Sustainable Urban Logistics Plan (SULP) methodology for Small and Mid-sized European Towns: the IEE ENCLOSE project results

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Abstract

Freight transport and city logistics are well-known factors of energy consumption and environmental degradation in European urban areas and this is the reason why EU countries are undertaking huge efforts, aiming to improve operations and reduce negative impacts. In this context ENCLOSE Project, funded under the European IEE programme (Intelligent Energy Europe) and ended in January 2015, aimed to develop Sustainable Urban Logistics Plans (SULP) for Small-/Mid-size towns (SMTs) integrated with Sustainable Urban Mobility Plans (SUMP). Therefore the key findings regarding the needs and potential logistics services for SMTs, are discussed and presented with respect the 9 involved European towns first solutions. Moreover the ENCLOSE methodology and the guidelines for carrying out the SULP in each ENCLOSE town is described outlining the measures and solutions defined for each towns. Finally some remarks on the relation between SULP and SUMP are provided with some simple recommendations for keeping “simple” the development approach of urban logistics solutions.

Keywords: Sustainable Urban Mobility, City Logistics, Small and medium towns

1. Introduction

As it is widely recognized, traffic and transport are two of the main sources of environmental pollution in urban areas. In this context, freight transport and city logistics are well-known factors of energy consumption and environmental degradation in European urban centres and this is the reason why EU countries are undertaking huge efforts, aiming to improve operations and reduce negative impacts. Based on gathered evidence, 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: Urban Consolidation Centres, optimized urban freight transport and delivery plans, clean vehicles and low emission technologies, restrictions and public incentive policies, last mile and added value services, integration of city logistics processes within the overall management of urban mobility. Additionally to this, the use of latest “green vehicle” technologies (FEV, PHEV and CNG) can play a key role in achieving a significant pollution reduction even with no variation of the urban logistics scheme applied, however this does not impact on the traffic congestion level.

The relevance of funding sustainable solutions for urban freight distribution problems is stressed also by one of the last recent EU documents “White Paper – 2011”, where one of the 10 defined goals is dedicated to “Achieve essentially CO2-free city logistics by 2030 in major urban centres”.


The impacts of freight distribution in urban areas are particularly important and significant in small and medium size cities in terms of pollution, emissions and costs due to, among other factors, the specific characteristics of the city structure (old road infrastructure, narrow streets, etc.), strict access regulations, presence of heritage and historic assets (with higher risks for pedestrian safety). Moreover, it is also evident that the difficulties that local administrations face in addressing urban logistics are due, on the one hand, to the skepticism of local associations of shop owners (often operating in self supply and provoking more difficulties than transport operators themselves) and freight operators (which are frequently small local operators) and, on the other hand, to the need of keeping the historic centres active (“Alive”) despite many urban policies in the last two decades have tended to “void” it. With regard to this situation it is worth noting that a further difficulty, existing also in other mobility sectors (i.e. in the integrated management of parking services and other collective mobility services), is related to the lack of capability to plan integrated solutions (not only for the city logistics) and manage process evolution and to insufficient structures and skills at the level of the single Municipality.

In this context this paper presents the main results of the ENCLOSE Project, developed, from May 2012 to February 2015, under the IEE (Intelligent Energy Europe) programme, in terms of approach, achievements and key findings regarding the needs and key logistics services suitable for European small and medium size towns (SMTs) discussed with respect to the 9 ENCLOSE towns.

Moreover, the methodology defined in ENCLOSE for defining and implementing the Sustainable Urban Logistics Plan (SULP) is described, showing the results achieved in the 9 cities.

Finally some remarks on the relation between SULP and SUMP are provided with some simple recommendations for keeping “simple” the development approach of urban logistics solutions.

2. ENCLOSE and Logistics challenges in Small and Medium European Towns

The ENCLOSE project, funded by the Intelligent Energy Europe programme, faced the different critical aspects mentioned above from the perspective of Local Authorities/Municipalities (including 9 European Cities), by “simply” (but not always known) recognizing that the small and medium size cities in Europe are more than 1350 (vs 21 cities with over 1 ml of inhabitants) and they need specific solutions and approaches that have not been addressed by the recent large European projects and EU Commission acts, which are, on the contrary, all focused on big urban realities.

