics Base - ICT Platform - Eco-fleet	A good example for this kind of measure is provided by the experience of Lucca Port, www.luccaport.it
Reverse logistics	Municipality, Transport operators Local trade associations, shop-owners	S	-Eco-fleet	Reverse logistics deals with e.g. refused/returned goods, collection and transport of packaging materials, etc. The collection of used packaging and other waste materials from shops can be operated according to subscriptions or, if possible, on-demand.
Delivery services through “Pick-up-Points”	Transport operators Other actors (e.g. gas stations, ...) Shop owners	H	- Logistics Base - Pick-Up-Point boxes	- Pick-up Points (PuP) operated in public locations (e.g. public buildings). A reference for this scheme is the Packstation™ system operated by DHL-German Post in several cities and towns in Germany - PuP based delivery services involving facilities from other service chains; e.g. using petrol stations like in the Kiala service, operated in Benelux, TNT and Shell partnership, etc - PuP based delivery services integrated with other mobility related services; e.g. delivery services at parking and Park & Ride locations, like the Park & Buy scheme piloted in Siena or a similar scheme operated in Ipswich, UK and Trondheim (N)
Home delivery	Transport operators Association Large-scale distribution	S	- Eco fleet	Similar to the former service, this measure is used for operating the delivery of goods at specific locations within the historical centre, such as hotels and other service locations Such services could be operated as value-added services offered by the involved organisations (e.g. individual hotels, hotel chains, Tourist Office, etc.) to their customers. Agreements between such organisations and organisations of the retail system (i.e. shops, Trade Association, the Chamber of Commerce, etc.) is also required



Service Measure	Key Actor Interested Actors	Type S/H	Requirements	NOTES
Delivery at the Parking lots – Park&Buy	- Transport Operators - Parking Operators - Shop owners	S	- ECO Fleet - Dedicated spaces in the parking	Insurance problems to be faced. As in the former case.
Remote warehouse services	UCC's Logistics platform operators Shop owners Transport operators	H	Logistics Base	This facility produces the following benefits: - allowing shop owners to access and consult the state of their remote stocks; - services to allow shop owners to request the collection and consignment of any item from the remote warehouse to the shop; - replenishment transport services between the logistics base and the involved shops operated by eco fleet vehicles as a result of previous operations. This service has a particular importance for small shops and points of sales as it contributes to make the most of their usable space, increasing the space available for those activities that are commercially most relevant (i.e. clients area, show room, displays and promotion space, etc.)
Loading-Unloading Areas management services	- Parking Operator - Municipality	H	- road infrastructure - ICT	This service scheme involves: - The possibility for users to book the required Loading-Unloading Areas, in accordance with the relevant regulations: day/time access restrictions for the particular user category (see Annex 1), allowed time window, etc. - The assignment of the requested loading -unloading bays to the users, according to the overall situation of demand and offer and, eventually, to any additional restriction related to the applied policies (e.g. max. number of allowed vehicles in the area). - The control of usage conditions and the generation of information or alerts to the police (e.g. exceeded time limits, unauthorised vehicle for the specific UA, etc.)
Van-Sharing for self-replenishment of the shop	- Transport Operators - Municipalities - Shop owners - Trade Associations	H	ECO Fleet ICT	Common use of commercial vehicles under a sharing scheme.

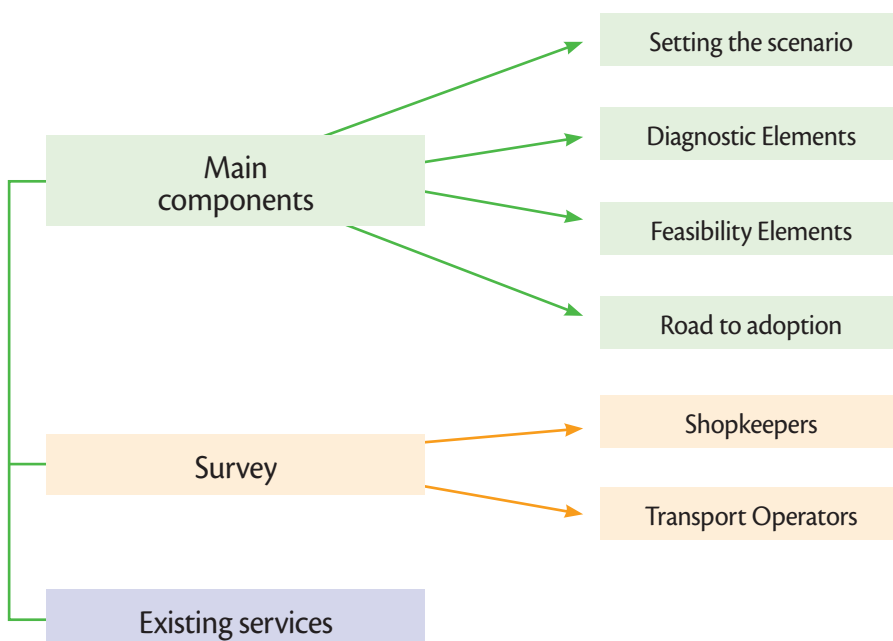
METHODOLOGY APPROACH

This chapter provides user-friendly guidelines on how to develop a Sulp - Sustainable Urban Logistics Plan, highlighting key elements that should be considered.

The Sulp methodology should follow a participatory approach, based on a strong involvement of the political level (as in Sump methodology) but maintaining a bottom-up perspective, starting from user needs, operators/associations requirements and following town policy priorities and perspectives. The following chapters deal with and thoroughly analyse each single element which shall be considered in order to develop a realistic Sulp supporting city stakeholders/managers in strategic planning and decision-making regarding freight distribution processes in local urban contexts. Each element of the methodology includes a set of actions, that are described by providing real examples coming from the work carried-out in the 9 partner towns for the implementation of their

Sulps. Therefore the proposed methodology, including each one of its unique components, has been already tested "on site" by the cities involved in ENCLOSE project activities and this surely results in an added value for this document, containing a very practical approach to the topic. It is important to highlight that elements and related actions described in the following sections shall be considered as a reference framework that city stakeholders (urban mobility planners or decision-makers) should take into account during the Sulp development, yet this methodology is subjected to changes and adaptations depending on local needs and requirements. Obviously, there is no unique official method for elaborating a Sustainable Urban Logistics Plan, but ENCLOSE activity allowed to develop a consistent and detailed approach that involves all the elements described below. The graph below summarises the key structure of the Sulp Guidelines.

Key structure of the Sulp Guidelines



The following table provides the list of the specific steps related to each methodology elements.

The Sulp elements

- E0: Setting the objective and target
- E1: Urban mobility scenario and priorities
- E2: Analyze the logistics context and processes
- E3: Setting requirements and logistics baseline
- E4: Identified measures and services vs. requirements
- E5: Service design
- E6: Organisation, business model and contracting
- E7: Assessment and impacts evaluation
- E8: roadmap di adopt the Sulp
- E9: Responsibilities and implementation/ monitoring plan
- E10: Promotion and Communication Plan

E0: SETTING THE OBJECTIVE AND TARGET

RATIONALE

The reference scenario for the definition of the main objectives to be reached at town level, in terms of urban mobility and transport, is provided by policies and official documents issued by the EU in the last 10-12 years.

As regards strategic planning and identification of priority objectives dealing with urban mobility and city logistics, city stakeholders and decision-makers shall consider the White Paper (2011), which sets 10 goals for a competitive and resource-efficient transport, two of which are specific for urban areas:

- "Halve the use of 'conventionally-fueled' vehicles in urban transport by 2030, phase them out by 2050";
- "Achieve essentially CO₂-free city logistics by 2030 - in major urban centres.



In this document, the transition from a car-based mobility to a mobility based on walking, cycling and high-quality public transport as well as to sustainable solutions for freight distribution in urban areas is outlined.

This objective can be well recognised also in the methodology set-up for developing Sustainable Urban Mobility Plans, where the transition from “traffic planning” to “planning for the people” is emphasized. Concerning logistics processes, the main objectives stated in the White Paper can be summarized as follows:

- Optimising urban logistics efficiency considering market and environmental aspects. This means that different problems need to be tackled by adopting a multi-disciplinary approach, always keeping in mind that logistics is strictly related to the overall city life and economic growth;
- Improving the links between long-distance, inter-urban and urban freight transport;
- Incorporating freight transport in local mobility policy and developing “Sustainable Urban Logistics Plans”.

Despite the provisions of EU positions/

legislation as key reference pillars, service planning at local level shall be based mostly on the real urban and transport situation. As anticipated, the absence of one model valid for any town means that strategic objectives shall be clearly identified on the basis of local stakeholders priorities and on local mobility services for accessing the city.

The approach usually adopted is focused on the minimisation of both economic costs and negative impacts to improve the sustainability, by taking into account the interests and needs (often conflicting) of different actors involved in the urban logistics chain (local authorities, service providers or agencies, logistic companies, transport service providers, commercial operators, consumers, etc.) in their different representation bodies (Chambers of Commerce, citizens associations, operators associations, etc.).

TASKS

Different activities should be set-up at this stage for creating the suitable baseline in terms of knowledge:

- Identify key actors interested in City logistics and involve them in the planning process;

- Involve Local Administrations, stakeholders and politicians (first of all the Mayor and its staff) and assist them to thoroughly understand city logistics approach and solutions, starting from the EU directives;
- Set the priorities, based on the overall Municipal strategy for urban and economic development plan and on the overall mobility policies including measures defined in SUMP, if any;
- Guarantee the alignment with the upper-level policy (mainly regional/national and, if necessary, European);
- Discuss with key stakeholders about possible hypothesis and check the possible consensus in carrying-out a city logistics process.

METHODS AND TIMING

City stakeholders should use web sites and official documents in order to get information regarding existing experiences and relevant legislation.

Focus groups are a useful tool for setting the objectives allowing to make high-level discussion and to involve other relevant stakeholders. This activity should be carried-out in a short time (ideally in one month).

EXAMPLES FROM ENCLOSE

BOX 1 - Stakeholders – Main actors and their goals

Actor category	Example	Goals and interests
Freight delivery services	Freight forwarders Shippers	More efficient delivery chain, less delays in delivery, increase delivery volumes, etc.
Freight transport services	Long-distance transport Express couriers, etc.	Less mileage, less delays, less operational costs, empty runs reductions, etc.
3 rd Party Logistics providers (3PL)	Consolidation Centre Operators Added-value logistics service providers	Business opportunities, new customers Optimise service to reduce operational costs (e.g. increase load factor, decrease number of trips)
Retail system service providers	Shops, Retail associations, e-Commerce, HoReCa	On-time delivery, less storage, new services (packaging/waste collection, etc.) No increase of costs.
Local Authorities	City Council Mobility Dept. Urban Police City Council Commerce Dept City Council Traffic planners City Roads Authority, etc.	Less congestion Less emissions/noise Better living conditions Increased City attractiveness, etc.
Citizens	Consumers Residents Tourists and travellers, etc.	Better services (e.g. on-time delivery, information, etc.) Better urban environment, More safety (e.g. for pedestrians), etc.

BOX 2 - General city objectives

<p><i>From the socio-economic point of view:</i></p> <ul style="list-style-type: none"> - Reducing traffic impacts in the historic urban centre - Increasing the livability of the urban environment - Enhancing local economic development 	<p><i>From the commercial point of view:</i></p> <ul style="list-style-type: none"> - Generate tangible benefits on competitiveness and business expansion - Optimise logistics operations - Reduce costs and improve knowledge about the costs of deliveries/logistics
<p><i>From the operational point of view:</i></p> <ul style="list-style-type: none"> - Improved city access regulations - Measures to support the adoption and operation of sustainable (e.g. fully electric) vehicles - Measures to support the transport operators market 	<p><i>From the technical point of view:</i></p> <ul style="list-style-type: none"> - Tools, systems and solutions to optimise fleet and delivery operations - Solutions to optimise logistics operations - Improved integration of logistics operations within the overall urban mobility system

BOX 3 - The case of Burgos

Burgos is a medium-sized city (180.000 inhabitants) situated in the North-central part of Spain in the region of Castilla y León. The urban area is 108,26 km² with a population density of about 1.662 inhabitants/km². Burgos is an important commercial and touristic city, worldwide known because of its cultural, monumental, and artistic heritage including 3 sites declared Human Heritage by UNESCO. Its historic centre extends for over 32 km² and houses 14.041 residents.

The funnel effect of the river and the Castle hillside, the wide historic heritage, narrow roadways and streets complicate mobility and logistics in the historic centre. With a view to reducing pressure in the urban zone arising from various economic and social factors, different activities have been carried out over time and in an orderly manner: traffic has been limited to certain streets, pedestrian areas established over 3% of the surface area, energy substitution introduced in buildings, parking areas built for 8% of the residents, etc.

The area identified in Burgos for the analysis of commercial and logistic activities and possible solutions (“study area”), is the vehicle-restricted area of Burgos Historical City centre.

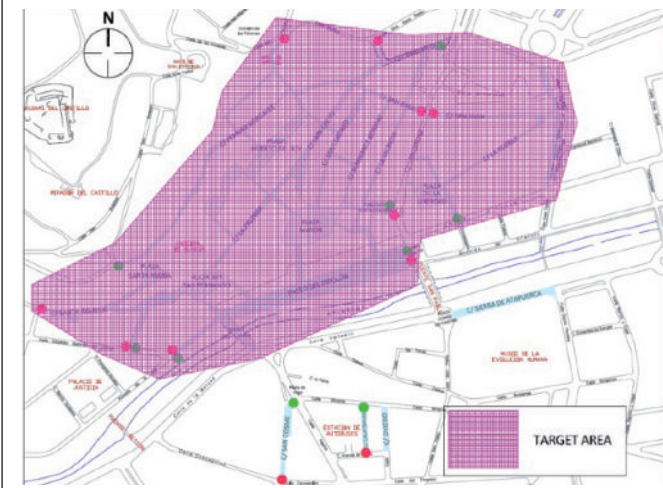
It is located in the historic city centre, around the cathedral, where about 628 commercial activities are placed, in particular: HO-RE-CA (32%), food (9%), personal equipment (33%), home equipment (10%), commerce with high service component (9%), banks (5%) and pharmaceuticals (2%).

The strategic objective set-up by the City administration was to design and establish a sustainable model capable of solving logistics needs of the city of Burgos both in the present and for the future.

On the basis of the Burgos context the following main strategic objectives/lines have been defined:

- Strategy Line 1: Deepening the understanding of various aspects of urban logistics management with new technologies. Smart city approach;
- Strategy Line 2: Optimising and implementing common infrastructures, services and resources;
- Strategy Line 3: Greening urban logistics system;
- Strategy Line 4: Rearranging the space devoted to parking. Refurbish urban public spaces and small key points;
- Strategy Line 5: Promote intermodality, coordination and integration of logistics.

The municipality set-up a specific “focus group” involving the different actors actively involved in the logistics chain. The focus group has been active all along the production of the SULP report.



E1: URBAN MOBILITY SCENARIO

RATIONALE
One of the crucial parts of the methodology is the analysis of the overall situation of the

city. It is therefore essential to understand well from the very beginning the city context, paying a special attention to the inner centre, from the mobility, transport and logistics points of view, in order to identify the specific issues and concerns that need to be

tackled. One of the key preparatory actions is the clear definition of the study area (that usually corresponds to the city centre) and the identification of the main features of the reference area by, for instance, collecting mobility information and data about economic



activities, social aspects, attraction centres (including the position of shopping centres and small shops) and traffic nodes.

Moreover, it is fundamental to identify:

- Zones which are mainly interested by freight flows, especially in those areas with a high percentage of economic and commercial activities;
- Characteristics and main types of city logistics flows (e.g. clothing, foods and drinks, Ho.Re.Ca., supermarkets, consumer electronics, house appliances, etc.); main regulatory aspects in force (e.g. traffic restrictions, pedestrian areas, regulated access areas, special regulations for residents, etc.) with particular attention to regulations for commercial and freight vehicles circulation. Eventually, the analysis of the study area from the perspective of ITS and city mobility technologies (e.g. Access Control System, Road Pricing systems, Parking Management System, etc.) is also important.

TASKS

Among the most important tasks involved

in setting a urban mobility scenario are the following:

- Identifying key city documents to be used for analysing the local situation (statistics, political decisions, past traffic surveys/data, city strategic planning, spatial development plans) considering different aspects, from mobility to social conditions;
- Reviewing the main existing/planned investment programs and decisions, dealing with mobility and logistics at Municipality level;
- Revising the available data on different transport modalities and making a critical reading of the main figures;
- Identifying the main data-source campaign on traffic already carried-out by the Local Authority, also by using the census data for obtaining a real picture of the city (e.g. definition of an o/d matrix);
- Analysing the situation of the technological systems and devices available in the urban area (i.e. access control system, urban traffic management system);
- Identifying existing infrastructures and

- facilities for city logistics and freight distribution (e.g. Distribution Terminals, load/unload areas for freight) that can be available and already in operation (forerunner sites) or are planned, studied or of potential interest for the site (followers sites);
- Analysing the key existing regulation framework and identifying the main relevant rules.

METHODS AND TIMING

The implementation of this task is mainly based on desk activity and on the existing documents produced by the departments of the Municipal administration and by other involved public and private entities (chambers of commerce, associations, etc.).

It is advisable to use GIS tools and a user-friendly database to summarise and process all the collected information, to clearly identify the most significant zones or points of interest, and to highlight the areas where city logistics solutions are currently lacking and could be implemented.

