

WPT2

Innovative Tools to increase acceptability and effectiveness of low-carbon mobility policies for city centers.

Activity A.T2.2

Identification and detailed design of Value-Added services for LEZ

Deliverable D.T.2.2.1	Final
Study on specific supply chains in professional urban freight transport and delivery services	version
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1 Introduction

Circulation of people, goods, information and ideas has always been a fundamental component for the development of human societies. The efficiency of the system for moving people and freight is a key element for the growth and development of the territory. The intensification of globalisation and the demographic growth will determine an increasing demand of transports; it's estimated that in 2050 the global passengers-km will triplicate and the freight traffic will quadruplicate.

The most affected places by such changes will be the urban areas where more and more attraction sites for the life of individuals will be invented. Just consider that today, 54% of the world population lives in urban areas and produces 85% of the whole global GDP and it's foreseen that by 2050 cities will host 66% of the world population. Mobility of people and freights however represents one of the key factors of deterioration of the quality of both environment and life. Nowadays transports are responsible for 25% of CO2 emissions, 1.5 million deaths and 50 million injuries per year and their economic inefficiency costs 1% of each Country's GDP. If we think ahead 35 years from now it's clear that the transport sector can't continue to develop following its actual path.

With a business as usual scenario the dependence on oil of transports will still be a little less than 90% while the energy from renewable sources will be a little bit more than the goal of 10% foreseen for 2020. By 2050 the costs due to congestion will raise by 50%, the gap between central and peripheral regions will deepen and the social costs due to accidents and acoustic pollution will continue to rise. The introduction of new policies, the new technologies for vehicles and traffic management will be key elements for reducing the emissions related to transports.

The competition for sustainable mobility has a new global dimension; therefore, a delay or a lack of ambition in the introduction of new technologies might doom to an irreversible decline the transport industry of the European Union. The transport sector of the EU has to face an increasing competition on the rapidly developing global market of transports.

The SOLEZ project aims at accepting such a challenge and realizing new mobility solutions, sustainable from an environmental, economic and social point of view. This report is aimed at providing a brief introduction about professional freight transport and logistics in urban areas, focusing the analysis on specific supply chains (retail, parcels, Ho.Re.Ca., pharmaceuticals).

Furthermore, this report describes significant good practices for sustainable logistics in urban areas (last-mile logistics), public private partnerships and innovative governance models including push and pull organizational measures (value-added services). The report finally provides a specific analysis of the baseline scenario in Turin in last-mile logistics, reflecting the low-carbon mobility planning and regulatory framework at urban at FUA level towards more sustainable freight transport and logistics.



2 Professional urban freight transport and delivery services

Freight transport logistics consist of the whole of organisational, management and strategic activities which rule the flow of raw materials in a company and the related information flow from their origins at the suppliers' premises to the delivery of the final products to clients and after-sales services.

Freight transport might be performed in different ways, the main ones being: road transport, railway transport, maritime transport and air transport. The issue is regulated by the State with the Law 298/1974; such law differentiates freight transport between "proprietary freight transport" (Art. 31) and "freight transport for hire or reward" (Art. 40). The proprietary freight transport is the transport performed with own vehicles where it doesn't represent an economically predominant activity and the freights belong to the same persons. The freight transport for hire or reward is an entrepreneurial activity providing a transport service in exchange of a precise compensation.

The mechanisms generating the demand of freight transport are consistently more complex and articulated of those generating the demand of people transport. As in the case of freight there's not only one decider (the person who wants to travel), but a complex and articulated whole of deciders responsible for the activities of supply, production, storage, transport, distribution and marketing of the products. Such displacements exploit, on the other hand, different transport services with specific features and that can be classified depending on the involved deciders:

- producers of goods and services who decide how much to produce, how to produce, where and the selling price;
- operators of the **urban supply chain** who provide logistic services (scheduling, management and stocking, planning of the distribution network) between different parts of the territory and that may be classified in the following way: retailers, wholesalers, haulers and carriers, providing basically services of collection, transport and delivery;
- retailers who are interested in low stocking costs and in frequent and punctual deliveries;
- final consumers who are interested in low cost products and in the urban environment.