The ENCLOSE project involved 16 partners (including 9 European towns) from 12 EU countries (Austria, Bulgaria, Greece, Ireland, Italy, Norway, Poland, Portugal, Spain, Sweden, Netherlands and the UK) and had its focus on the following main issues:

- Assessment of the applicability and benefits of energy-efficient and sustainable urban logistics measures, specifically targeted to European small/mid-size historic towns, by the implementation of (a) pilot measures in the 3 urban centres of Lucca - Italy, Trondheim - Norway and 's-Hertogenbosch - Netherlands and (b) feasibility study and implementation of soft-measures in the 6 mid-size (follower) towns of Balchik - Bulgaria, Serres - Greece, Almada - Portugal, Alba Julia -Romania, Burgos - Spain and Dundee – UK;
- Development of Sustainable Urban Logistics Plans, integrated in the related Sustainable Urban Mobility Plans (SUMP), in 9 European towns;
- Investigation into policy-level issues and definition of suitable strategies to ensure long-term sustainability of SULP for small/mid-size towns;
- Assessment of the efficiency of “green vehicles” (FEVs, PHEVs, CNGs, etc.) in urban logistics schemes for achieving energy savings and CO2 reductions;

The ENCLOSE project was mainly based on the real experience achieved and lessons learned by Lucca Municipality (Italy), that developed the local SULP focused on the provision of last-mile delivery services, by implementing a Urban Consolidation Centre (Lucca Port), a FEV fleet, inner center access regulation and innovative logistics schemes managed by a specific ICT platform. The experience of Lucca, Trondheim and s’Hertogenbosch have been the starting point for the development of the different SULPs in the other ENCLOSE towns.

A cross site assessment of needs and priorities of ENCLOSE Towns was carried-out for identifying the key high-level requirements common to all ENCLOSE sites. These are grouped into the four investigation categories – socio-economic, commercial, operational, technical – related to each site and showing the corresponding relevance: strong interest (★★★★), interest (★★★), moderate interest (★★), as showed in the following Fig. 1.

![Figure 1: ENCLOSE Logistics priorities](image)

The key findings can be outlined as follows:
- Implementing more sustainable city logistics solutions to contribute reducing traffic impacts in the historic centres is the highest priority for ENCLOSE towns. Forerunner towns have already measures in place and consider this as a top goal in their urban mobility policies. Most part of follower towns too report this as the highest priority.
- The goal of providing more sustainable city logistics entails the objective of increasing the liveability of the urban centre, also reported as a main high level need in almost all ENCLOSE sites.
- Increasing the competitiveness of the commerce and retail system and of the connected business services is the highest priority for ENCLOSE towns as regards commercial and business needs.
• Due to their current experiences, the ENCLOSE pilot towns are also very focused on looking for business models enabling a substantial reduction of the operational costs.

• Improve the regulation for accessing to the urban centre is one of the priorities for all ENCLOSE towns due to the direct involvement of the Local Authorities and to the perception that they can act directly (i.e. formulating new rules by-local law), fast (as the normative is under their duties) and receive prompt benefits.

• From the technical point of view the focus is concentrated on several technology options but mainly on the “system” for managing all the operation/logistics cycle. The attention shown by most of the towns for the integration of logistics policies in the overall urban mobility plan mitigates to some extent the possible approach “buy technology and solve the problems”, that is currently a key trend in the transport and mobility context.

Among the main challenges identified, the importance of the interaction between urban logistics measures and urban planning has also clearly emerged from the identified needs of Enclose towns and European best practices surveyed. The relationships that were more frequently identified in ENCLOSE survey concern: the location of Urban Consolidation Centres and their integration within the overall urban (and regional) transport network; the location of other urban logistics infrastructures such a “Proximity Logistics Spaces” (ELP), 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 development plans in the larger context of urban planning development represents a strategic issue for ENCLOSE cities to investigate when considering the design and implementation of a particular sustainable logistics measure.

3. Logistics Measures implemented in the 9 ENCLOSE towns

The exchange of experiences and knowledge sharing activities, carried out in the first 15 project months by the 3 pilot towns towards the follower towns, enabled ENCLOSE cities to define and implement different measures dealing with logistics processes: follower towns implemented “soft” measures, that do not require an high level of investment but can have important positive impacts on city logistics, while pilot towns implemented additional logistics services complementary to the ones that are currently being operated at their sites.

The definition of the measures to be adopted has been carried-out by each town according to the feasibility study as part of the methodology for developing the SULP as indicated in the next sections. A brief idea of the measures implemented in ENCLOSE pilot and follower towns is provided by the following figures.

The Urban Consolidation Center (LuccaPort), developed by the Municipality of Lucca, as top down institutional initiative operated under “conventional scheme” as reported in Fig. 2 below.
The LuccaPort UCC was consolidated for operating not only the conventional last miles services but also other added-value services:

- Third party warehousing with on-demand delivery
- Direct storage from Suppliers
- Park&buy
- Packaging collection (reverse logistics)
- Hotel baggage delivery for tourist bus
- Specific solution for “self supply”
- Special urban quick deliveries
- Out of hours deliveries

These services have been also extended to the Lucca suburban surroundings allowing the UCC “survival” from the costs/benefits point of view.