BOX 1 - The case of Serres

The city of Serres is located in the Northern part of Greece (Region of Central Macedonia). Following a recent legislative reform in the Greek local administration, Serres is now an extended Municipality (resulting from 4 former municipalities and 2 communities of the Region) and the largest in population among the 7 Municipalities of the Regional Unit of Serres.

Situated 80 km NE of the city of Thessaloniki, Serres is integrated in the Transeuropean Transport Networks, part of the Egnatia Motorway vertical axis. Since its complete destruction in 1913, Serres has gradually become a remarkable urban administrative and commercial centre with rich traditions, sports and cultural activities in arts and literature.

Serres area is around 600 km² and its residential population sums up to 75.233 people (2011 census). There is also a considerable student community due to the presence of the Technical Institute of Serres and the Physical Education Department of the Aristotle University of Thessaloniki.

During working days, the number of people increases up to round 100.000 due to commuters, students and city users.

Mobility management is an open issue for the Municipality of Serres. In 2008, an important Traffic Regulatory decision was made by the Municipal Council concerning improving sustainable urban mobility, with pedestrian paths expansion towards the whole historic and commercial centre, increase of controlled parking area up to 4,000 spaces, construction of cycling pathways and creation of three regional facilities for park and ride.

The Municipality of Serres has shown a significant interest in environmental protection and energy saving matters. Among other activities, it has established an office for energy management and promotion of energy environmental technologies. Given recent national funding opportunities, Serres has gained considerable funding on energy saving related projects, mostly concerning buildings and green energy solutions. Sustainable urban mobility was also part of the energy saving rationale of these projects. Therefore, a urban mobility study will be undertaken in 2015.

In addition, as regards urban space management, a lot of new infrastructures have been recently developed, such as pedestrian areas, cycling paths, urban equipment, accompanied by mobility management measures.

In this context, urban freight transport is a key issue, and regulatory decisions are also in place. However, Serres needs a revision as actual regulations are a bit out of date and have to be enforced by traffic police control, given the recent abolition of Municipal Police. Having acknowledged the problems related to the current freight traffic situation, especially in the city centre, the Municipality of Serres is interested in making steps forward in this field. In close collaboration with different stakeholders, a strategy towards sustainable urban freight mobility needs to be developed in order to avoid traffic congestion or energy consumption, towards more environmental friendly commercial fleet and logistics management in order to obtain social approval and bring economic growth. The Serres SULP will be integrated in the municipal agenda, giving space to a new urban freight regulation in the commercial area shown below.



BOX 2 - Dundee users’ needs analysis (the table is also relevant for component E2)

Technical Users’ needs	Operational Users’ needs	Commercial users’ needs	Socio economic users’ needs
Allowing track-and-tracing	Possibility to contact and contract different transport operators (transport operators ‘market’)	Maximising profits	Enhancing local economic development
Possibility to generate statistical reports about the logistic processes	Creation of a consistent framework of institutional measures (public and private): public private partnership construction	Generating recognisable benefits for the participants (price, delivery time/quality) to optimise logistic measures	Increasing citizen’s employment opportunities
Interfaces with other systems sharing data / information	Removing authorised time windows restrictions for delivering goods to customers	Minimising transport costs of inner city deliveries	Increasing pedestrian citizen / tourist city tours
Possibility to handle external warehouses	Harmonising access restrictions (weight/length) between municipalities	Increasing business	Reducing impacts of traffic congestion
Route planner (GIS) and real-time traffic information system	LC	Delivering cost knowledge	Improving the environmental sustainability and CO ₂ reduction within the city
Using logistic optimisation technologies to increase load factors of carrier trucks		Maintaining goods transport prices in the inner city at a competitive level	Improving the urban area traffic safety
Optimising the assignment of available loading and unloading spaces (network optimisation)	LM	Increasing the number of deliveries	Reducing kilometers driven related to goods distribution
	LM	Optimising the distribution system for retailers	HM

E2: ANALYSING THE LOGISTICS CONTEXT AND PROCESSES

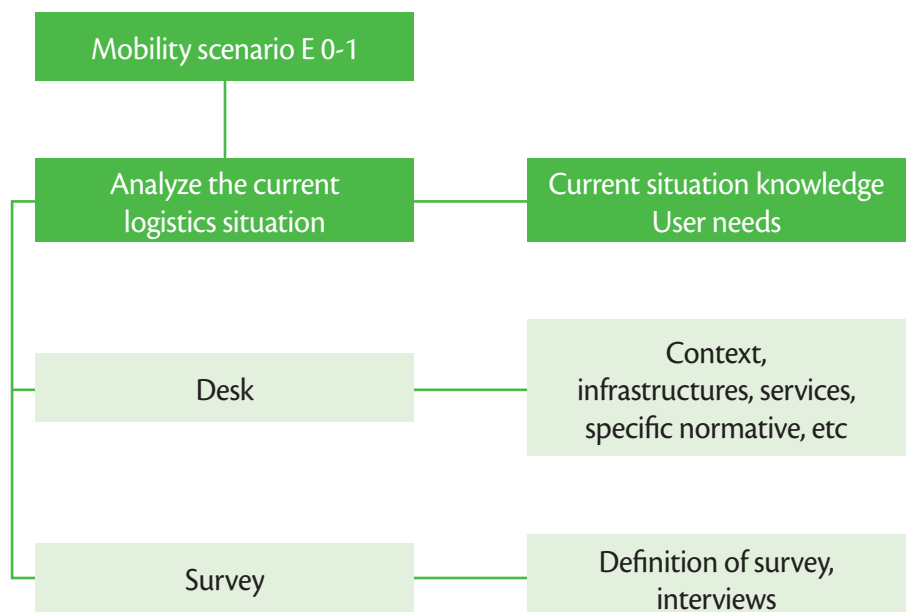
RATIONALE

Based on the results of the activities carried out in E0-E1 and, in particular, on the main collected data related to freight distribution processes and to the mobility scenario, this step is dedicated to the analysis and understanding of the general town situation from city logistics and freight transport points of view, in order to identify specific issues and concerns.

TASKS

The analysis involves these main aspects:
 - Characterising the study area from the commercial point of view. Identifying various commercial structures (bars, res-

Activities for logistics context analysis





- restaurants, shops, small markets, and large retail groups and large-scale distributors/department Stores) on the basis of their supply chain, size and type of product;
- Analysing the specific regulations for commercial and freight vehicles circulation in the study area;
 - Overview of characteristics and main types of logistics flows in the study area (e.g. clothing, foods and drinks, Ho.Re. Ca., supermarkets, consumer electronics, house appliances, etc.);
 - Analysis of logistics process of the identified infrastructures and facilities for city logistics and freight distribution, if any (e.g. city distribution terminals, load/unload areas for freight, etc.);
 - Identification of the most relevant supply chains including the related commercial vehicle flows and packaging typologies. Moreover, the main aspects and figures of the demand (shop owners, hotel, HO.RE.CA) and existing transport operators have to be identified. For each identified activity, an analysis of the organisational and operational conditions should be carried-out with the identification of the main transfer logistics points, if any, and of the main specific indicators.

On the other hand, a specific data collection and information survey must be carried-out on the main roads of the reference area (study area). Data can be collected by means of already consolidated methodologies, suitable to the level of detail that shall be achieved.

METHODS AND TIMING

The method to be adopted for carrying-out this activity is mainly based on interviews/surveys, besides, of course, desk activities dedicated to the collection of information on existing logistics processes and infrastructure. As regards the survey, key activities are:

a) Interviews with local stakeholders: a more detailed analysis of freight and city distribution processes must be carried out through interviews with key stakeholders, aimed at identifying the needs of each rel-

evant category. Particularly, two main categories will be addressed and interviewed on-site: shop owners and transport operators.

Both individual stakeholders and Associations belonging to each relevant category must be interviewed, depending on the particular context in the site (i.e. whether any Association is present, or relevant for logistics processes, etc.).

The support of chambers of commerce or trade associations can be an important success factor in this activity, allowing a larger data collection and contacts database.

b) On-field data collection: information shall be collected from Transport Operators and complemented by surveys carried-out on road during specific time windows.

Depending on the economic and staff resources, traffic counting can be also implemented. These can either be:

- Automatic: enabling to monitor time of transit, length of vehicles and relevant speed in a continuous way during a fixed period of time;
- Manual: by employing operators along the routes. Compared to automatic counting, this system, besides being less accurate, is also rather discontinuous as it is not possible to guarantee the constant presence of operators on the road.

Useful information can be collected by merging traffic counting with specific surveys to drivers of commercial vehicles:

- Traffic typology (within the urban area, crossing the urban area, etc.);
- Type of transport (self-supply, 3rd party, courier, etc.);
- Origin/destination of freight;
- Type of freight carried;
- Number of deliveries per day;
- Average stopping times of vehicles during delivery processes;
- Time slots and days characterised by higher traffic flows of commercial vehicles.

For an optimal implementation of surveys and counting, it is essential to quantify the

costs, define staff resources, investigating areas, prepare questionnaires for surveys, etc.

Both types of surveys (automatic vehicle counting, on-road interviews) can provide additional information allowing to:

- (a) Extend the information collected through stakeholders interviews (see above);
- (b) Validate such information through direct observation of logistics flows in the area.

It is worth noting that repeating the survey for two or more times can prove to be very useful, in order to cover different days of the week and time periods (e.g. peak vs non-peak hours). It will also avoid any irregular situation that may happen in case of a single survey (i.e. market days, etc.). In case any significant data/information is not available, it is possible to approach the different stakeholder groups (transport associations, chambers of commerce, etc.). This may be achieved by organising specific focus groups. Data and information can be collected in a quick and efficient way, helping to set-up a useful reference scenario.

BOX 1 - Structure of questionnaires

In the following table, a blend of the different questionnaires structures related to

specific town stakeholders is provided. For more information and details please refer the Deliverable D2.2 released by the EN-CLOSE consortium.

Addressed stakeholder	Section	Addressed stakeholder	Section
Shop Owners	Company information	European SMHTs	Reference site - short description of the site
	Contact Person		EXISTING MEASURES OF URBAN LOGISTIC
	Type of Company		Name of the initiative
	Type of shop		Description of the initiative
	Type of shop management		Type of measure/field of application
	How are goods you receive packed		RESULTS
	Selling surface		Achieved logistics results
	Available storage surface		Quantitative energy end environmental results achieved
	Supplies and deliveries		KEY CONSIDERATIONS
	Deliveries		Lessons learned
	Delivery time		Primary Obstacles
	Reverse logistic		Critical Success factors
	Other issues related to delivery and suggestions		Transferability considerations: 1 - Policy/Administrative/ Normative details 2 - Infrastructure and technologies details 3 - Operational details 4 - Supporting Mechanism
	Transport operators		A - GENERAL INFORMATION
Company information		Company information	
Contact Person		Contact Person	
Type of company		B - OPERATIONAL SCHEME	
B - WAREHOUSE/DEPOT		Type of transport	
How much warehousing space do you have?		Other info	
Eventual special storage requirements		C - VEHICLES AND DELIVERIES	
Added value activities		Dimension of the fleet operating on the targeted area versus total	
Other warehousing		Description of the interviewed Vehicle	
C - PRODUCTS INFORMATION		Delivery trip	
Products usually delivered in the study area		Product packing (for the targeted area only)	
Product packaging		Where do you stop the truck/van for the delivery	
Number of outbound deliveries per week		Loading/unloading areas	
Use of barcodes		Type of goods usually transported by the company	
Type of goods usually transported by the company		Reverse logistics	
Reverse logistics		D - ADMINISTRATIVE ISSUES	
Other logistics services		Eventual access permits	
D - GOODS VEHICLES INFORMATION		Any other normative/rules	
Description of the commercial vehicles operating in the referenced area		E - OTHER ISSUES OR NEEDS RELATED TO DELIVERY AND SUGGESTIONS	
Dimension of the fleet operating on the targeted area versus total			
Outsourcing			
Delivery trips			
Transit point			
E - ADMINISTRATIVE ISSUES			
Eventual access permits			
Eventual access regulations			
F - OTHER ISSUES RELATED TO DELIVERY, NEEDS AND SUGGESTIONS			



BOX 2 - Example of questionnaire (deliverable d2.2 form t2.2b - question 15-19)

The following figure provides some questions defined in the questionnaire for the transport operator.

D. Goods vehicles information:

15. Description of the good vehicles operating in the referenced area

	Gasoline			Diesel			Electric/hybrid		
	N°	Euro	Loading capacity	N°	Euro	Loading capacity	N°	Euro	Loading capacity
Light commercial vehicles (LCV) with a gross combination mass of not more than 3.500 kg									
Trucks with a gross combination mass above 3.500 kg									

D. Goods vehicles information:

16. Dimension of the fleet operating on the targeted area versus total

Please, express in % the dimension of the local fleet operating on the targeted area into your entire fleet (directly owned or outsourced)	%
--	---

D. Goods vehicles information:

17. Outsourcing

Do you outsource the delivery services to the targeted area to others (owners, local transport cooperatives, etc.)? In % on the total provided serviced on the targeted area, how much is the outsourced one?	%
--	---

D. Goods vehicles information:

18. Delivery trip

Average loading of the goods vehicle (in %)	%
Average weight of each delivery - Palletized:.....Kg - Palletized:.....Kg	%
Average number of drops for each trip	%
Average number of trips per day	%
Average number of km per trip	%

D. Goods vehicles information:

19. Transit point

Interest to evaluate the possibility of outsourcing the services operated in town to a specific transit point	yes/no
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BOX 3 - Survey results: the case of Almada**Study area and general aspects**

The city of Almada, with around 100.000 inhabitants and strong tourist flows, has significant dynamic patterns. The city is organised in several districts, with particular characteristics as regards to mobility and logistics.

Cacilhas district – Almada's downtown neighborhood, close to the harbor, one of Almada's strongest mobility areas. Cacilhas is Lisbon Metropolitan Area's most important Multimodal Interface, where around 50 000 people arrive every day, with an important commercial area, counting restaurants and small shops hooking local citizens, Lisbon visitors and foreigners, which has been recently pedestrianised (June 2012) so that no vehicles are allowed, except for bikes and electric mini-buses.

Almada Centro – is the city commercial centre, with a large shared space area where pedestrians, public transports, bikes and cars circulate daily. The area is an open-air commercial district, although the economic crisis has constraint its vivacity in the last couple of years.

Almada Velha - is the historic area of the city, with small streets, old shops, little restaurants, churches, gardens, theatres, museums and service facilities. Most part of Almada Velha streets are so narrow that not all types of cars can go through, which makes the district particularly problematic when it comes to logistics aspects.

The proximity and differences among the three districts imply that Almada logistics approach, for both people and goods, is a significantly complex problem. Thus, Almada City Council is considering these or some of these districts to be part of the pilot area for its logistics measures.

Regulations in the study area

The area covering the three districts includes over 500 commercial activities. For the pilot project in Cacilhas district, in the areas surrounding Rua Cândido dos Reis, it has been planned to restrict accesses, allowing only authorized private cars; moreover, specific areas and l/u time windows will be defined as regards to commercial traffic.

In Almada Centro, a maximum speed limit of 20 km/h will be defined for all vehicles. Moreover, for freight vehicles, access widows will be established, with a maximum loading mass and dimensions (exceptions only in special cases). In Almada Velha, no restrictions of speed or access are planned, as the nature of streets themselves represents a physical barrier to traffic, yet loading/unloading windows and other small measures are planned.

Main types of logistics flows

The presence of more than 500 shops implies large amounts of goods delivered with more than 1500 freight vehicles/day circulating in this area, with peaks of 480 vehicles in the time window 08:00-10:00 am.

On the average, the load factor of freight vehicles is less than 50%. For what freight typology breakdown regards: 40% are alimentary products, 8% clothing and sports, 4% furniture, 8% electronic equipments, 7% pharmaceuticals. As in many commercial areas, about 27% of shops and restaurants use their own vehicles for freight own-supply, while the remaining commercial activities are served by couriers and transport operators. Almost all the commercial vehicles have Euro 2 and Euro 3 diesel engines.

Infrastructures and facilities for city logistics

In the historic City Centre, there are no significant logistics infrastructures or organised measures (optimised logistic platform, electric vehicles, optimised loads, etc.) to save energy and improve city mobility and air quality. The only existing logistics infrastructure are loading and unloading parking areas in commercial streets and some electric vehicles for municipal gardening services.

Local logistics data

A survey done in the study area shows that 200 commercial vehicles per day have access to commercial area in the Cacilhas district of historical centre. The peak of about 60 accesses is between 8.00 am and 9.00 am, and more than 56% of accesses is concentrated in the morning from 8.00-12.00 am with considerable impact on mobility of pedestrians, citizens and tourists. For the type of vehicles used, the majority are vans and trucks with diesel engines.



Integration of parking schemes with last mile goods distribution rules.



E3: SETTING REQUIREMENTS AND LOGISTICS BASELINE

RATIONALE

Based on the above steps and, in particular, starting from the results of the surveys carried-out, key users' needs shall be identified. Special attention should be paid to the main town objectives, needs and constraints, and to the identification of the main requirements related to logistics services, to the institutional background, and the regulatory and organisational framework.