In urban areas there is also a generalised desire to tackle in the best way possible the discipline of freight distribution, with basically the goal of realising a net benefit for operators, users, consumers and for the community as a whole. Therefore, a useful classification of the transport service may be realised taking into account the type of utilised vehicle:

- i) by dimensions (small, medium, heavy);



- ii) by fuelling (diesel, gasoline, methane, electric, hybrid).

As a matter of fact, for example, the exploitation of small low impact vehicles, more suitable for the transports within urban areas, might, on one hand, increase the costs for the operators because of the higher number of displacements needed, but on the other hand reduce pollutants' emissions.

2.1 Freight transport demand in urban environment and distribution channels

Urban freight transport, in general, might be differentiated in transport related to the supply of productive activities and transport related to the distribution of final products. The configuration of the demand of transport in urban environment is determined by the level and the spatial distribution of the activities on the territory and by the characteristics of the offer of transport.

Transport problems do not end at city limits. Check carefully whether the problems you are going to address may involve the territory of neighbouring municipalities (FUAs). If that is the case, check with the main municipality about the information and engagement policy regarding its neighbours.

As far as it concerns freight transport and delivery services, simplifying, the demand of transport may be considered as made of two different types of displacements:

- displacements of final users (citizens, city users) for buying goods and services;
- displacements of the operators for supplying the economic activities and their reverse logistics for displacing packaging, returned goods and other reusable or not reusable waste.

These two components are strictly related since they are part of the same system.

Logistics is the art and science of managing and controlling the flow of goods, energy, information and other resources from the source of production to the marketplace. The convergence of economic, political and technological forces in the mid-1990s dramatically increased the importance of logistics. The delivery of goods overtook production as the most critical factor in business success.

The responsibility of logistics grew from simply getting a product out the door to the science of controlling the optimal flow of goods, energy, and information through the purchasing, planning and transportation management. In this respect, **last-mile logistics** involves items being delivered from a depot or hub a short distance to their final destination. Some larger delivery companies make the distinction between last miles (up to 10 miles/km from the depot) and last metres - the actual delivery from the van in high density areas within e.g. 1 mile. First mile logistics is the natural progression from last mile logistics in terms of collecting items from customers who need to send items nationally or internationally.



Public and private sector should work together in order to determine the success of last-mile logistics initiatives in European urban areas. Policy makers should try to create good working relationships with companies involved in freight transport and logistics working in their areas, through the creation of joint public and private sector working groups, platforms and networks. All stakeholders have to be included representatives of small and big transport operators, shopkeepers' associations, retailers, city residents, city interest groups. The process has to be coordinated by local authorities.

a) Demand per channel of distribution

Most of the displacements of the transport and logistic operators in urban areas are attributable to the supplying of commercial activities.

The domain of retail commerce is quite a composite universe, that includes very different activities in terms of dimensions, productive and distributive processes and specialisation. It actually includes the operators of the organised large-scale distribution and the multi-brand chain stores, big brands and the "traditional" retailers who run small or medium multi-brand stores. The different channels of commercial distribution are differentiated also by the modalities of physical distribution of the goods from the producers to the selling points and by the involved operators.

A first type of distribution channel is the **direct** one, from the factory or the storage of the supplier or the manufacturer or its logistic operator to the retailer, eventually by means of a sales representative or an attempted sale operator. This is typical for perishable products destined to small retailers. Another form of direct channel is the one that exploits the centralisation of flows of a distribution centre. This channel is the one used by organised large-scale distribution and franchising.

Another type of distribution channel is the **indirect** one. In this case there can be the intermediation of a wholesaler between producers and retailers, as in the commerce of clothes or pharmaceuticals, or in the case of a wholesale centre (market or cash and carry), often with self-supply as in the case of fruits and vegetables. As an alternative, the intermediation might be performed by a specialised operator, such as in the cases of newspapers and tobaccos.