An idea of the measures developed and/or consolidated in the two other ENCLOSE Pilot towns, Trondheim and ’s-Hertogenbosch is provided in Fig. 3 below.
As regards the ENCLOSE follower towns, different “soft” measures were analyzed, defined and implemented. The term “soft” measures was used in ENCLOSE for indicating measures that do not involve high level of investments but that require a high level of commitment from the Municipality as requested, for example, in the case of the definition of a new regulation for the main aspects of freight distribution in the inner centre as access, time windows and parking lots management among the others.

Fig. 4 and Fig.5 provide the indications of the measures adopted Almada and by Burgos.

Finally the soft measures defined in the other follower towns are illustrated in Figure 6 below.

<table>
<thead>
<tr>
<th>Town</th>
<th>Soft measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alba Iulia</td>
<td>Regulation by time windows, restrictions, penalties, etc.</td>
</tr>
<tr>
<td></td>
<td>Awareness Raising Campaign to shops and transport operators</td>
</tr>
<tr>
<td>Serres</td>
<td>Awareness campaigns to the shops, operators and general users</td>
</tr>
<tr>
<td></td>
<td>Improving the visibility of (un) loading areas.</td>
</tr>
<tr>
<td>Dundee</td>
<td>Increase the enforcement levels on loading bays</td>
</tr>
<tr>
<td></td>
<td>Electric Vehicles as replacements for existing Municipality fleets</td>
</tr>
<tr>
<td>Balchik</td>
<td>Restriction of the van access during the summer season</td>
</tr>
<tr>
<td></td>
<td>Regulation by time window and space</td>
</tr>
</tbody>
</table>

From the feasibility studies carried out by the 9 ENCLOSE towns emerged, once more, that the Local/Regional Authority plays a unique and relevant role in “fixing” the rules of the “games”, acting on:
- **policy and support initiatives** (i.e specific mobility action, quality permits schemes, dedicated infrastructure, cooperation PPP, green vehicles use incentives);
- **measures/regulations** (i.e access restriction rules, enforcement scheme, Access Control System, Specific rules for “green vehicles”);
This means, for the City and Municipality, to have the capability to define the policy and design the solutions integrated with the general mobility policies and shared with the relevant freight distribution process actors (from the citizens and association to the shopkeepers and third part transport operators). In one word, the Municipality should develop its Sustainable Urban Logistics Plan (SULP).

4. The ENCLOSE methodology for SULP development

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 and 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 achieving a complete 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 the environment and of life. It builds on existing planning practices and pays high attention to 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 project and based on the activities implemented at partners site level, 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 perspective; defining the common vision and priority goals of the city, analyzing 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 municipality level.

The following Figure 7 gives an idea of the SULP methodology approach.
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 considering the constraints and the indications of Territorial and Urban Plans, in accordance 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. In the design and planning phase of 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;
- Neighboring Municipalities or other Local Authorities that may be interested in/concerned by the plan;
- Other interested public/private actors.

Based on the above, specific agreements could be made in order to make these discussion forums official at the institutional level. In the discussion phase, Regional Authorities shall support Municipalities in organizing periodic meetings with associations of logistics operators, 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/Organization 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.

Therefore “SULP guidelines” build on 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 (organization and operation dimensions, costs analysis, impacts, responsibilities, regulation framework, etc.).

“SULP guidelines” is now a working document, which is under evaluation for its possible integration in the more general SUMP methodology, paying a special attention to the specific and detailed actions to be developed for successful and efficient city logistics process. Overall, these Guidelines serve as a useful tool to develop an adequate Sustainable Urban Logistics Plan tailored on the specific characteristics of the city.
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 surroundings.

The SULP 11 elements

- Setting the objective and target
- Urban mobility scenario and priorities
- Analyze the logistics context and processes
- Setting requirements and logistics baseline
- Suitable measures and services vs. reqmts
- Design of Identified solutions
- Business Model, actor role and responsibility
- Services/Solutions Assessment and Impacts
- Responsibilities, implementing plan
- Promotion and Communication Plan
- Roadmap to adopt the SULP

This methodology was defined by MemEx - in collaboration with the other ENCLOSE partners and was adopted by the 9 ENCLOSE towns for developing their SULP - along with the basic elements needed to involve the different local actors (including private sector, transport operators, shopkeepers associations, etc.) and to define the more suitable logistics solutions and regulatory framework (including technical and financial requirements, limits and policy issues).

Each one of the 11 methodological elements defined, as indicated in Fig.8, have been described in terms of Rationale, Tasks and timings, Methods providing Boxes with examples coming from the work carried-out on the specific element by a specific ENCLOSE town.

The following table includes the main measures defined in the different SULP developed by each ENCLOSE town.