The needs of the different stakeholders shall be identified in order to define the main requirements that can be classified in four main categories (additional categories can also be identified depending on specific local situations):

Technical users' needs focusing on the technical and functional aspects of the involved city logistics schemes and applications;

Operational needs addressing day-to-day city logistics operations including elements such as the type of operations carried-out, the workload, work environment, motivation, monitoring and control of logistics processes;

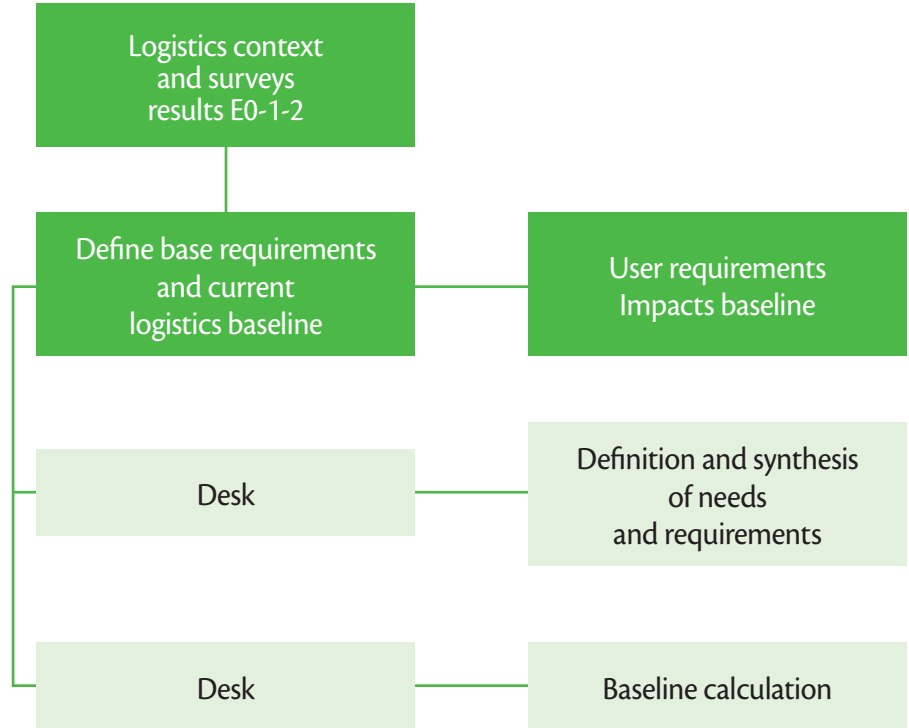
Commercial impacts on economic and sales processes. This category deals with, for instance, services and support offered to commercial operators, customer service and satisfaction, quality of information supply, competitive advantage or company image.

Socio-economic impacts consisting in the wider impacts of city logistics schemes and services on socio-economic related user needs.

Moreover, it is essential to identify the main problem to be addressed and objective to be achieved. Some examples are listed below:

- Alleviating traffic congestion and reducing the number of heavy trucks in urban centres;
- Sustaining economic development;
- Maintaining accessibility to the (historic)

Setting requirements and logistics baseline



town centres, increasing the attractiveness of the city for residents, tourists and commercial organisations;

- Optimising loading and unloading lots and parking spaces.

In parallel to these key activities, based on the data collected with local surveys, a baseline should be defined from the energy consumption and environmental emissions point of view.

TASKS

The identification of requirements should be based on the results of the surveys and on the information and data gathered from the activities described at E1 and E2 above. Specific requirements should be identified for the 4 categories detailed above.

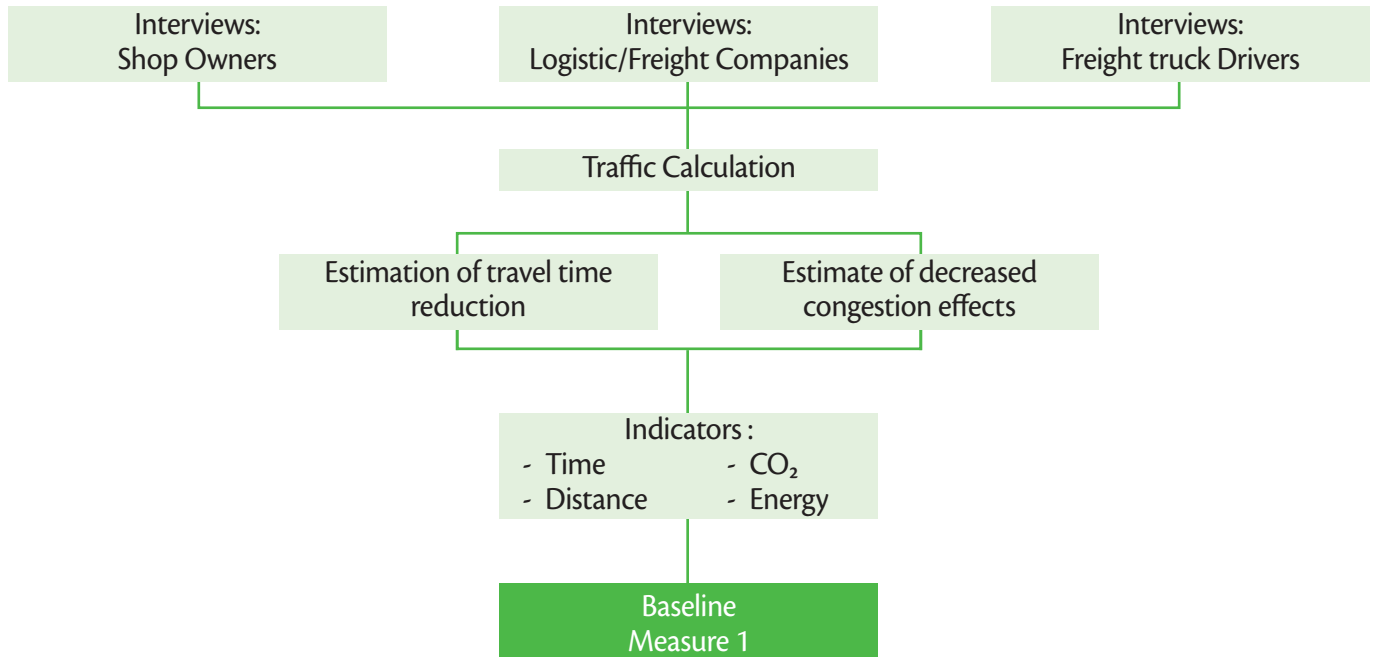
Based on the data collected during the surveys, an analysis should be carried-out in order to define the baseline for the interested area. For example, the number of commercial vehicles, their type and size, average distance covered by each trip and the

daily number of trips. This will allow calculating the number of kms per year covered and consequently impacts produced by urban logistics processes. In fact, based on these data and considering average consumptions of fuel (diesel or gasoline) and engine standard emissions (Euro), it is then possible to calculate the baseline regarding both energy consumptions and commercial traffic.

METHODS AND TIMING

The analysis should be predominately a desktop study, using specific tools for synthesising the various collected information. The specific methodology developed in ENCLOSE for this specific assessment is based on the following steps (see Almada case in BOX 1 below):

Measure 1 - Loading and Unloading Regulations



BOX 1: Almada baseline

Data inputs (from surveys)

Parameter	Data	Unit
LIGHT VEHICLES		
N of vehicles	1024	
Average trip	6	km
Working days/yr	300	
Deliveries/trip	17	
HEAVY VEHICLES		
N of vehicles	512	
Average trip	6	km
Working days/yr	300	
Working days/yr	17	

Almada baseline (Emission and Energy aspect)

Parameter	Heavy	Light	Sum	Unit
CO ₂ Emission	543	412	955	tonCO ₂ /year
Energy consumptions			3632	MWh
Total distance	3072	6144	9216	km/day
CO	1382	1843	3225	kg/year
NOx	719	922	1640	kg/year
PM	157	147	304	Kg/year

Assumptions for extrapolation

Assumption	Value	Unit
Vehicle tier	EURO 2	
Heavy consumption	16,67	l/100km
Light consumption	11,00	l/100km
Trip/day/vehicle	1,00	

Adopted parameters

Parameter	Heavy	Light	Unit
Diesel density	0,835	0,850	Kg/l
Diesel CO ₂ emiss.	2680	2680	g/lit
CO ₂ Emission	447	295	g/km
Kcal/kg	10200	10200	
Energy conversion	11,84	11,84	MWh/toe
Diesel CO emiss.	1,50	1,00	g/km
Diesel NO emiss.	0,78	0,50	g/km
Diesel MP emiss.	0,170	0,008	g/km

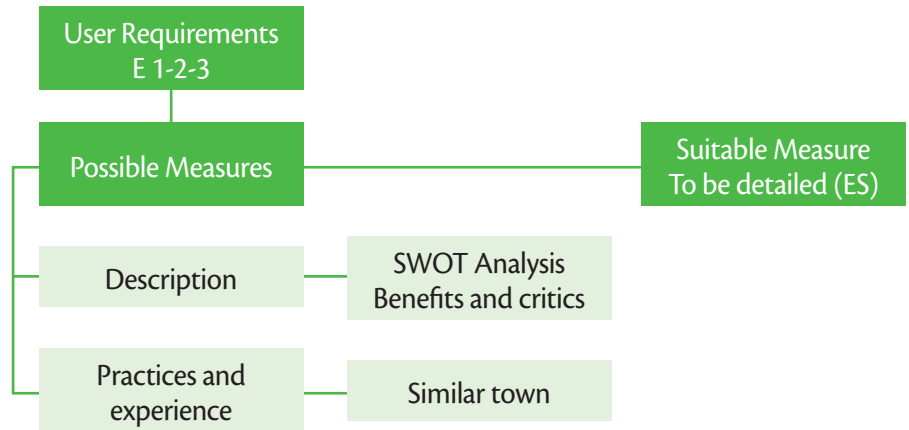


E4: IDENTIFIED MEASURES AND SERVICES VS. REQUIREMENTS

RATIONALE

On the basis of the requirements identified in E3, the possible measures/solutions to be adopted by the Municipality shall be identified and analysed, as showed in this scheme. All the involved Elements are essential parts for the definition of a robust and coherent Feasibility Study, which is the core component of any Sulp in the ENCLOSE project, as it identifies main needs and problems at local level. It will also establish the suitable set of logistics measures/services to be adopted. In fact, as stated in the above sections, one of the main challenges is to assess the viability and the efficiency of the proposed measures with respect to the known city requirements, in order to identify the most suitable ones for the town. Thus, a set of possible solutions/measures to be implemented for tackling the problems identified

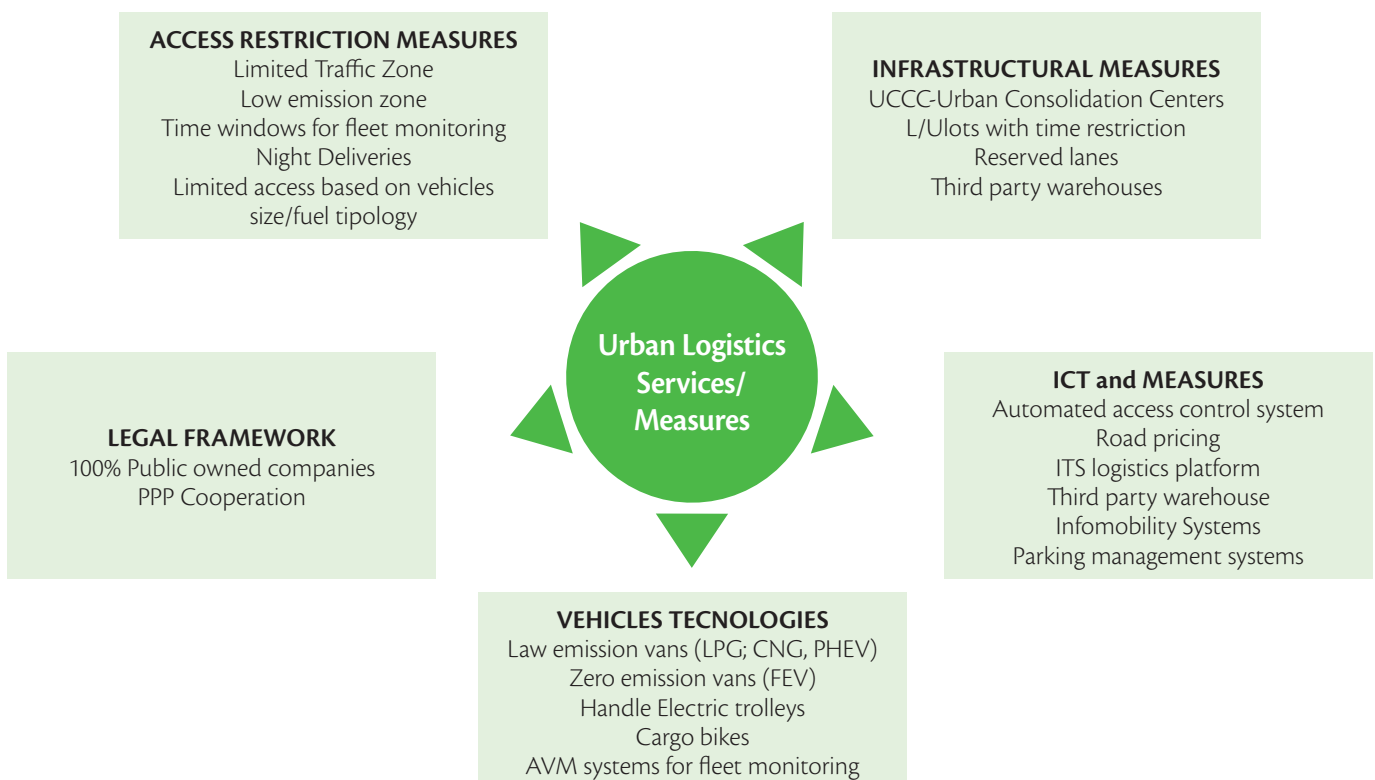
Definition of possible measures/solutions to be adopted



shall be analysed. Such solutions are based on successful examples and best practices at European level. An exhaustive collection of successful cases is available in the ENCLOSE Deliverables D2.1, D2.3 (also available on the project website). Generally speaking, the set of possible solutions suitable for different local needs can

be represented in the figure below, where some of the available options are grouped in specific categories (from regulation to demand management measures, infrastructures or services schemes). This figure is not intended to be fully exhaustive but aims to give an idea of the possible (and most popular) existing solutions.

Main urban logistics services/measures



After the feasibility study, a detailed SWOT analysis (in terms of Strengths, Weaknesses, Opportunities and Threats) shall be carried out in order to plan a realistic and efficient SULP. The SWOT analysis will allow to compare all the different solutions identified in terms of “pros and cons” with respect to the objectives to be achieved, and to facilitate decision-makers to identify the most suitable measures for the local situation.

The SWOT analysis can assess the strengths and weaknesses of each measure and provides useful information about real possibilities for the Municipality. It also identifies the potential opportunities and threats (internal or external) to be considered in the implementation of the solution. The SWOT analysis can also provide useful support information for helping the Municipality to adopt a specific solution by overcoming particular barriers (i.e. need of support infrastructures, etc.).

A useful opportunity for subjects that are deciding about a candidate measure to be adopted is the possibility to participate to study visits to sites where similar initiatives have already been implemented. This approach, followed by the towns of the EN-CLOSE project, will help to discuss directly with local actors about problems, limits and potentialities of the implemented solutions.

The result of this activity is a list containing the most suitable measures/services to be designed for tackling city issues and pursue main city strategies/objectives, as defined in the previous steps.

The selected measures aim at enhancing the overall management of city logistics, in order to improve and optimise these processes, thus producing significant benefits not only from a logistics/commercial perspective, but also from the ecological sustainability point of view. They will also produce positive effects on the overall city mobility, by contributing to lower logistics-related traffic congestion.

TASKS

The main tasks of this step are the following:

- Overview of existing measures, experience and best practices by desk activity and, if possible, participation to technical visits to towns already implementing successful logistics solutions;
- SWOT analysis on each of the identified candidate measures/services;
- Discussion on the results of the SWOT analysis with target stakeholders.

METHODS AND TIMING

The SWOT analysis should take into account the perspectives of the various actors involved such as:

- City administration;
- Citizens;
- Private business (e.g. Ho.Re.Ca. representatives, shops, retailers, etc.);
- Logistics service providers;

- Urban freight transport operators;
- Associations and any other important player for city logistics.

To this purpose, it is useful to organise periodical meetings and focus groups with representatives of various interest groups to well understand their point of view on urban logistics development.

For the sake of transparency and for a clear idea of meetings outcomes, all the identified SWOT results (in terms of Strengths, Weaknesses, Opportunities and Threats) should be summarised in a table format and the parameters should be ranked in order of importance from the most urgent to the less important.

Technical visits should be organised to more experienced cities with similar characteristics, which are implementing or have already implemented similar solutions.