A direct channel is also used while directly selling to the final user and the recipient might be the consumer's residence or a pick-up point. The selling might occur by mail or via internet.

b) Demand per type of recipient

A further classification of freight flows depend on the type of recipient, whether intermediate or final. Among the intermediate recipient there are the commerce operator which can be further distinguished according to their impact on the territory: proximity, neighbourhood market, district or large area or peripheral extra-urban commercial centre.

In general those are independent multi-brand that get supplies directly form producers or wholesalers. Big brands rule the distribution by managing a certain number of selling



points and, in addition, franchising stores. The organised large-scale distribution instead manages its commercial activities by retail selling food products or large-scale consumption non food products in large selling points. Its selling points are characterised by a unique brand and the supply and commercial policies and logistic activities are managed centrally, in order to control the entire flow of the commercialised products. Among the intermediate attractors there are also the public exercises and the so called Ho.Re.Ca (Hotel, Restaurant and Catering).

The final consumers (citizens, city users, service and tertiary activities) are considered final attractors.

c) Demand per type of goods

Examining, in the end, the characteristics of the goods, it is noted the need to analyse the demand of goods in urban areas according to the physical and economical characteristics of the goods themselves in terms of weight-volume and weight-value ratio, seasonality, perishability (for example, fresh, dried, frozen and deep frozen food or beverages), danger, life cycle and unit value.

Urban areas are of course for their nature more affected by distribution flows whether destined to final users (residents) or intermediate (selling network). The goods that go to the final consumer might follow different paths, the most traditional ones being the distribution centres and the wholesalers. Downstream of these there are the selling activities divided into

organised large-scale distribution and small distribution.

In the last few years the handling of goods went through some remarkable evolutions in the modes of distribution with the affirmation of the *Just in Time (JIT)* market concept and the diffusion of e-commerce. Just in time is an industrial philosophy that inverted the “old method” of producing final products for storage waiting to be sold (so called push logic) by switching to a pull logic according to which it’s necessary to produce only what’s already sold or that is foreseen to be sold shortly.

E-commerce is the whole set of transactions for the commercialisation of goods and services between producers (offer) and consumers (demand), made via internet. The consequence of these two professional distribution models is the intensification of displacements for the delivery of the goods to distribution centres or final users.

E-commerce is growing at a doubledigit rate in almost every country in Europe which entails a tremendous increase in city deliveries. While this is seen as a major contributor to traffic, emissions and congestion, there is still an opportunity to achieve a transformation to a more efficient delivery capability decoupled from environmental and mobility nuisances. In parallel, new technologies such as modularisation of transport units, autonomous delivery vehicles and drones are presented as potential technologies to be implemented in the near future. Impact of these solutions and the way these systems could transform city dynamics need to be further explored and understood. According to



the investigation performed during the last three years with International Couriers, in the framework of the European project NOVELOG - *New Cooperative Business Models and Guidance for Sustainable City Logistics*, the overall daily trips have increased by 30% because of e-commerce.

The service of delivery *JIT* is not exclusive of express couriers, but also involves structured or non structured enterprises on account of third parties, whereas the first ones represent the value-added high end of such market. If, until a few years ago, the two segments of the good delivery market (**traditional transport and urgent packages delivery**) were clearly distinct in terms of characteristics and prices, today they got closer instead. The reason is that the basic productive technology, the cost structure and the prices of inputs (e.g. vehicles, fuel, labour cost, drivers, etc.) are pretty much the same. Therefore, the only difference consists in the offer by express couriers of value-added supplementary services such as the tracking & tracing or scheduled deliveries, accepted by the client at a slightly higher price than the standard one of traditional logistics.

2.2 Stakeholders of urban freight transport and delivery services

Urban freight transport and delivery services are characterized by the presence of many stakeholders. The main reason for this is that it takes place in the city and neighbouring - the central location where flows and activities intersect. Private stakeholders are very important in the decisional and implementation process of urban logistics measures and it became clear that public-private partnerships are crucial to develop efficient and low carbon last mile mobility solutions.