<table>
<thead>
<tr>
<th>ENCLOSE town</th>
<th>Main SULP measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucca Italy</td>
<td>- Third party freight storage service</td>
</tr>
<tr>
<td></td>
<td>- Logistics services for tourist and hotels</td>
</tr>
<tr>
<td></td>
<td>- Agreement with shop keepers for the UCC as final destination</td>
</tr>
<tr>
<td>s’Hertogenbosch Nederland</td>
<td>- To increase the activities of UCC</td>
</tr>
<tr>
<td></td>
<td>- Garbage collection efficiency</td>
</tr>
<tr>
<td></td>
<td>- Biogas filling stations</td>
</tr>
<tr>
<td>Town</td>
<td>Actions</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Trondheim Posten Norge Norway | - Increase the electric vehicle fleet  
- Biogas and Hydrogen filling stations  
- School and relevant destinations services |
| Alba Iulia Romania | - New Integrated mobility plan  
- Proximity delivery centres  
- Night freight distribution  
- Measures to foster the use of eco-friendly commercial vehicles  
- IT systems for commercial traffic monitoring  
- UCC (long Term) |
| Almada Portugal | - UCC- Last Mile services  
- Pack Station at the Flexibus depot  
- Fish Market van-parking reorganization |
| Balchik Bulgaria | - Normative restriction for commercial vehicles  
- New load/unload parking slots enforcement  
- New parking building near the city center |
| Burgos Spain | - Last mile service  
- Platform B2B for card system management  
- Van-sharing  
- Park&Buy by cargo bike  
- Plaza Espana reorganization  
- UCC (long term) |
| Dundee UK | - ECO-stars environmental fleet  
- Web traffic information for lorry routing  
- Electric vehicles adoption for the Municipality Fleet  
- UCC (medium term) |
| Serres Greece | - Spatial and temporal restrictions within a new city logistics regulation  
- Routes optimization via ICT platform use  
- Web traffic information for lorry routing (medium term)  
- UCC (long term) |

Figure 9: the SULP in the 9 European towns

It is worth noting that the UCC was adopted as a short term action only by the Municipality of Almada. On the contrary, despite being initially oriented towards this solution, all the other ENCLOSE towns after a deep analysis carried-out in view of SULP development decided to consider the UCC as a city logistics option on a long/medium term perspective. This
was one of the key results of SULP methodology, that enabled the Municipalities to duly analyze their specific local needs and priorities and to adopt different soft measures producing high positive impacts on city mobility, with reduced implementation costs.

5. Conclusions and recommendations

Due to the different innovative aspects tackled by the project, the lessons learned can be divided into two main categories. First of all ENCLOSE identified a robust set of needs, requirements and constraints, which are common to Small and Mid-sized European Historic Towns regarding logistics processes in the historic centre, as well as a wide range of effective and successful possible solutions to be adopted for facing city logistics challenges.

ENCLOSE demonstrated the feasibility and assessed the business model of real logistics schemes thanks to the pilot measures implemented in the towns of Trondheim, Lucca and ‘s-Hertogenbosch. Moreover, as regards the SULP approach/methodology, the experience of partners in defining and submitting SULPs to local policymakers allowed them to identify a specific set of recommendations serving as best practices adaptable to the specific situation of other cities facing similar problems (i.e. implementing gradual measures depending on specific needs, strengthening the cooperation among involved actors and create a forum, efficient solutions can be adopted also in low-resources scenario by, i.e., adapting existing technologies, etc.).

Overall, the lessons learned thanks to ENCLOSE deal with environmental, socio-economic and policy aspects but also on cooperation among public and private sectors/actors. Finally the ENCLOSE SULP guidelines is now a working document under the evaluation of the IEE officers for its possible integration in the more general Sustainable Urban Mobility Plan (SUMP) methodology of the specific and detailed actions to be developed for the city logistics process.

These Guidelines provide useful tool to develop an adequate Sustainable Urban Logistics Plan tailored on the specific characteristics and objectives of the city. 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 SUMP, devoted to integrate urban logistics schemes/services/ regulation in the overall mobility strategies and solutions.

Finally, in the following, the simple recommendations that the 9 ENCLOSE towns have taken into account during the development of their SULP and the ENCLOSE project, are summarised:

- SULP implementation can be a gradual process depending on the real needs and objectives of the town;
- SULP can’t require to implement advanced systems or heavy infrastructures or making great investments
- SULP can take advantage on what is already available in terms of depots, operators, technologies, regulations, etc
- SULP shall, first of all, to act on the city regulation, enforcement and incentives for adopting “clean” policy and behavior of transport operator and “shopkeepers”
- SULP should allow to create a forum among the different social/economic actors for cooperating and understanding the potential benefits
- SULP solutions should be harmonized with the upper Local Authority level (shire, region etc.) and with the SUMP at town (or interrelated towns) level

Acknowledgements

We would like to thank the ENCLOSE partners and, in particular, the ENCLOSE towns for the significant work carried-out in the past three years within the IEE ENCLOSE project. Special thanks to the EU for allowing us to find new solutions concerning the mobility governance at level of small and medium size European towns.

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