BOX 1 - Example of swot analysis for one of serres’ logistics measures

<p>Strengths Better urban freight transportation management Synchronisation of transport operators in loading and unloading areas and better service Reliability Improvement Coordination and planning of trucks arrivals in heavy traffic areas Congestion reduction</p>	<p>Weaknesses Flexibility for simultaneous customer service Reduced use, in case the use of the platform is free of charge Familiarity with information technologies and an Internet connection is a prerequisite</p>
<p>Opportunities Exploitation of increasing carriers and customers familiarity with new technologies Better exploitation of loading/unloading places Better organisation for shopkeepers and transporters Better planning and coordination of trucks’ arrivals in the centre of the city Reduction of traffic flows Reduction of noise and air pollution</p>	<p>Threats Limited level of carriers’ organisation Technical problems Requirement for stakeholders’ cooperation non-acceptance of the system by users</p>



BOX 2 - Measures and best practices: expected benefits, key enablers and success factors, possible implementation obstacles

Measure and example of best practices	Benefits and Opportunities	Key enablers and Critical Success Factory	Possible Primary Obstacles
<p>Sustainable Urban Mobility Plans Den Bosch, Granada, Terrasa, San Sebastian-Donostia</p>	<p>Reduced access, circulation and impacts of traffic in critical (protected) urban areas Less pollution, less noise and risk for pedestrians. Improved accessibility to historic centre, improved urban life. Urban renewal and possibility to regain qualified public spaces, attract more businesses opportunities. Increase citizens participation. Raiser awareness on sustainable city solutions.</p>	<p>Willingness of public authorities and stakeholders representatives (associations) to accept the idea and purpose of the project. Suitable policies balancing restrictions and incentives. Importance of communications to increase the societal revenue of the initiative. Relevance of neighbourhood participation to enlarge the acceptance of the measures.</p>	<p>Insufficient political commitment. Possible resistance and opposition to norms and rules enlarging pedestrianisation and introducing limitations on traffic circulation. Concerns by shops and retail open possible reductions of activities.</p>
<p>Low emission zones, Freight distribution Plans London, Bologna, Utrech, Prague</p>	<p>Reduced access, circulation and environmental impact of traffic (PM10, CO, NO, etc.) in critical (protected) urban areas. Reduced noise and risks for pedestrians. Improved accessibility to historic centre, improved urban life. Reduced traffic stress on historic assets and heritage. An overall policy including both passenger and goods transportation is possible.</p>	<p>Willingness of public authorities and stakeholders representatives (associations) to accept the idea and purpose of the project. Importance of communications to increase the societal revenue of the initiative. Decision about the type and age of the vehicles accepted for circulation. Enforcement patterns and system for the LEZ, combination with road pricing schemes. Integration with other mobility governance measures (e.g. Zone Access Control, access and road charging, etc.).</p>	<p>Possible long and controversial process. Possible resistance and opposition to norms and rules enlarging pedestrianisation and introducing limitations on traffic circulation. Worries by shops and retail operators on possible reductions of activities. Need to balance between restrictive policies and the requirements of free market and competition. Enforcement costs may be high for the authority.</p>
<p>Urban consolidation Centres and related services Vicenza, Lucca, Padua, Siena, Parma, Thun</p>	<p>Optimisation of distribution trips. Reduction of trips and vehicles on the centre. Possibility to serve both direct and reverse logistics. Possible support for 3rd party logistics services. Enhanced safety and liveability of the historic centre.</p>	<p>Adequate support by legislation (regional, national) transport operators. Consultation and consensus building with key stakeholders associations (transport operators, small independent carriers, shop and retailers, businesses, consumers, etc.) To reach the critical mass of small independent transport operators for consolidation services.</p>	<p>Cost of infrastructures and required investment. Possible resistance and opposition from transport operators (impact on current practices, worries about competition, etc.). Competition between UCC and other carriers not using UCC services is to be dealt with. Economic sustainability of operation (moving from public subsidy to financial autonomy). Strong efforts in marketing may be required.</p>
<p>Quality partnership programs Den Bosch, Toulouse</p>	<p>Improving the sharing of the road space between cars, delivery vehicles, pedestrians and other street space users. Rationalise delivery operation in the urban centre, reduce the impacts of freight vehicles. Reduction of through commercial traffic in the area. Higher number of energy efficient and green vehicles used by suppliers.</p>	<p>Definition and sharing of a common "charter" fixing the roles and good practices for the urban transport of goods. Solution must ensure entrepreneurs and suppliers both benefit from the scheme. Carriers have been in favour of the scheme. Cooperation with all parties is essential. Local initiatives need to work on a commercial basis to survive. Long term involvement of the administration and elected officials is needed.</p>	<p>To reach a consensus for the definition of the common Charter. To make the Charter easy to enforce Commercial initiatives need a certain time to develop. In economic downturn times, suppliers tend to protect their own business.</p>

Measure and example of best practices	Benefits and Opportunities	Key enablers and Critical Success Factory	Possible Primary Obstacles
Green public procurement for freight transport Den Bosch	Stimulate suppliers to focus environmental impact for freight and suggest green alternatives. Higher number of energy efficient and green vehicles used by local governments	Procurement policy as an instrument to stimulate innovation and apply sustainable solution and corporate responsibility	Market offer of vehicles meeting all requirements is still limited. Development of highly customized vehicles might be conflicting with the transparent procurement policies of public organisations and governments
Use of green vehicles (FEVs, PHVEs, Bio Gas Vehicles) Den Bosch, Trondheim, Lucca, Reggio Emilia, Parma	Integration of zero-emission vehicles in the overall urban mobility. Societal benefits (more employment, education, air quality, noise, etc.). Significant public acceptance.	Electric vehicles can replace operationally conventional freight vehicles for last mile services. Electric vehicles are technically reliable and accept by the drivers. Public financial support in the context of an overall program involving environmental targets	A relatively new market, cost of vehicles and related services are still high. Lack of core infrastructures such as gas filling stations and charging infrastructure. Electric driving has new issues around road safety and daily use (e.g. recharging strategies). The use of (local/regional) renewable energy is still difficult.

E5: SERVICE DESIGN

RATIONALE

The services/measures which were identified in the E4 element as the most suitable for towns' objectives shall be detailed and specified.

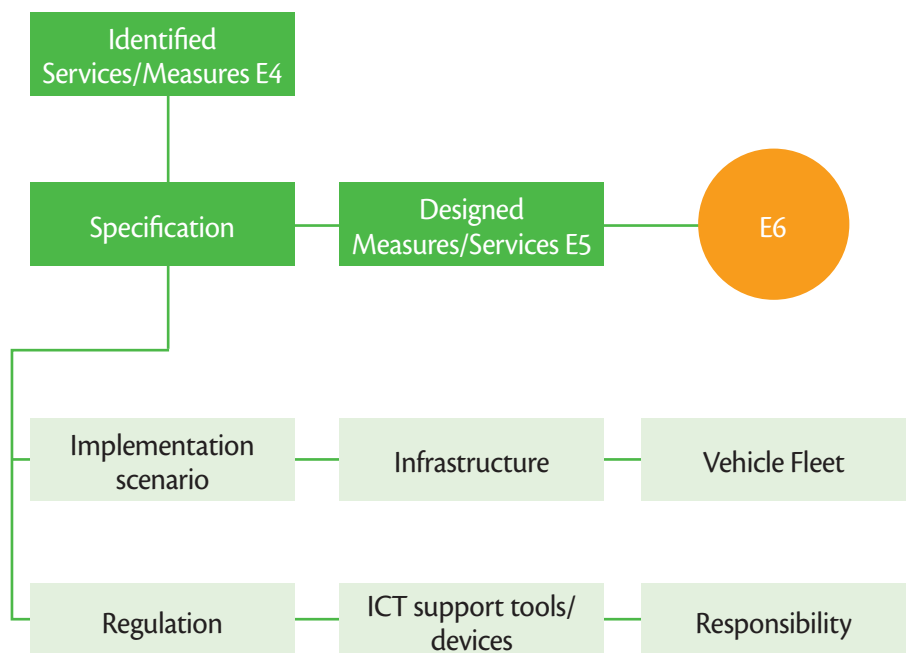
The design of each suitable measure/service should be performed on the basis of clear specifications, considering the peculiarities of each site and dealing with, at least, the following aspects:

- **Implementation scenario:** this is a key specific feature characterising every different measures, thus it shall be thoroughly analysed and generalisations should be avoided.

Implementation scenario often affects service provision modalities and/or the choice of infrastructures and vehicles to be adopted. This is the case, for instance, of the issues related with the type of road network and the fleet vehicles' characteristics (e.g. narrow streets in the city centres often require minivans).

Moreover, the environmental context is another important factor influencing project specifications. For example, in high value areas it is essential to design services and adopt vehicles that can minimise emis-

Identified measures design



sions and pollution impacts. Moreover, regulations regarding LEZ/LTZ shall be duly considered (particularly as regard to vehicle characteristics).

- **Infrastructure:** the specifications dealing with this aspect are of typical "engineering" nature, as they can concern hard measures

such as Urban Consolidation Centres (i.e. warehouse location, typology of building, new or adaptation of existing ones, accessibility, internal and external areas, devices, energy supply, etc.).

The size and typology of infrastructures are also influenced by additional factors. These



include the use of electric vehicles (requiring suitable recharging systems and equipment, in some cases solar panels covering logistics bases), service schemes (i.e. third-party warehouse, Pick up Points services), type of goods delivered (fresh, refrigerated, frozen product, etc.).

Finally, minor but important measures shall also be considered for infrastructural specifications. This is the case of road signals highlighting loading/unloading areas and/or reserved lots for electric or shared vans (also by using variable message panels, if needed).

- **Vehicle Fleet:** this element is strictly related to the specific logistics measures to be implemented, but also to the regulatory framework and the road network (see also the above mentioned “Implementation scenario”). Additional aspects to be considered in the definition of fleet specifications deal with particular logistics measures such as: “van sharing” for self-replenishment of shops (by equipping vehicles with specific monitoring devices), “reverse logistics” services (i.e. collection of packaging waste), use of eco-friendly vehicles (i.e. conventional/electric bikes, electric cargo motorbike/scooters, electric handled trolleys, etc.). Eventually, the size of the served area is an additional factor affecting vehicle specifications considering that extra-urban services with longer routes cannot be provided by FEVs but require different technologies/fuel (CNG, Hybrid, Bi-Modal, etc.). About this aspect, the ENCLOUSE consortium has carried out a specific activity regarding the analysis of the city logistics requirements related to FEVs. Results of this analysis have been reported in a specific document available on the ENCLOUSE website (D2.2 “Sustainable logistics in European small/mid-size historic towns: stakeholders goals and User Needs Analysis” and D2.3 “Sustainable logistics in European small/mid-sized historic towns: challenges, opportunities and priorities”).

- **Regulation:** this element shall be detailed in order to support the implementation of the overall measures. Regulations shall deal

with both access modalities to the different urban areas and operations within a specific area (i.e. specific time windows for commercial vehicles – that may depend on the nature of transported goods – specific/dedicated routes, restricted areas, vehicle weight/dimension, type of engine, load factor, etc.) and may differ based on the operator (third-party operator, provider, self-supply, etc.).

- **ICT support tools/devices:** despite specifications of this aspect usually have an engineering/technological character, the definition shall be strictly related to operational and service schemes of the logistics measures to be implemented, to the type of vehicles to be adopted and to the identified regulatory aspects. In the field of city logistics, ICT tools have several applications. For instance, specific technological platforms can be used for the management of UCC, for monitoring the different phases of last-mile delivery (collection of orders, delivery/route planning, track & tracing, goods return, administrative procedures), vehicles and delivery status. By integrating specific modules, the platform can also be used for managing added value (i.e. pick-up points systems, park & buy, etc.) and van sharing services, vehicles booking, fleet scheduling, reporting and administrative management. In relation to the points above, for monitoring and enforcing regulation of freight delivery processes, Local Authorities can adopt ICT systems – such as Automated Access Control Systems or on street parking systems– in order to control the compliance of logistics vehicles with the related city regulation. If ICT systems are used for the control and monitoring of freight vehicles, the relevant specifications shall be included within those related to city logistics measures.

- **Responsibility, organisation and operation:** this aspect is closely related to each specific measure typology and is also necessary for the development of the business model (see E6). It is the case of a new regulatory framework for accessing the LTZ or for dedicated loading/unloading areas. It is

fundamental that specifications shall concern the Municipality as a key actor, with the full responsibility of defining the rules. Also in the case of UCC, specifications should consider the Municipality as the main actor for the implementation phase. When the UCC starts operating, specifications for different solutions can be envisaged (i.e. either by internal management team, or by an external company contracted through bid under specific service constraints). On the contrary, as regards the control of load/unloading parking areas occupancy, measure specifications shall include the possibility of different solutions depending on local situations (i.e. the on street parking system managed directly or by subcontracting private companies, etc.). Besides responsibilities, organisational and operational specifications shall be clearly detailed in order to allow the assessment of the overall costs (investment, maintenance and management) to be carried-out (see following E7 element). In particular, the organisational dimension is closely related to the operational schemes defined for the measures/services and should be identified in step E6.

TASKS

The term “design” here highlights the need to develop a detailed analysis of each measure/service identified, in order to allow a practical assessment of the overall sustainability of the solution (in terms of efficiency with respect to energy, environment and economic aspects) to be carried out in the following steps E6 and E7. Therefore, the main tasks, at this level, relate to the analysis, identification and specification of the main characteristics and/or elements involved by each measure/service.

The level of detail of the project specifications is strictly connected to the nature of the service to be implemented. For instance, the specifications and the design of an UCC for last-mile delivery services, at this level, shall involve several aspects such as the identification of the suitable location, the possible infrastructure (adapta-

tion of an existing warehouse or realisation of a new one), the definition of supporting ICT, the identification of the equipments and devices necessary for the specification of the fleet vehicles.

Other kinds of added-value services such as van sharing, pick-up-points and park&buy require particular attention to the planning of technological aspects dealing with operations management, vehicles (i.e. on-board devices) and infrastructures (ie. delivery boxes like "pack stations", parcels delivery sites at parking areas, etc.).

In this service-design phase it is essential to consider normative aspects: logistics measures/services can produce expected benefits only if supported by a robust regulation. For instance, a van sharing service operated by low/zero emission vehicles can succeed only if a specific regulation that forbids (or limits) the use of (non eco-friendly) private vehicles for shops' self-replenishment is adopted by the Municipality. Regarding the specifications related to the so-called "soft" measures, it is important to remind that the definition of "soft", meaning "easy" measures with low/zero costs like, is applicable in practice mainly to infrastructural aspects, for instance, the implementation of loading/unloading lots with specific road signs. For what regulatory aspects concerns, the definition of "easy implementation and low implementation costs" is not correct, because although the definition of a regulation does not imply any direct costs, its application can pro-

duce significant impacts on operational aspects and thus on the relevant costs for the operators, and may require high level of acceptance.

This is the case, for instance, of all those regulatory measures that can directly or indirectly affect urban logistics processes (and often related costs), such as restriction of time-windows for LTZ and limitation of accesses to LEZ based on emission standards of commercial vehicles, regulation of stops inducing loading/unloading lots, extension of pedestrian areas, etc.

The design of a "soft" measure requires a specific detailed analysis of their implications not only from the point of view of the Municipality (or of the Public Authority in charge of the rules) but also from the perspective of involved transport/commercial operators.

Therefore, an essential recommendation for the specifications and design of urban logistics measures concerns the importance of providing all the elements for a robust evaluation (in terms of organisational, operational and economic aspects) of the possible different impacts of each measure by the relevant stakeholders.

METHOD AND TIMING

The design shall be carried-out by using the classical approach of design tools and be as much accurate as possible. This should be based, if needed, on former significant experiences, in order to benefit from any support initiative that already proved to be

useful for correcting problems and overcome barriers toward the success of the solution.

In particular, the methodology adopted for the definition of specifications shall duly consider and develop the different aspects detailed in the E5 "Rationale" section, in order to achieve an efficient implementation of the measures from all the different perspectives (regulatory, technological/technical, operational and economic).

The time schedule for this phase depends of course on the quantity and on the complexity of the measures to be implemented (or enhanced), as well as on the level of requested integration and priority.

It is important to stress that the possibility to plan different logistics services separately is a good opportunity: starting with the "simplest" services, going to the more complex ones and integrating the two categories in the subsequent phase.

This approach allows to follow from the beginning, and step-by-step, the possible problems that may arise (and that are inevitable due to the complex nature of some measures), and to adopt any needed corrective action before an advanced planning status, thus guaranteeing important savings during the whole planning process.

This time schedule eventually produces also an overall enhancement of the skills of the involved staff all along the various steps of the planning phase, as these are characterised by a growing level of technical and operational complexity.



EXAMPLES FROM ENCLOSE

BOX 1 - UCC GENERAL FEATURES: Burgos Sulp Measure.

A UCC can result from a private (i.e. an operator or a consortium of operators) or, more frequently, a public entity (i.e. Municipality or other Local Authority). In the latter case the Public Authority is in charge of setting-up the structures, purchasing the fleet vehicles and managing the service, also availing itself of external staff.

At a following stage, once UCC experience is consolidated, the Authority may also involve private actors in the overall UCC management, maintaining only the function of control and regulation, thus establishing, in practice, some form of Public-Private Partnership (PPP).

The UCC can operate, from the commercial point of view, on two different approaches:

1. the UCC makes an agreement with the main long range transport operators that often prefer avoiding to enter the inner city centre for delivering low volumes of goods. In this case, the transport operator goes directly to the UCC, leaving parcels to be delivered in the city centre by the UCC fleet. The operator bears the cost of these last mile transport service. This scheme was implemented in several European cities (with different characteristics and dimensions), such as Bremen, La Rochelle, Parma, Vicenza, Siena, Barcelona, Lucca, etc.
2. The UCC makes an agreement with the owners/responsible persons of the main commercial activities located in the city centre or urban area (shops, restaurants, cafés, minimarkets, etc.). This agreement foresees that the delivery of the ordered freight is to be made directly to the UCC address. In this case, the shop bears the cost of last mile service but, at the same time, can also benefit from a lower delivery price applied by the freight operator, thanks to the agreement that guarantees significant quantities of freight to deliver during the year.