Urban freight transport and delivery services involve many different stakeholders, both those within the urban area that are not directly involved in the freight transport movements (city authorities, residents, tourists/visitors) and the actors in the supply chain. The latter can be categorised according to the demand for goods (receivers), the supply of goods (shippers or producers) and finally the transport of goods (transport operators). The interaction between these stakeholders increases the complexity of the search for solutions to achieve sustainable urban distribution.

The role of the private sector consists in the private initiatives, that can be in cooperation amongst agents and can be part of an urban freight transport policy, particularly when public measures are taken to support this. Among private players and representatives are, primarily, the individual businesses and companies. Logistics service providers ensure the distribution process and the delivery of the product to the consumer. Their main role is distribution, warehousing and other supporting activities. Usually logistics service providers, due to the fact of being private entities, do not consider themselves as key players whose strategies, behaviour and actions are key issues to whether or not solutions proposed by the city will be successful and beneficial to the city and to themselves as commercial operators. Usually they tend to complain on the regulations implemented by cities even if these regulations focus on the congestion relief. This is because operators mainly experience problems at an operational level and do not typically consider the wider scope of the problems and proposed solutions. The private actors' main interest is to find



those aspects which help to improve their own businesses, or which can endanger their profitability lines. This includes a strong preference for short and mid-term solutions. On all else they usually will soon lose interest.

The private actors work in a competitive environment. They are generally willing to cooperate on common issues - but usually they will never accept cooperation with a competitor on a core issue. Even if such cooperation appears unavoidably reasonable to them, they may nevertheless prefer if each works separately with the same neutral institution. Furthermore, a number of professional logistics operators may run facilities for cross-docking, etc., in a city and/or suburban areas.

Regulating activities should also be a task for the local authorities. Public local administrations usually regulate essential areas of urban freight transport, mainly those referred with access restrictions (tonnage and size). By regulating implemented measures as access restrictions, optimization of routes, innovative financing models, etc., one can identify and differentiate strategic plans/issues.

Urban supply chain stakeholders, who are responsible for sending, carrying and receiving goods are distinguished as follows:

- 1) Shippers
- 2) Carriers
- 3) End-receivers
- 4) Local authorities

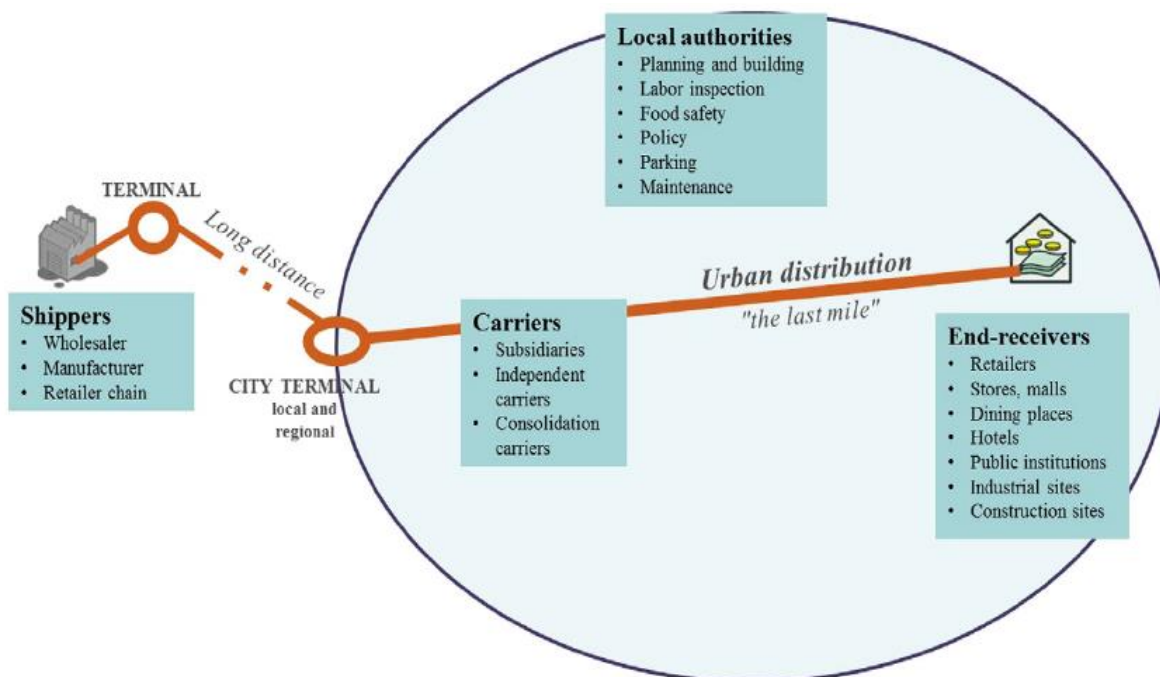


Figure 1: Urban supply chain stakeholders



1) Shippers - manufacturers, wholesalers, retailers, etc.

Shippers send goods to other companies or persons and are often not located in the city; as a result they usually do not feel responsible for urban freight transport issues. They tend to maximise their levels of service in terms of costs and reliability of transport. In many cases the shipper is the stakeholder responsible for hiring a carrier.

2) Transport operators - freight carriers, couriers, etc.

Transport operators usually aim at minimising their costs by maximising the efficiency of their pick-up and delivery tours, and they are expected to provide a high level of service at low cost. There is a trade-off between a high level of service and the efficiency of freight vehicles loads. Transport operators are the stakeholders carrying out urban freight transport, but in many cases they are restricted by boundaries set by others (e.g. opening hours of stores or designated time windows to make the deliveries). Transport operators are active in a geographically larger area than the city.

3) End-receivers - shopkeepers, offices, construction sites, residents, etc.

Receivers are located in the urban areas and are mostly the endpoint of the logistics chain. Receivers are often not responsible for urban freight transport since shipments are organised and paid for by the shipper (so for the receiver the transport price is included within the price of the ordered goods).

In many cases receivers do not realize that they can and do influence urban freight transport by, for example, setting time windows. However, as the receiver is often the only supply chain actor located in the city, they can better identify with local issues than transport operators and shippers who are usually active across a larger geographical area.

4) Local Authorities

The role of Local Authorities in terms of freight transport and delivery governance is essential for facilitating a freight movement that should be fluent, effective and environmentally, economically and socially friendly. Local Authorities have several ways to influence urban freight transport and delivery services: setting regulatory and policy framework conditions, getting involved as a player themselves, etc.. By involving relevant stakeholders local administrations can identify problems perceived by those relating to freight delivery in city, identify measures to resolve such problems and identify good practice measures and principles to promote economic, efficient and efficient delivery of goods.

Local Authorities are in charge of set-up and implement the following common interventions:

- regulative measures in terms of incentives (e.g. extension of time slots to access urban area, incentives for the adoption of ICT systems, incentives to purchase



freight vehicles with low environmental impact, incentives for converting traditional freight vehicles to natural gas and/or LPG fuelled vehicles, etc.);

- regulative measures in terms of restriction in accessing the city for vehicles used for purposes of delivery and collection of goods (e.g. restrictions on the time slots to access the city center, limiting times to load/unload, limiting access to some types of freight vehicles identified on the basis of the relative emission factors and/or weight, creation or extension of pedestrian areas and/or LTZs, access permissions, etc.);
- pricing measures (e.g. payment to access a specific urban area, payment to transit on a specific road corridor, charging for parking, etc.);
- organizational measures designed to create alternative distribution and eco-friendly systems to ensure continuity of good delivery and collection supply within the areas of restriction.

2.3 Impacts of freight transport and delivery services in urban context

Transport contributes significantly to economic growth and enables a global market. Transport activities give rise to environmental impacts, accidents, congestion, and infrastructure wear and tear.