In addition, shopkeepers do also benefit from added advantages, because they can avoid the costs of other related logistics activities e.g. storage management, reverse logistics processes, etc. Moreover, additional benefits can also be represented by the possible lower delivery prices, thanks to the possibility for the shopkeepers to order larger quantity of goods without any problem of storage.

This is the scheme adopted in 's-Hertogenbosch (NL) by the private company Eco2city (<http://www.binnenstadservice.nl/>).

The two different schemes detailed above highlight the fundamental characteristic of a successful UCC: for operators not having a logistics centre in the reference city, the delivery of freight to UCC, upon payment of a fare, may be more convenient than to overcome the difficulties for its own vehicles to enter into the city centre.

Such a convenience can either be "pushed" by the Municipality (i.e. Vicenza, Lucca, etc.) imposing tight city access restrictions (i.e. time windows, parking time on load/unload lots, vehicles sizes, vehicle emissions, one way streets, pedestrian areas, etc.), or be caused by the city morphology itself (i.e. Siena), where the characteristics of the historic centre, with narrow and steep streets and alleys, are the first deterrent for entering in the inner centre (along with regulations and restrictions). As already pointed out, the UCC is based on significant investments on infrastructures, fleet and organisation, therefore this solution can be only the final step of a process aiming to identify the most suitable solutions and it can only result from a strong political commitment and from the capability to evaluate the different benefits and costs (both direct and indirect).

For this reason UCC are usually viable solutions mainly for big cities or metropolitan areas, where they usually play the role of urban interports. As regards small/medium sized cities, these structures should, if possible, be based on existing infrastructures and operators. Two ENCLOSE towns can be taken as reference in evaluating the feasibility of a UCC in Burgos:

- Lucca, where the Municipality, taking advantage of significant European and National co-funding, set up its UCC (infrastructures and vehicles fleet) after a long process lasted 8-10 years, adopting as logistics base (during the experimental phase) an existing minor public warehouse;
- Trondheim, where the system implemented by Posten Norge is composed by two hubs located at the opposite sides of the city. Large vehicles bring freight to the hubs, where electric vehicles collect goods to be delivered to the city centre.

Moreover, an interesting solution is given by the possibility to adopt a logistic "cross docking" approach consisting of a service operated by the UCC, where freights are collected by the UCC vehicles directly from national operators warehouses and delivered to the shops in the city centre for last mile distribution (e.g. Siena, Italy). Whatever the chosen solution is, the implementation of a UCC usually produces several advantages, mainly dealing with freight flows and environmental sustainability of the logistics system. Among these, the most important are:

- Enhancement of the loading factor and reduction of half-load trips with reduced transport unit cost;
- Reduction of fuel consumption (energy savings) and of polluting emissions and noise pollution;
- Possibility to use low impact vehicles – electric, CNG or hybrid – for last mile deliveries management;
- Compatibility with different transport, environmental and social policies.

Logistics operators can also benefit from significant advantages by using UCC services, such as:

- Reduction of kms covered by freight vehicles;
- Reduction of waste of time due to traffic congestions;
- Reduction of delivery times.

Finally, from the point of view of the city of Burgos, shop owners also enjoy positive advantages by using new delivery services:

- Possibility to receive useful delivery information from UCC (tracking) and to indicate specific hours for delivery;
- Possibility to enjoy other added-value logistics services based on UCC infrastructure (i.e. third party warehousing services, packaging collection, etc.).

The main problems concerning UCC deal with economic sustainability, in particular:

- Costs for building the logistic base infrastructure (when already existing infrastructures cannot be used);
- Costs for supporting infrastructures and devices;
- Costs for purchasing commercial vehicles, in particular FEVs, hybrids and low emission vans;
- Costs for freight trans-shipment.

Finally, marketing problems could consist in the unwillingness of national transport operators to allow delivery operations of their own freight made with vans showing different brands.

BOX 2 - Almada urban consolidation centre - Selected location

In the selection phase of the Almada UCC location, some key requisites were to be considered:

- Easily accessible for long range operators (i.e. close to main roads and/or railways);
- Not too far from the main city delivery area (in order to avoid excessive long trips, enhancing trips/day, thus allowing the adoption of electric vehicles);
- According to these pre-requisites, the area which best suits the Almada case is the one located at the beginning of Avenida Bento Gonçalves, close to the Centro-Sul roundabout, which is currently exclusively dedicated to a parking area, close to the Metro line 1.

This location is particularly close to the junction connecting Almada to the main northern ("25 de Abril" bridge), southern (A2) and western roads (IC20 and A38), it is around 2,5 km far from Praça Movimento das Forças Armadas, which can be considered as the central point of the study area and, finally, it is 3,3 km far from the farthest point of Cacilhas.



BOX 3 - Almada infrastructure: general features and dimension

Warehouse

To keep the initial investment as lowest as possible, it would be enough to start with a small/medium modular structure that could be enlarged in order to satisfy any future need for a wider space. Based on estimation about the volume of freight to be managed (around 4.2 tons/day – considering to operate around 7% of freight entering the study area), requiring at least 8 trips per day, a 600 sqm (i.e. 20x30 m, including a small office and facilities), a warehouse with unloading/loading portals along two opposite façades and side doors was estimated to be enough. At the very beginning, only two loading areas could be sufficient and would be used for both loading and unloading freight vehicles. Doors of loading part shall be equipped with canopies in order to protect goods and operators from rain.

External area

An external maneuver area of 500 sqm (i.e. 20x25 m) is the minimum space required for allowing truck operations in front of the unloading portals. The side of loading portals, occupied by vans, needs a smaller external area of 200 sqm.

In principle all these infrastructures should be fenced (and CCTV controlled) for security and safety reasons.

With the infrastructure dimensions detailed above a total surface of around 1500 sqm is needed. The selected Almada UCC location, with an overall extension of around 13.500 sqm, well meets all these requirements in terms of available space. It is important to highlight that this area is at present a car parking area (mainly used by commuters travelling on the close tramline), and that the UCC would occupy only around 11% of it.

Thus, the UCC would not create any problem to parking users (considering that a reduction of a maximum of 100 parking lots would be needed), thus fostering the acceptance of new logistics services by citizens.



Example of prefab warehouse



Front view with loading spaces and Interior



BOX 4 - Balchik soft measures

The new logistic regulation for freight deliveries in Balchik is focused on the seaside “Dambata Promenade” area, where the main hotels, restaurants, shops and entertainment facilities are located.

Main activities carried out have been:

- Definition of specific time windows for loading/unloading activities;
- Definition of conditions for commercial vehicles allowed to enter the restricted area;
- Definition of conditions by order issued by the Town Mayor and adopted by the Municipality Council for the peak season (high tourist flow);
- Restrictions by barriers, side channels and half-meter-high solid columns;
- Signage panels to be put at the beginning of access roads;
- Indication of loading/unloading areas in the official urban parking plan layout;
- Definition of dedicated parking lots on the ground by using coloured lines or, better, a different coloured asphalt;
- Signage panels indicating maximum stopping time for commercial vehicles and forbidding private cars to park;
- High level of controls by guards.

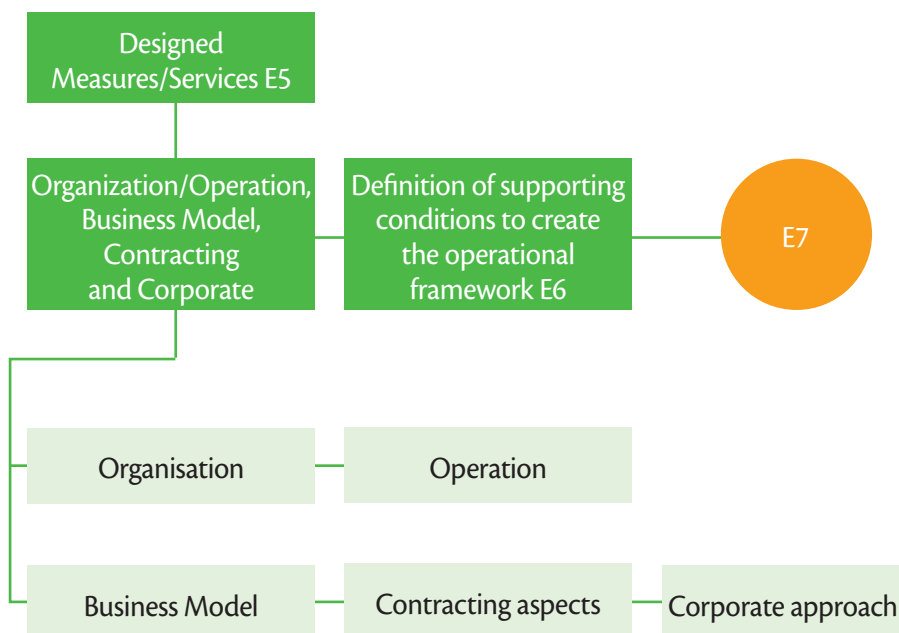


E6: ORGANISATION, BUSINESS MODEL AND CONTRACTING

RATIONALE

This element, which is strictly related to the results of above E5 and to the impacts assessment to be carried-out in the following E7, is focused on the specific organisational and operational dimensions, connected to the different service schemes required by the designed measures that involve a significant level of complexity. The overall aim of this E6 is to identify the support conditions of each measure/service for the implementation of the services designed in E5 and for the evaluation of the different impacts to be carried out in E7.

Organisation, Business Model and Contracting



As already described, the complexity of measures/services is directly linked to the complexity of levels of every single component involved in the specification and design (phase E5). For this reason, for the identification of the supporting conditions, it is essential to consider, at least, the following issues:

- Organisational/operational aspects and management model of the different design logistics measures;
- Business model related issues;
- Contractual issues (regulating the relationship among the different actors involved);
- Aspects related to the possible structure of the actors providing/managing services.

In the following, some details are provided for each relevant aspect:

- **Organisational aspects:** the definition of this aspect shall take into account a wide range of factors, related to the specific characteristics of the different urban logistics services identified and designed in the former E5 step. For this reason, it is essential to avoid any general consideration and to carefully analyse this aspect.

Whatever Sulp measures are defined, in order to achieve a successful management of city logistics processes, it is essential to identify organisational and operational aspects in close connection with each other, in terms of both staff and infrastructures.

As an example, it is worth considering the case of an UCC employing a lower level of staff resources (as it may happen in the start-up phase) - compared to the actual need: this can negatively affect operations efficiency and may also undermine service success. A different result can be obtained when a new service is introduced in an already existing and consolidated system for the management of logistics process in a specific local context: in this case, minor measures for rearranging the existing resources can be enough for guaranteeing

a good operation of the new service.

In most cases, at least at the early stage of the UCC implementation, human resources needed to perform daily activities (administrative and operational) should be workers with “multifunctional” skills, in order to minimise staff costs (i.e. drivers shall collaborate also to loading/unloading operations, etc.).

A possible alternative solution consists in outsourcing some activities by sub-contracting, for example, the delivery transport, allowing a flexible management of the fleet “tailored” on the volume of freight to deliver. The last solution is particularly valuable for cities characterised by significant variations of freight transport demand, depending on the season and due to the touristic presence.

The same considerations can be made also with reference to infrastructures (i.e. dimension of the logistics base, equipment, etc.), vehicle fleet (i.e. UCC or van sharing) and technologies (i.e. functionalities of the ICT platform).

In order to reduce the impact of these issues, it is very important, during the definition of the organisational aspects, to plan, at least in the start-up phase of a city logistics system, a “step-by-step approach” with the progressive introduction of new logistics services (starting from basic ones) and the related definition and assessment of the organisational adjustments requested, following the introduction of each service.

- **Operational aspects:** as already anticipated, this aspect is closely linked to the former one.

Procedures shall be specified for every service, by stressing needed resources in terms of staff and infrastructures. Economic issues related to operations shall be considered when defining the Business Model.

As an example, it is worth considering an additional service such as the “park & buy” one, consisting in the delivery of purchased goods at a parking area,

in order to ease shopping also in low demand areas. Operational procedures shall detail not only collection/transport and delivery modalities of the operator, but also all the different existing options in terms of service booking, temporary stocking of freight at parking areas, use of support technologies (i.e. specific smartphone apps, sms service...), etc.

- **Business Model:** the definition of the business model shall duly consider the whole set of measures/services provided by every single operator. Economic aspects shall be evaluated both in the initial phase and in following periods, based on specific milestones in terms of time and operation development.

Taking as a reference a complex logistics measure as an UCC, such kind of procedure allows to monitor and evaluate the economic issues related to basic services (that may sometimes, over those in the start-up phase, result in some losses) and added-value services that can make UCC-solutions economically sustainable from the beginning of their activity.

Of course, bearing in mind the considerations dealing with organisational and operational aspects, it is essential to take into account a progressive implementation of the different services also in mid-/long term analysis. Economic feasibility studies of the possible additional services to be introduced can set-up the priorities and consequently re-steer organisational, operational and technical decision.

- **Contracting aspects:** one of the key aspects of the definition of supporting conditions for setting-up the operational framework deals with contract factors, that can be considered from different perspectives:

- a) Level of Contracting Authority/Operator (i.e. Municipality/UCC manager);
- b) Level of Operator/User (i.e. Van Sharing operator/Shop owners).



The a) hypothesis represents a “classical” contract between contracting entity and contractor, with specific indications concerning the relationship and the allocation of responsibilities between the involved actors. The modality to adopt shall be chosen among the different forms available in order to identify the one that best suits managing (but also operational and organizational) needs and that is more convenient for the contracting authority. For this reason, this choice is particularly important as it affects (positively or negatively) the final outcome of the business model. Such an activity requires also to identify public procedures and administrative tools needed to adopt the chosen contract form and to clearly define relevant responsibilities, duties and roles. Besides the Service Contract, a detailed “Management Performance Chart” between the Municipality and the operator contracted for UCC management should be defined, in order to clearly set-out from the beginning not only contractual issues (in terms of rights and obligations) but also the level of performances that the operator shall guarantee for the whole contract duration. Key performance indicators shall be easy to monitor and thus shall be characterised by well understandable qualitative measures.

The Case b) represents, in general, a contract/regulation for the use of the service. A good example is the regulation for the use of van sharing vehicles, which is characterised both by contractual issues (i.e. temporary rental of the vehicle - such as rent, loan for use, etc. – responsibility, etc.) and by aspects related to modalities of vehicle use (i.e. booking modality, vehicle pick-up/drop-off, vehicle maintenance).

- **Corporate aspects:** another important aspect for the definition of supporting conditions is related to the type of Company in charge of managing (from the legal, administrative, organisational

and operational point of view) city logistics measures and services.

The E6 activity shall take into account the possible company options, considering that these may also vary following the different achievements of logistics services designed in E5. Company typologies that might be evaluated are:

- **Direct management by the Public Authority:** this option can have a temporary character limited to the initial service start-up phase, in order to demonstrate the feasibility of the solution before making the final decision about corporate aspects (logistics activities are not included among the task of Public administrations).

- **In-house company:** a body belonging to the Public Administration (public owned company) which is financially and administratively dependent on the Public actor. In such case, the contract is awarded directly, with no need to adopt any public procedure.

- **Public-private partnership:** a private company, in collaboration with the public institution, participates as a partner in the mixed capital company set-up for the management of services. In most cases, this company structure allows Public actors to obtain economic benefits resulting from the achievement of public value objectives, identified in the contractual phase, with the most convenient price/quality ratio. In case of mixed public/private companies for service awarding, a Service procurement partnership is needed: a public tender and relevant following contract regulating the relationship between Public Administration and Private Company.

The definition of supporting conditions to create the operational framework is an essential factor for implementing city logistics services.

The main tasks at this level are related to the analysis and definition, for each designed measure/service, of the supporting conditions with respect to the

aspects outlined in the above mentioned rationale section:

- Organisation - in terms of involved staff and operational procedures;
- Management model - in terms of how to organise the process of managing the overall set of measures, taking into account their different aspects (regulation, ICT, vehicles fleet, infrastructures, etc.) and the involved actors;
- Service contract - in terms of typology of service awarding (procurement, company structure, etc.), objective and tasks/commitments, performance indicators, etc.

Of course, in the portfolio of possible measures and services available for city logistics optimisation, the Urban Consolidation Centre (UCC) represents a case study with the highest level of complexity and thus it is taken as a reference in the analysis of supporting conditions.

From the organisational point of view the UCC represents a much more invasive solution with respect to other services/measures, as it involves many different elements (infrastructure, fleet, regulation, ICT platform, organisation, etc.), that can be tuned depending on the requirements and objectives of the Municipality. The UCC (logistics base and collection/consolidation activities) represents a “breaking point” in the urban logistics chain and therefore, in order to be competitive, it should present quality performances, efficiency and reliability similar, at least, to those offered by National/International freight operators (if not even better, considering the advantages of a small-scale structure and the support of the local public administration).

The UCC management and organisational level should be based on three key requirements, in particular:

- i) provision of “last mile” freight distribution services (delivery and reverse logistics), as base services;

- ii) provision of “added value” services, which are additional services, with a high economic return, that can boost the whole urban logistics system towards self-sustainability;
- iii) implementation of ICT platform (that in a UCC is to be considered as mandatory) that, besides performing basic functions dealing with daily logistics management, can guarantee a correct exchange and integration of data with the informational systems of various long/medium range transport operators, allowing a real continuity in delivery tracking & tracing. Actually, meeting the reliability and efficiency demand of transport operators for being involved in the UCC process, is one of the main issues related to the success of an UCC. The definition of the supporting conditions shall be approached both at system level and from the perspective of every single measure/service. For instance, considering the case of an UCC, it is essential to define all the different contractual, corporate and financial issues dealing with the UCC system and, at the same time, organisational/operational aspects of logistics services (both “base” and “added value”) shall be detailed.

METHOD AND TIMING

Always taking as a reference the most complex urban logistics system, an UCC, the methodology to be adopted for defining the organisational structure to manage the different logistics measures/services consists, in a first phase, in identifying all the actions to be implemented.

In this perspective, in order to achieve the economic self-sustainability of the UCC, in particular during the early stage of implementation, the approach should be oriented towards a “light and simple” management/organisational level in terms of facilities, procedures (administrative and operational) and

human resources. At infrastructural level, this means to look for solutions based on an existing warehouse and, at operational level, to try to involve some transport operators already operating delivery services in urban area.

Once these aspects are clarified, the following steps consist in setting-up the organisational chart, allocating human resources (also considering temporary replacements of staff for holiday/other absences) and identifying the tasks to be performed by the figures identified. The estimation of human resources depends on freight volumes, structures used, ICT systems, typology of vehicles and skills of the staff and is a key factor to be considered, as it significantly affects management costs.

According to these considerations, in the initial operations phase of an UCC, the different operational activities shall be set-up, in particular: freight unloading, collection and consolidation of goods based on delivery destinations, optimisation of loading factor on delivery vehicles, delivery, service invoicing, etc.

The staff needed to perform the activities identified shall be allocated and, in order to minimise costs, this shall be composed of persons with multifunctional skills. In the reference case a minimum of n. 2 professional skills (1 technical/administrative, 1 warehouse/delivery planner) and n. 2 drivers (also collaborating in loading and unloading activities) shall be dedicated to the service.

Regarding the support technologies, in the very first phase the administrative/planning procedures can also be performed without ICT or with low-complexity ICT systems. Once freight volumes progressively grow and added-value services are introduced, it will be necessary to increase the number of staff members and to adopt an integrated ICT system, with specific functions allowing to duly perform delivery

planning and management, tracking & tracing procedures integrated with long/medium range freight operators (by using GPS equipped vehicles), warehouse control and administration tasks (including service invoice).

On the contrary, taking as an example the case of a van sharing service, after the definition of the number and typology of vehicles (electric or conventional, with or without ICT system) and of the standing zones, it is essential to detail both organisational activities (booking modalities, pick-up/drop-off of vehicle, vehicle refueling or recharge – in case of FEVs – ordinary/extraordinary maintenance, etc.) and those dealing with administrative issues (service registration, vehicle booking, service invoicing, penalties and fees in case of misuse of vehicles, etc.). Once the planning actions concluded, the organisational chart can be defined and staff can be allocated with specific responsibilities based on the task to be performed. Also, in this case an efficient allocation of staff is very important as it significantly affects management costs.



EXAMPLES FROM ENCLOSE

BOX - Service Contract for the Management of LUCCAPORT UCC

A "Service Contract" regulating the relationship between Lucca Municipal Administration and the "Contracted operator" managing LuccaPort UCC. A detailed "Management Performance Chart" is also defined.

Municipality can act on the UCC for the extension of business and obtaining funds while the Contracted operator:

- manages logistics services and has the right to use the infrastructures, technologies and all tools for the UCC;
- carries out last mile services with zero emission vehicles;
- guarantees the service with respect to market standards and quality indicators directly and/or with sub-contractors;
- guarantees the UCC operation, maintenance and expenditure;
- guarantees the services vs. market tariffs;
- can subcontract the service as a whole or in part;
- can perform promotion campaigns, customer satisfaction surveys and control quality and quantity indicators.



E7: ASSESSMENT AND IMPACTS EVALUATION

In the previous steps the suitable measures/services were identified and designed (E5) and the relevant support conditions for their implementation were defined (E6) at different levels (organisational/operational, contractual dimension, business model, corporate aspects, etc.).

In E7 the planners should work along two specific stages:

- In the first stage, for each designed measure/service, the impacts on energy consumption, environment and economic aspects shall be elaborated by using basic tools based on reference standards and conventional procedures. The result of this stage is a table summarising, for all measures, the level of impact related to the following three main categories: energy, environment and costs;

- The second stage ranks the measures based on these impacts, on the resources available at city level (including private investments) for a specific time perspective (i.e. years) and on the general objectives and city policies (urban and mobility plans first of all).

Once all the different impacts have been evaluated, city administrators shall identify the more sustainable/convenient measures for the City also in terms of availability of resources, estimation of the related timing (short and medium period) for the activation of the identified measures, and checking the possibility to push private investments by collaborations or partnerships. The result of those stages is represented by a specific priority list representing a useful tool for decision makers in defining the overall Implementation Plan and in elaborating the Road Map for adopting the identified measures/services at Municipal level (political and administrative).

TASKS

The core task of E7 is the evaluation of the impacts/benefits produced by each identified measure/service, to be carried-out on 4 evaluation categories:

- environmental benefits,*
- energy efficiency gains,*
- technical performance, service provision and quality,*
- economic viability.*

For each of the 4 categories above, details on the main aspects to be taken into account are provided:

- Positive results regarding environmental impacts (reduction of GHG, polluting, acoustic emissions and vibrations, etc.) can be achieved by reducing the overall number of kms travelled by freight vehicles in the urban environment. This result can be reached by operating on city logistics aspects, with the adoption of a wide range of measures that may be rather different from each other:

- Reducing the number of circulating vehicles thanks to the optimisation of the vans loads (making better use of loading capacity) by consolidating goods at a UCC;
- Making use of route planners;
- Creating an adequate number of load/unload areas in order to reduce the traffic of vehicles in search of a free parking space.

Furthermore, besides the reduction of kms travelled, significant benefits in terms of emissions can be produced also by using zero/low emissions vehicles (i.e. latest generation diesel Euro6, PHEVs, FEVs, etc.).

The adoption of such kind of fleet can start from the vehicles used for UCC services and then be extended to private operators, also by means of specific regulations boosting the use of eco-friendly vehicles and of political incentives to invest in electric cars/vehicles. For example, in Norway an environmental agreement among all political parties in the Parliament has led to a significant increase in sales of electrical cars. For the first 6 months of 2014, Tesla Model S and Nissan Leaf have been among the 5 most sold models in Norway. The incentives consist of reduced car and road taxes, toll-free driving on toll roads, free parking and free use of public transport lanes. These incentives are also available for businesses.

Eco-friendly behaviours, such as the optimisation of delivery processes, can be boosted also by adopting specific rules and regulations aimed at, for instance, enlarging LTZ and/or LEZ, reducing/modifying time windows, etc. It is essential for all these measures to be fully supported by adequate control/enforcement schemes as, for instance, automatic access control systems. Other kinds of services are oriented in the same direction, as an example, the implementation of a van sharing service allowing to reduce the number of vehicle accesses of shop owners in self-supply.

ii) As regards the evaluation of energy impacts/benefits, all the above detailed measures for emissions reduction, in particular

those aimed at reducing kms travelled, do also produce positive effects regarding energy aspects.

Furthermore, innovative vehicles (including FEV in case these are recharged by photovoltaic systems) play a key role in reducing emissions.

Finally, also non-logistics related aspects should be considered when carrying-out the impacts evaluation. In fact, important benefits can be produced also by improving infrastructures like, for instance, logistics bases characterised by high-efficiency buildings (high-energy performances), low-consumption equipment, photovoltaic systems guaranteeing energy autonomy, etc.

iii) The evaluation of the impacts related to technical performances, service provision and quality is closely related to the above mentioned points and shall take into account all the technical/technological elements involved in city logistics processes, both directly (i.e. ICT platform, freight vehicle fleet, etc.) and indirectly (i.e. UCC infrastructures, access control systems, infomobility systems for L/U areas, etc.). Special attention requires the assessment of the performance of the technologies used for managing the different services, in particular of ICT platforms.

The quality and efficiency level of logistics services defined in the SULP is essential to achieve the necessary support from operators/users that is, in turn, a key factor enhancing service consolidation.

For instance, taking into account the various delivery services operated by a UCC, specific procedures and technologies shall guarantee that, at least, the same standards and service levels (i.e. delivery times, track & tracing, interface with complex systems of involved companies, insurance) offered by private medium/long-range operators are achieved. Otherwise, for example, in the case of a van sharing service the assessment of efficiency and quality level shall consider different aspects, such as: booking possibility, vehicle maintenance and cleanliness, efficiency of on-board devices (black

box), insurance, etc.

iv) The evaluation of economic aspects is crucial as it allows checking the feasibility of the measures/services and of the overall logistics system identified in the SULP.

Such kind of evaluation, to be carried-out by adopting the methodology described in the section below, shall take into account both investment costs and operational costs/revenues.

The assessment of economic aspects allows to adopt corrective actions in case of losses - such as the revision/optimisation of costs - and to implement added-value services in order to enhance the profitability of the overall logistics system (i.e. UCC and related services).

This evaluation shall start from the assumption that the economic sustainability of a service/measure - or of a whole system - is not a compulsory objective to be achieved by Local Authorities. This would be the case of private operators (or of a public-private partnership), but it can be a secondary objective in case of public initiatives, where the key focus is on citizens' life quality in historic centres (city logistics would be considered as a public service like Public Transport), and Local Authorities can provide contributions for achieving this objective.

METHOD AND TIMING

Although the evaluation of impacts/benefits of the identified solutions plays a key role in E7 as it can orient organisational, operational, infrastructural and economic decisions, the analysis methodology and the level of accuracy are closely linked to the resources available.

It is recommended to adopt a rather conservative approach in estimating the expected benefits produced by the solution chosen, as well as operation and installation costs. Low-cost, simple measures that can be implemented in a short time are to be preferred, at least in the initial phase.

As regards energy and environmental aspects (see evaluation categories i) and ii) of the tasks above described) the evaluation



methodology to be adopted in E7 should be based on the following elements: Methods for the identification, collection and analysis of data;

- Parameters for baseline definition;
- Parameters for the evaluation of the measures identified by the Sulp in the ex-ante scenario;
- Guidelines for future ex-post assessments.

Once the set of indicators and data collection methods are identified, the evaluation process will be structured along four phases:

Phase 1) – Definition of baseline scenario, that is the situation before the introduction of Sulp-related measures. For a correct definition of the baseline, it would be important to have specific data collected through surveys (also dating back to former periods). Once kms traveled and circulating vehicles are identified, it is necessary to calculate the total of emissions/year and the energy consumption of commercial vehicles in TOE/year by using standard methodologies. The baseline can deal with a specific category of vehicles toward which the logistics measure/service is addressed (i.e. private vehicles used by shop-owners in self-supply).

Phase 2) – Collection and analysis of environmental, energy, quality and efficiency data dealing with already implemented measures/services (i.e. pilot and soft measures implemented in the framework of the ENCLOSE Project).

Phase 3) – Evaluation of the overall ex-ante scenario, including estimation of the impacts produced by the services/measures introduced by the Sulp, based on existing knowledge, on former experiences in the relevant field and on data available both from former surveys and from specific campaigns (i.e. investigations carried out while implementing ENCLOSE feasibility studies).

Specific software applications for the micro-simulation of traffic flows and calculation of emissions – such as the “COPERT - Computer Programme to calculate Emis-

sions from Road Traffic” model implemented by the EEA (European Energy agency) – can be used for this assessment. When performing energy and environmental assessment the European standard to refer to is the one set-out by the CORINAIR (COOrdination INformation AIR) project, in the framework of CORINE program. The classification of emission sources used for CORINAIR is based on SNAP (Selected Nomenclature for Air Pollution) categories divided into 3 levels (sector, sub-sector, activity/technology).

The pollutants considered in the methodology are 10, in particular: nitrogen oxides NOx, nitrogen dioxides NO₂, sulphur oxides SOx, methane CH₄, non-metallic volatile hydrocarbons, carbon oxide CO, carbon dioxide CO₂, ammonia NH₃, particulate and lead-based compounds.

Usually, for substances like CO, VOC, NOx and PM (only for diesel vehicles) and for the fuel consumption (in g/km) it is possible to make accurate estimations, while in the case of CO₂, SO₂, N₂O, CH₄, NH₃, heavy metals and benzene calculations are less accurate and based, generally, on the quantity of fuel used.

Any further environmental evaluation shall take into account the aspects related to noise pollution produced by circulating vehicles. In fact, even if this is not a key factor as regards extra-urban traffic, the role that it plays in urban environment and historic centres (above all in night hours) is very important.

Noise pollution evaluation (and its limitation by adopting FEV) shall be carried-out by means of specific phonometric activities on conventional (diesel) and on electric vans (either FEV or latest generation diesel vehicles).

Phase 4) – Comparison between the ex-ante (existing measures and planned measures) and the baseline scenario.

Finally, E7 should also provide the guidelines for future assessments of the measures/services implemented following the Sulp and allow a comparison among baseline, ex-ante and ex-post scenario.

As regards technical performance, service provision and quality (evaluation category iii) of the above section “Tasks”) the methodology to be adopted is based on:

- Set of indicators;
- Modalities for identification and collection of data;
- Analysis of collected data.

The evaluation of these impacts shall not consider only data used for the evaluation of the two former categories, but also some specific indicators dealing with:

- Technical/technological components, referred in particular to the performances and reliability of the ICT platform and freight vehicle fleet. In case the two elements have already been implemented, data can be acquired both automatically (i.e. by means of ICT platform “troubleshooting” tools) and manually by using specific logbooks (i.e. filled in by platform operators or drivers);
- Operational components that, for instance, in the case an UCC is implemented, shall consider at least: average number of trips, average number of deliveries per trip, average weight of the different deliveries, type of freight, kms travelled for each trip, etc. Also in this case the collection of data (in case the logistics base is already functioning) can be both automatic (i.e. by means of AVL systems, electronic delivery documents, etc.) and manual (i.e. paper documents, specific logbooks filled-in by drivers, survey to operators, etc.);
- Quality and efficiency levels both expected and achieved (in case of already implemented measures). The collection of relevant data can be carried-out by surveys to both the operators (single operators and associations) and customers, which are commercial operators (i.e. for last-mile delivery and third-party warehouse) but also residents and tourists (i.e. for Park & Buy, Pick-up-Points, delivery to hotels, delivery of bulky goods, etc.). As regards to the evaluation of economic aspects (IV evaluation category) of the above section “Tasks”) it is essential to consider both investments and operational costs/revenues. In principle the overall cost should be cal-

culated by taking into account the investment for infrastructures (i.e. in the UCC solution: the cost of the warehouse - depending also on the typology of intervention, new or existing structure), vehicle fleet (in case of a renting approach, this represents an operational costs), equipment, ICT platform, etc. Other significant costs are related to maintenance of infrastructures, equipment and with operational/management activities (mainly staff costs, energy, fuels, insurances, etc.).

When assessing economic aspects, a special attention shall be paid to the calculation of break-even points, in particular for all the measures/services that require significant resources to be committed, as it is the case of an UCC.

A possible calculation option is detailed below:

- *Total measures/service costs (Investment costs + Operating costs + Infrastructure and equipment/fleet maintenance costs);*
- *Calculation of the freight quantity delivered by logistics operators in the base-*

line scenario;

- *Estimation of the quantity and typology of freight that could be taken in charge;*
- *Calculation of tariffs to be applied for reaching the break-even point.*

Another methodology (“backward analysis” type) is based on the a priori definition of a tariff - with a price per delivery which is competitive and in line with the existing market – and on the following calculation of the minimum number of deliveries (per day/year) to be performed for reaching the break-even point.

As anticipated, the economic assessment described above refers to the implementation of a UCC and deal only with the “last mile” delivery service.

Several experiences at European level (among which also some of the ENCLOSE towns – such as ‘s-Hertogenbosch and Lucca – are included) have demonstrated that, in order to achieve an economic self-sustainability, added-value services are essential for the UCC to compensate any possible losses related to the last-mile delivery service by economies of scale and

introduced enhancements/improvements. The high investment cost needed for the construction and start-up of an UCC requires, from the very beginning, a significant turnover that can be achieved only by exploiting the full potential of the infrastructures (logistics base, ICT platform, vehicle fleet, etc.) and of the staff, by diversifying the logistics services provided.

A correct economic assessment shall then consider all the revenues coming from the different services (both base and added value services).

Other key issues to be duly considered in the economic assessment are:

- Legacy aspects, concerning i.e. the evaluation of the best procurement process for subcontracting external subjects with the responsibility to implement the measures/services);
- Social aspects, concerning i.e. benefits in terms of human resources, both as regards new jobs and the enhancement of skills of the existing staff, that the adoption of the measures identified in the SULP can produce.

EXAMPLES FROM ENCLOSE

BOX 1 - Almada baseline

According to several surveys, a total of around 1,000 commercial vehicles per day enter Almada study area. Each vehicle has an average of 6 km travelled within the area, for a total of 6.000 km per day. Number of working days/year is 240. An average vehicle emission of 325 gr/km (Euro 2 COPERT III) and 6.000 km per day with an average consumption of 16 liters per 100 km were considered.

- Total energy consumption 202 toe/year
- Total CO₂ emissions 623 tCO₂/year



BOX 2 - Burgos baseline

Relate to transport operators

Type	Car/Minivan	Vans	Light truck	Total	Unit
Number per day	3	10	12		
Fuel Used	Diesel	Diesel	Diesel		
Fuel Economy	7,2	9,1	9,3		l/100km
Load Factor	65	53	87,5		%
Trips per year per vehicle	450	405	247,5		
Distance per year per vehicle	5400	10206	7493	23099	km
Distance per Trip per vehicle	12	25,2	30,3		Km/trip
Fuel consumption	425736	3389923	3052321	6867980	Litres/year
Fuel per trip	946	8370	12333		Litres/year
Energy	4329309	34472126	31039050	69840486	kWh/year
Final consumption CO ₂	1143	9097	8191	18431	Tonnes of CO ₂ /year
Primary CO ₂	1490	11865	10683	24038	Tonnes of CO ₂ /year
Nitrous Oxide	447	3563	3208	7218	Tonnes of NOx/year
Carbon Monoxide	2193	17458	15719	35370	Tonnes of CO/year
Particles	298	2373	2137	4808	Tonnes PM10/year

Related to vehicles owned by shopkeepers

Type	Car/Minivan	Category 1 Usage	Category 2 Usage	Total	Unit
Number per day		75	225	300	
Fuel Used	Diesel				
Fuel Economy	7,2	7,2	7,2		l/100km
Load Factor	65	65	65		%
Trips per year per vehicle	450	450	450		
Distance per year per vehicle	5400	5400	5400		km
Distance per Trip	12	12	12		Km/trip
Fuel consumption	389	29160	87480	116640	Litres/year
Fuel per trip	0,86	0,86	0,86		Litres/year
Energy	3954	296528	889584	1186112	kWh/year
Final consumption CO ₂	1,043	78	235	313	Tonnes of CO ₂ /year
Primary CO ₂	1,361	102	306	408	Tonnes of CO ₂ /year
Nitrous Oxide	0,41	31	92	123	Tonnes of NOx/year
Carbon Monoxide	2	150	451	601	Tonnes of CO/year
Particles	0,27	20	61	82	Tonnes PM10/year

“Category 1 Usage” are businesses that use their own vehicles, daily

“Category 2 Usage” are businesses that use their own vehicle exceptionally, this is assumed to be once/week

BOX 3 - Almada UCC break-even point calculation

The initial configuration of the Almada UCC plans the use of n. 2 FEV (3,5 tons vans), operating 4 trips/day each (2 trips in the morning + 2 trips in the afternoon) to perform all the expected deliveries.

Considering a revenue of 6€ for each delivery (composed of one or more parcels for a total of max 100 kg), which is a price in line with the logistics market, a minimum number of deliveries/day is required to achieve a balanced budget (excluding depreciation costs), in particular:

8 trips/day x 300 days/year x 6 € = 14.000 €/year; yearly income for 1 delivery of each vehicle

200.000 €/year management cost / 14.000 €/year = 15; number of deliveries to be made by each vehicle

These figures draft a business plan showing that the Almada UCC is economically sustainable only if an average of 15 * 8 = 120 deliveries/day can be ensured.

E8: ROADMAP TO ADOPT THE Sulp

RATIONALE

The Sulp is a planning act at Municipal/inter-Municipal level. In the version defined in the above steps, having positively passed the quality and congruity check, also with respect to the priority list defined at E7 and to implementation timing, it shall be officially approved and adopted by Local Authorities.

Usually, the approval and adoption process for a planning act is regulated by national and local laws, which may significantly differ from country to country, characterised by different methods and publicity level in order to guarantee the interests of all the citizens and not only those of the directly involved actors.

As discussed in the sections above, the Sulp can be considered as a part of the Sump, both in terms of methodology and as regards the adoption process. For this reason, it is possible to follow for the Sulp the same steps/road map for approval/adoption as an official Municipality act like the Sump.

TASKS

In the following, a possible process for the adoption/approval of Sulp is indicated. The suggested process is clearly open to amendments, even significant, depending on the different rules and procedures existing in the EU Countries at local/national level. At European level, at present, there is not even a common meaning of and consensus about the terms and processes of "adoption" and "approval".

In any case, some key steps are listed below:

- Preliminary activities for the publication and release of Sulp approach and contents, by involving in particular the interested citizens and stakeholders. Focus groups and discussion about and possible adoptions of the indications/contributions provided;
- Analysis and correction (if needed) of possible interactions/conflicts of Sulp with Sump and/or any other urban planning

acts (i.e. General urban plan, Land use plan, urban traffic and parking plan, etc.);

- Presentation of the Sulp to the Municipal Authority by the Sulp Planning Team (depending on the different local cases, this can consist either of internal staff or on external consultants). In this phase minor remarks and corrections can be integrated in the Sulp;
- Discussion and adoption of Sulp by the Municipal Council by means of specific acts;
- Large dissemination and promotion of Sulp adoption through various Municipality channels and media (i.e. Municipality bulletin, website, local gazette and newspapers/TV, etc.);
- Filing the Sulp at Municipal Secretariat for a reasonable period (i.e. not less than 30 days) in order to guarantee that any interested actor can read it (either by email request or directly at the Municipality premises) and can submit any possible objection/remark. It is important to highlight that the participatory approach followed from the very beginning of Sulp definition (see, as an example, the AREs organised in the framework of the ENCLOSE project) should avoid too many remarks and, at the same time, should guarantee a significant knowledge and understanding of the document from relevant stakeholders;
- In parallel to the "adoption period" a "safeguard period" shall start, in order to avoid to implement any single measure which is not in line with Sulp provisions, even if these are not in force yet;
- The Sulp team analyses all the remarks and objections received and prepare the "technical answers" to be submitted again to the Municipal Council, that shall decide about their approval or rejection;
- After the conclusion of these activities and institutional discussion/analysis, the Municipal Council should approve the Sulp;
- Once approved, the Sulp comes into force.

It is essential to include specific participatory steps (i.e. events/meetings) all along the

Sulp adoption-approval process, in order to guarantee a wide dissemination of and to build-up a large consensus on strategic, regulatory and operational choices that Local Authorities intend to adopt.

The participatory approach, already in place in the analysis, study and design phases (see, in particular, the above E0, E2 and E5) should be maintained during all the Sulp development steps, in order to guarantee to the different stakeholders and citizens several opportunities to discuss and accept/reject the planning document, thus avoiding too many objections during the adoption-approval phase.

The main tools supporting this step can be summarised as follows:

- Specific information and promotion campaigns addressed to local stakeholders (in particular to commercial and transport operators operating in the Sulp study area). In this phase, beyond the dissemination of specific information material, in the case of more complex measures (as the Urban Consolidation Center is), it is possible to organise specific technical visits to already existing structures, for representatives of associations and other relevant actors;
- Organisation of discussion/information events involving local stakeholders, associations and citizens (in particular those living in the interested area) in order to collect their suggestions/remarks to be integrated in the Sulp before the submission to Local authorities.

Finally, it is important to stress that the road map is a process where a high level of involvement of different actors can be observed: from single operators to Associations, to citizens, Municipal offices and external planning experts. For this reason, it is worth noticing that any kind of discussion forum is welcome, from "live" meetings, to virtual and social spaces provided by new social networks (i.e. Twitter, Facebook, etc.). Finally, when adopting a participatory approach it is essential to bear in mind that quality and quantity are closely related to each other.

EXAMPLES FROM ENCLOSE

BOX 1 - Road map for Burgos SULP adoption

The SULP development has been a progressive process: from the solid basis of the Feasibility Study, developed within the ENCLOSE project, and the results of the Soft Measures, a draft document was designed.



The city of Burgos opened a participatory process with the stakeholders for the validation, consolidation and embracing of the SULP. Here, 3 basic elements were considered:

- Information/Training: information about any public action is crucial for the stakeholder's participation;
- Consultation/Debate: stakeholders give their opinion, make suggestions and present alternatives, and a phase of dialogue is opened for consensus;
- Management participation
- Joint decision makes the implementation shared with stakeholders.

In particular, as regards the case of SULP in Burgos:

The 2 Awareness raising events (AREs) held in Burgos were a useful tool for stakeholders information, as well as the specific training sessions in other experienced cities.

Within the 2nd ARE event, a consultation session was held with stakeholders and was organised as an open debate where the developed work was presented and discussed in order to build-up consensus.

SULP includes both public measures and measures that should be promoted by/in cooperation with the private sector, leading to an implementation shared with stakeholders.

After a review phase with comments and suggestions gathered during the AREs, the SULP will be promoted, discussed and approved with the Strategic Plan City of Burgos Association. The Association is a local entity (promoted and chaired by the City Council) where more than 60 large companies, public and private organisations and technological institutions are integrated, with the common goal of acting in all areas that impact positively on the economic and social progress of Burgos, promoting and coordinating public and private sector.

This means that Strategic Plan City of Burgos Association has a wide representation of key stakeholders of the city, and so, in a third step, these stakeholders will spread and embrace the SULP within their organisations.

E9: RESPONSIBILITIES, IMPLEMENTATION AND MONITORING PLAN

RATIONALE

The final set of measures/services has been selected also on the basis of the available budget. In this step, each selected measure is analysed from the perspective of responsibility upon the development of the SULP, in order to have a clear vision of the actors in charge of the related measures/services. A realistic implementation plan should be

defined in order to have a clear picture of the evolution of the measures with respect to the time.

It is also necessary to have an assessment tool for monitoring the implementation (or the development) of each measure/service.

The most important aspect of this tool is related to the monitoring of the development of the plan in order to keep a close control of the planning process and of the state of implementation of single measures. This control should also support the

very planning phase due to its connection role between the planning start phase and the final phase through feedbacks on the planned measures.

This is the base for monitoring the overall planning process. In parallel, it is necessary to make specific resources available for carrying-out the monitoring tasks and for defining a set of indicators allowing the assessment of the performances of the different measures implemented and the level of achievement of the objectives defined. Based on the set of specified measures, as

results of the steps above (characterised at minimum by the level of feasibility, the level of needed resources and by the probability for a successful implementation,) a range of specific tools (or methodologies) should allow to monitor:

- The planning process, by verifying each scheduled step for checking the consistency of the work made and to be carried-out and, if necessary, to reschedule or change some actions related to the same planning methodology. This allows all the involved actors to have a continuous control of the planning process, identify the achieved milestones and the compliance with constraints and, if necessary, to recognise the difficulties and the responsibilities in developing the Sulp. This monitoring phase can also show the efficacy of the planning process and its actions/results;
- The implementation process, by verifying the implementation level of each of the planned measures and the related effects allowing to adopt corrective actions in case the expected results and the planned objectives were not achieved;
- The after-implementation phase, assessing achieved results with respect to the planned objectives.

The work made in the previous steps drives this monitoring procedure, as the more accurate the results of the steps are (in particular the impacts evaluation), the more effective the monitoring will be.

TASKS

The Implementation Plan is a “working in progress” document defining in details (as the executive design) each operation to be performed for the overall realisation of each Sulp measure (already defined in terms of feasibility, provisional and definitive design).

This document can be modified, during the implementation timing, depending both on the possible changes of realisation priorities on new regulations or infrastructure modifications. Moreover, time plan

changes could be caused by the experience gained in the realisation of the first Sulp measures/services.

Therefore, for each single Sulp measure, a specific detailed realisation plan should be defined, indicating the responsible person and related team. The responsible, among the others, will:

- Coordinate the overall realisation actions (interrelations with providers, work monitoring, testing procedures, etc.);
- Carry out all the administrative/reporting activities for achieving the related permits and authorisations (i.e. public space occupancy, building authorisations, plants certification, etc.) needed;
- Manage the subcontractors both in respect to the type of procurement and to the related assignment.

For what the Monitoring plan concerns, the implementation phases/steps (detailed in the Implementation Plan) related to the Sulp measures/services (i.e. infrastructures realisation, rule issues, authorisations and certifications, testing procedures, operation start up, etc.) should be specifically monitored in order to allow the responsible team (within the Municipality office) to evaluate the level of realisation and the related attainments in terms of timing and budget constraints.

Therefore, it is necessary to establish a specific Monitoring Plan that for each measure/service allows, among the other:

- To continuously check the level of implementation;
- To assess the attainment of measures realisation with respect to its detailed design;
- To support the identification of the discrepancies against the planned activities in order to adopt suitable remedial actions.

Many of these monitoring activities involve procedures already consolidated in the common practice (i.e. work log book/journal, work progress verifications, etc.), while the specific set of indicators and the related operation modalities for collecting data should be defined in the Monitoring Plan.

Once the measure have been in operation, the monitoring activities shall be focused on controlling and verifying the financial and operational efficiency, the different impacts and socio-economic aspects.

EXAMPLE

To make the above indications clearer, a description of the set of indicators identified for monitoring the “load/unload bays” is provided:

a) general indicators

- N. good vehicle /day present in the urban area;
- Travelled Km/day by good vehicles in urban area, n. deliveries for each trip, n. deliveries for each bay.

These indicators can be monitored by data collection campaigns or through on site interviews with transport operators

b) Daily use of the single bay

This indicator is based on on-site counts or by the parking management system (if present) on the basis of maintenance reports

c) Service efficiency and approval

The efficiency can be monitored by the single bay availability verification as indicated above.

The knowledge and approval parameters can be monitored with specific interviews directed to transport operators and shopkeepers.

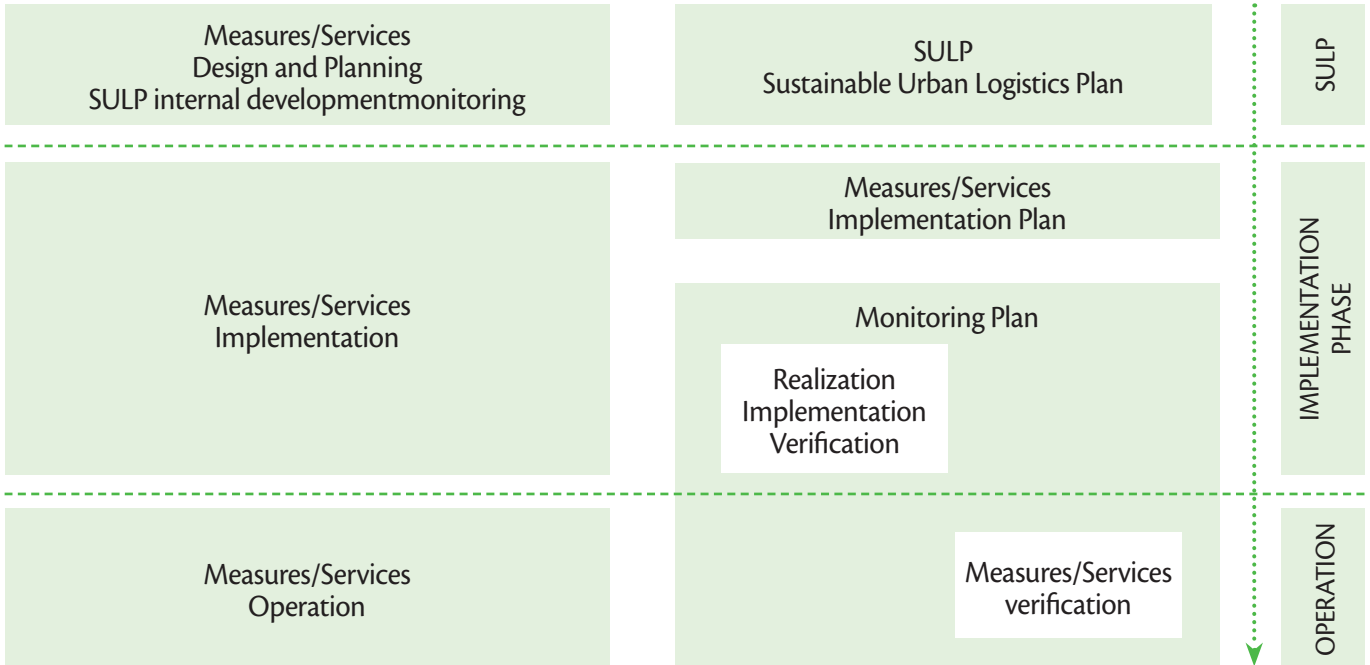
METHODS AND TIMINGS

In the Sulp measures/services implementation process it is necessary to clearly define different roles, competences and responsibilities among the various actors (municipality, service providers, associations, etc.) in order to minimise the possible conflicts and for better coordination of the different activities and operational phases. Therefore, the Implementation Plan and the Monitoring Plan are operational handbooks, allowing the Municipalities (and its responsible) the continuous control of the activities both during the realisation phase and during the start up.

The main milestones of this implementation process can be outlined as follow:



Implementation and monitoring process



EXAMPLES FROM ENCLOSE

BOX 1 - Dundee municipality logistic measures implementation plan

Two soft measures were identified for application in the Dundee central area in the short term as part of the ENCLOSE project. These were:

- enhanced enforcement of loading bays, increased use of electric powered Dundee City Council vehicles.

The following were identified for consideration in the medium term:

- Urban Consolidation Centre (UCC)
- carriage of customer purchases on Park & Ride buses
- further development of web / app / Sat Nav based information for freight/logistics operators in Dundee.

A programme has been developed that aligns with the time scales of the Dundee SOA (Single Outcome Agreement), until 2017, and the Regional Transport Strategy, until 2023. The programme has been split into short-term measures covering 2014 - 2017 and medium term 2018 - 2023. The short-term programme reflects the current position of financial constraint. Earlier implementation of the medium term programme may be possible as funding opportunities arise. Implementation of the medium term programme will be subject to review during the period 2018 - 2023.

BOX 2 - Serres municipality logistic measures implementation plan

The Sustainable Urban Logistics Plan for the city of Serres foresees the implementation of five specific measures, which are planned in different timing perspectives:

- **Short Term Measures:**
Users' Awareness Raising and Information campaign;
Spatial and temporal restrictions.
- **Medium Term Measures:**
ICT e-platforms and collaboration between stakeholders in urban freight transport;
Routes optimisation through the provision of real time traffic system.
- **Long Term Measures:**
Urban consolidation centre (UCC).

The stakeholders debate for the implementation of these measures ended up in specific conclusions:

- The measure that seems to be easily applicable is users' awareness raising and information. According to public opinion, in order the measure to be

effective a synergy between all stakeholders is required.

- Spatial and temporal constraints could be a solution to facilitate access to loading/unloading places, but need a collaborative effort in order to continuously inform citizens about the utility and functionality of these places.
- Routes optimisation through the provision of real time traffic system could improve the time and service reliability, reducing at the same time the operating costs of transport companies.
- The use of ICT platforms could lead to an exploitation of all loading/unloading places in the best possible way and therefore could contribute to the coordination and planning of trucks' arrivals within the city centre, reducing that way traffic congestion, noise and environmental pollution.
- The construction of an UCC, concentrating goods that are grouped and trans- shipped from large trucks to small vans in order to be delivered in an area close to the centre of Serres, is a highly costly measure requiring a strong synergy between the public and private sectors.

E10: PROMOTION AND COMMUNICATION PLAN

RATIONALE

The promotion and communication plan describes the main strategies in order to spread all the information concerning the various activities and actions results, and prepares the ground for sustainable results. Dissemination and promotion activities are designed to address and meet the main objectives of promoting sustainable, eco-compatible services and solutions for city freight distribution. For this reason, local dissemination and promotion are crucial for the success of the measures/action to gain interest, involvement and trust of all concerned user and public categories in the towns and in the surrounding territories.

TASKS

- Communication tools and actions definition;
- Web presence and social media: publication of papers / publications (including multimedia) and articles in the specialised and general press;
- Audio-visual material;
- Newsletters;
- Awareness Rising Events (AREs);
- Meetings with local stakeholders.

The most important aspect that requires a proper communication activity is the willingness of the local Administrations to concretely establish, among the others, commitment of substantial resources in the implementation of infrastructure/ measures/regulations towards a more sustainable approach to urban logistics developed through the SULP.

METHODS AND TIMING

The specific methods heavily depend on the local context. It is essential to define periodically a method, allowing the evaluation of the results obtained and eventually adjusting it.

A number of key elements have to be taken into account and have to be carefully as-

essed when implementing each single dissemination phase and measure.

The main goal of the promotion plan is the creation of a "communication network" between all parties concerned by city distribution, including the different branches of Public Administration, shop owners and commercial operators, freight transport operators, citizens, visitors and tourists.

The designed communication plan should target and concretely involve a series of stakeholder to help providing the various planned actions with a coherent and consistent drive leading to the achievement of tangible results.

Key issues requiring special attention and careful choices in order to achieve and implement an effective and coherent local dissemination and promotion strategy include:

Integration. All activities concerning dissemination and communication must be integrated in the context of a single communication strategy, with clearly identified targets and lines.

Coordination. For all planned actions and initiatives related to public information and communication about the Sustainable Urban Logistics Plan, a coordination phase is necessary to identify the most suitable ways, instruments and contents to develop the actions within the integrated communication strategy in the most effective way.

Identification. It is of utmost importance that any message related to the town's Urban Logistics strategy is immediately identified by the public, with clear and direct reference to the action by means of easily identifiable elements such as the logo, colors, etc.

Objectivity. It is likewise very important that any message targeting the different public and user categories is felt as much as possible as conveying 'objective' information, to avoid being interpreted as commercially-biased communication and advertising.

Credibility. Even more important, credibility of the action must be ensured, avoiding any propaganda or hype. Messages should not only convey positive pictures and success, hiding difficulties or problems, if any. Rather,

a wise communication should use these as useful lessons for the interest of the community.

Persuasiveness. Messages and actions should be persuasive and avoid any imposition or strong statement. Such a model and solutions should be made attractive for the concerned public and user categories, as they suggest proper behaviours, provide evaluations and comparison elements, and are convincing because of collective advantages and proposed benefits.

Visibility. All information and communication activities must contribute (together with integration and coordination) to enhance visibility within the concerned territory and user categories, making measures, implementations and achievements as much visible as possible on a local as well as national and European level.

Accessibility. Information, messages and project products in general must be characterised by simplicity, clarity and immediacy in order to ensure being accessible to all intended target publics and user categories.

Interactivity. Communication and promotion about Sustainable Urban Logistics initiatives must favor interactivity and multi-directionality of messages.

The communication plan identifies and classifies the target audience for the communication material and dissemination activities. Target audience is composed mainly by local stakeholders, including Local Authorities, transport operators, logistics service providers, commercial operators and associations, policy makers, citizens and user groups. From a general point of view, the targets related to the implementation of urban logistics schemes and services are:

- Local authorities, i.e. municipalities (including policy makers, infrastructure managers, urban planners, etc.);
- Local mobility and energy agencies as well as public companies in the transport sector, i.e. in-house or private-public enterprises managing transport or mobility-related services at various levels;
- SMEs, service providers (including shippers, transport operators, etc.), profession-



- al workforce operating logistics services in urban areas;
- Chamber of commerce, institutional representatives of the local economic operators;
- Professional associations, in particular the ones related to trade, craft and commerce, whose members are present in the areas

- interested by urban logistics processes;
 - Retailers, distributors, wholesalers, shopkeepers, hoteliers, tourist operators, etc.;
 - Citizens (including residents, commuters, visitors and tourist).
- Additionally, sponsors and supporting bodies, General Public, Press and Media organi-

zations should also be targeted since they represent also relevant key actors as they has the potential to influence decision makers, support the project general objectives validating its legitimacy, spread the word about the initiative, provide additional support (i.e., political buy-in from sponsors).

EXAMPLES FROM ENCLOSE

BOX 1 - Local awareness raising events in the enclose project

Awareness Raising Events (AREs) integrate with and complement previous experience exchange actions by providing a number of public events and presentations aimed at stimulating the uptake of energy-efficient urban logistics solutions in the ENCLOSE historic towns.

The goal of AREs is twofold:

- to provide a platform to facilitate the involvement and consultation with local stakeholders in the follower/learner sites, and to build up local consensus around energy-efficient urban logistics;
- to support the definition of the local Sustainable Urban Logistics Plan in the sites enabling presentation and discussion of the principles and elements of the SULP to the involved stakeholders, as well as the collection of feedbacks used in the definition process.

AREs are local meetings (duration: 1 day, up to 2 days each) held at local level and targeted and tailored to relevant local urban logistics stakeholders (e.g. Local Authorities, transport operators, local logistics companies, associations of shop owners and retailers, citizens, etc.).

Each event has been organised in two logical parts:

the first one brings the expertise of participating experienced towns, illustrating the audience their success story and explaining the implementation path and process undertaken by them, the goals and main concerns of Local Authorities, etc.

The second part, is more focused on illustrating the general scheme of the SULP to the relevant stakeholders involved in its implementation (e.g. local

authority policy dept.), on gathering information on the site in order to later provide support to the preparation of the feasibility studies and in the following phases of development of the local SULP.

During the course of ENCLOSE, each learner partner has organised and hold at least two AREs, which eventually were followed by other events depending on the specific needs and identified urban logistics solutions as well as on the characteristics and complexity of the political and participatory path each learner Local Authority wanted to follow. One representative from one of three forerunner sites, assisted by the ENCLOSE Coordinator, attended the event. The presence of these partners has provided the requested expertise to maximise the results of the events and create the relations and common understating required to develop the following phases of the Action (e.g. energy benefits assessment). The events have had great success supporting local authorities in the following project activities.

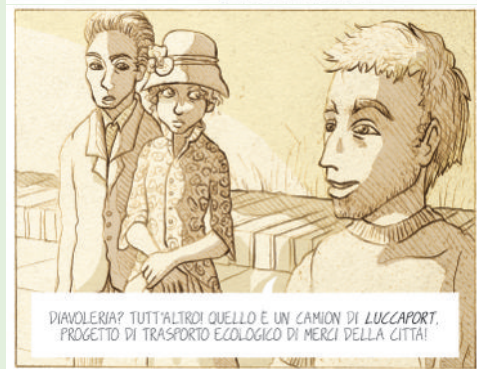


BOX 2 - Local enclose contest for Luccaport

In order to disseminate the results so far achieved by the local action Luccaport, the Municipality launched in June 2014 a competition to tell about LUCCAPORT through comics, videos or photographs. The ecological city distribution terminal of the town of Lucca is running some of the services piloted in ENCLOSE. Photography and video enthusiasts and budding cartoonists: they were all the recipients of this contest, designed by the local authority as part of the project and in collaboration with several other stakeholders, with the aim of promoting LUCCAPORT - the city terminal that distributes goods in the city with electric vehicles and sustainable means - through works that can best

express the economic, social and environmental benefits derived from its activity. In fact, the main purpose is raising awareness, starting with school kids, about the existence of Luccaport and why this experience is positive and useful for Lucca.

Participation was free and open to all professionals or enthusiasts of all ages, who at the date of submission of the application had already turned 18. Three sections: cartoon, digital photography, video. The awards was eventually presented at an ENCLOSE workshop specially organised by the city of Lucca; the best five works presented in each section were made available on the official ENCLOSE website. The participation to the contest and its press dissemination have let the themes of the Luccaport project reach a variety of interested people both at local and at national level.



SULP INTEGRATION WITH SUMP

The urban traffic flows and related traffic congestion level are the first and main motivations pushing Local Authorities to act and to control urban mobility processes. A set of measures are planned and implemented in various modalities with the main objective of reducing externalities (i.e. pollution and noise, energy consumption, accident risk, urban degradation, congestion, etc.) caused by the traffic flow related to people and goods transport. Traffic congestion is in any case the main factor among the negative impacts directly perceived by “users”, both for what timing and costs and, in the case of goods transport, for production costs and the overall production chain regards.

For the above mentioned and other well known motivations and factors, in the last decade many policies, directives and “on field” actions have been defined and promoted by the EU (i.e. Action Plan on Urban Mobility COM (2009)-490/5, The White Paper 2011, the CIVITAS, IEE programmes etc.) in order to tackle mobility problems in both urban and metropolitan areas in the perspective of an overall urban sustainability. With these measures and initiatives the EU aims to promote an unitary and integrated plan indicated as Sustainable Urban Mobility Plan and defined as “a Strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles ...”

Such an approach is not new for some EU countries (i.e UK - Local Transport Plans, France - Plans de Déplacements Urbains, Italy – PUM-Piani Urbani della Mobilità) but surely more “persuasive” for cities.

The overall objectives of the SUMP can be summarised as follows:

- To ensure that accessibility offered by the

transport system is available to all;

- To improve safety and security;
- To reduce air and noise pollution, greenhouse gas emissions and energy consumptions;
- To improve the efficiency and cost-effectiveness of the transportation of persons and goods;
- To contribute to enhancing the attractiveness and quality of the urban environment and urban design. Therefore, the policies and measures to be defined in a SUMP should cover all modes and forms of transport in the entire urban agglomeration, including public and private, passenger and freight, motorised and non-motorised, moving and parking, etc.

With the SUMP approach (and the related directives, actions and founding) the EU does not intend to create a new further planning tool as compared to the national, regional and town level. Instead, it aims to provide a reference methodology for elaborating an integrated urban mobility planning. Taking advantage of the existing planning tools, participation and evaluation principles/criteria, the SUMP aims to answer the current and future mobility needs of people and goods in order to reduce negative impacts and to enhance life quality in the urban areas.

This methodology is based substantially on these main phases:

- Status analysis and baseline scenario;
- Definition of a vision, objectives and targets;
- Selection and design of policies and measures;
- Assignment of responsibilities and resources;
- Monitoring and evaluation arrangements.

The relevant phases are described in the SUMP Cycle scheme structured in 11 Ele-

ments corresponding to the main steps of the Plan) and 32 Activities (corresponding to the detailed specific tasks of the Plan) promoting from one side a participatory and integrated approach, and from the other side measurable targets identifying the various costs and benefits.

In this context, there is a close mutual relation between the SUMP and the SULP methodology introduced and defined in the above sections, which can be summarised as follows:

- SULP is a relevant action or part of the SUMP, dedicated to urban logistics processes;
- SULP provides real and planning working details to implement the specific SUMP approach for what Logistics processes regards;
- SULP follows the participation approach and the political level involvement with a bottom up approach starting from the user needs.

Moreover, the SULP, as the SUMP methodology, puts great attention in covering the different aspects related to the various urban area levels (institutional, political, operational and infrastructural/technological). It is possible to identify some integration levels between SULP e the sustainable urban mobility (SUMP) as the following ones:

- Stakeholders decision level: SULP supports the SUMP for the main objective of reducing external impacts/costs (traffic congestion, pollution and consumptions, low safety);
- Town situation diagnosis: SULP supports SUMP in identifying the town base line situation not only for logistics processes, but also for some common mobility factors (first of all the identification of the traffic situation);
- Town measures design: the measures regard the road network and its control should be shared between the solutions



for people mobility and logistics (i.e. parking areas, city accessibility, time windows, clean vehicles, etc.). Therefore, Sulp and Sump have mutual feedbacks, the realisation of one can push and facilitate the realisation of the other, thanks to the same participatory approach towards the various stakeholders.

The border line between the Sulp and Sump is provided by the level of solutions dedicated to the different mobility or good distribution processes, and by the fact the Sulp should also guarantee an efficient urban logistics system.

Finally, the Sulp should be integrated with the emerging “smart city” approach and mainly with the ITS development plan for urban areas, as indicated by the EU directive 2010/40/UE and their national implementations/receptions concerning the development of ICT systems dedicated to the mobility and the interface with the other mobility services and modalities.

The integration with Sump can be reached at different levels depending on the Town existing and/or planned policies and initiatives.

This integration is still more relevant at the level of small and medium-sized towns, where a set of factors do not allow to have a clear separation of planning tools (or better, a lot of resources to be dedicated) for what concerns the main aspects of urban mobility (traffic, goods and public transport). Therefore, in the small and mid-sized historic towns, the integration should be achieved working on many tasks, requirements and tools that can be shared by the Sulp and Sump methodology in terms of i) expertise practice ii) extension of the range of applications and analysis of specific methodology steps/actions and iii) design of networks, regulations and ITS measures. For the expertise and capabilities, the possible integration can be achieved with respect to at least the following points/

aspects:

- Transportation planning and modeling;
- Data collection, analysis, and forecasting, including use of geographic information systems (GIS);
- Working with Local Authorities and coordinating stakeholders groups, using participatory tools (surveys, interviews or focus groups, stakeholder engagement, and preparation of information for the general public);
- Impact analysis based on different indicators and monitoring and evaluation of the plan.

For what the task concerns, it is possible to extend the following tasks. that could be common among the two methodologies:

- Project management and coordination;
- Stakeholder involvement in terms of: documentation analysis, meeting and focus groups leading, interviews, briefings to a project advisory group, city boards and commissions;
- Database: create the same information system on which to integrate the different useful modeling tools and the results of the data collection/base line activities;
- Baseline: to extend the data collection to the existing town condition (from traffic aspects to freight deliveries, etc.);
- Policy strategy: to extend the vision, goals, objectives, and performance measures to define freight and mobility policies, network, programs and investment decisions and evaluate the near future situation;
- Implementation strategy, in order to classify the different solutions and project measures, programs, and maintenance activities to support an efficient transportation and mobility system. A main focus has to be on prioritising the different activities and projects so they integrate in a collaboration between Sump and Sulp for their implementation .

For the design of specific measures regard-

ing the network, regulations and system aspects, the integration can be reached at these levels:

- Traffic counting and interviews;
- Analysis of loading and unloading areas and detailed traffic impacts evaluation;
- Low emission areas/zone utilisation, identifying the freight routes and the relation with the network hierarchy;
- Definition of time and space accessibility rules (night delivery, use of transit lane, etc.);
- Sharing some requirements for possible ITS solutions/systems (access control for the entrance and exit goods van despite resident vehicles, dynamic loading/unloading areas by Integrated management parking system, etc.);
- Sharing the platform of some innovative service (car sharing platform for good van sharing, bike sharing platform for cargo bikes);
- Sharing the UCC platform for managing the booking and operation of the flexible mobility services (i.e. demand responsive solutions);
- Electric mobility by sharing the electric recharge station;
- Integration of parking schemes with last mile goods distribution rules.

Overall, the present Guidelines provide useful tools to develop a proper Sustainable Urban Logistics Plan. Building on existing planning practices and taking into consideration integration, participation, and evaluation principles, Sulp represents a strategic plan designed to satisfy the freight mobility needs of people and business in cities and their surroundings, in order to achieve a better environmental and life quality. Sulp must be considered as one of the main parts of the Sustainable Urban Mobility Plan (Sump), devoted to integrate urban logistics schemes/services/regulation in the overall mobility strategies and solutions.

The 9 ENCLOSE towns



LUCCA (IT)



TRONDHEIM (NO)



'S-HERTOGENBOSCH (NL)



BURGOS (ES)



SERRES (GR)



DUNDEE (UK)



ALBA IULIA (RO)



ALMADA (PT)



BALCHIK (BG)

IEE ENCLOSE PROJECT

SULP Guidelines certified
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