In contrast to the benefits, the costs of these effects of transport are not fully borne by transport users. Without policy intervention, the so-called **external costs** are not taken into account by transport users when they make travel decisions. The internalisation of external costs means making such effects part of the decision making process of transport users. Internalising the external costs of transport has been an important issue for transport research and policy development for many years in Europe and worldwide. The internalisation of these costs means making such effects part of the decision making process of transport users. This can be done directly through regulation, such as command and control measures or indirectly through providing the right incentives to transport users, namely with market-based instruments (e.g. taxes, charges, emission trading, etc.).

External costs refer to the difference between social costs and private costs. Social costs reflecting all costs occurring due to the provision and use of transport infrastructure, such as wear and tear costs of infrastructure, capital costs, congestion costs, accident costs, environmental costs. On the other hand, private (or internal costs), directly borne by the transport user, such as wear and tear and energy cost of vehicle use, own time costs, transport fares and transport taxes and charges.

The available literature suggests that road transport's share of the economic cost of premature deaths - when properly calculated - is likely to be about 50% across the EU, albeit not in each Member State (OECD, 2014). As far as their contribution to air pollution is concerned, diesel vehicles are more harmful than petrol vehicles. In contrast to petrol vehicles, diesel vehicles have not shown significant reduction in Nox emissions since the 1990s. Exhaust emissions from such vehicles are lower for carbon monoxide, non-methane



volatile organic compounds and PM, but may be substantially higher for NO_x. The fraction of NO_x emitted as NO₂ by diesel vehicles is high - at around 25-30%, as opposed to a few percent for petrol vehicles - and has shown a variable rather than downward trend over the years (Carslaw & Rhys-Tyler, 2013; Carslaw et al., 2011).

The most recent studies that offer estimates broken down by sector support an estimate of about 50% responsibility (directly or indirectly) for the damage inflicted by the road transport sector in EU countries. These indicate that in the WHO European Region road transport and household fuel combustion combined account for the majority of the impacts. No other single source, such as industry, power generation, agriculture, transport (other than motorized road transport) contributes as much. Existing studies on external costs have mainly concerned road transport. The evidence shows that road transport has by far the largest share in total external costs of transport.

Urban freight transport plays an important role in the development of cities representing an element of great importance for the economic system, mainly distributing goods to retail, commercial establishments, offices, as well as homes. Nevertheless, urban freight transport can have relevant negative impacts on the environment, the economy and the society in general.

Common negative externalities are air and noise pollution, and the consumption of non-renewable energy sources, mainly fuel. High levels of pollutant emissions have negative effects on public health.

Urban freight transport and delivery services cannot be seen separately from other parts of the transportation chain, particularly when focusing on environmental aspects. Freight transport in European cities has increased rapidly in the past decades, and hence freight transport vehicles increasingly demand space for delivery and parking in the cities, compete with other public and private mobility groups, cause congestion, make distribution of goods and services less efficient, and ultimately threaten the quality of a sustainable urban environment. Congestion can be considered as one of the main negative externalities, causing delays in the delivering of goods, higher costs of logistic operators, decreased hours of productive service, increased emissions, more accidents, etc.

Freight transport and delivery services in urban context is associated to the following key problems:

- delivery vehicles circulating throughout the city centre aggravating congestion,
- pedestrian zones full of large, noisy delivery vehicles during working hours,
- double parking during loading and unloading due to the illegal occupancy of reserved delivery bays,
- delivery vehicles entering the city's pedestrian zones,



- emissions of noise and air pollution,
- deterioration of the urban environment.

Even if freight transport logistics in urban areas represents only 10% of private traffic, when it comes to the average of daily km (even 7 times more than a private vehicle for the transport of people) and to the type of vehicles (powerful diesel engines), their impact on the quality of air is considerable.

A synthesis of the negative impacts generated by freight transport in urban areas is provided.

ECONOMIC IMPACTS	ENVIRONMENTAL IMPACTS	SOCIAL IMPACTS	IMPACTS OF SCALE
road congestion	pollutant emissions	physical consequences of pollutant emissions on public health	few resources
inefficiency	use of non-renewable fossil-fuel	traffic accidents	lack of co-operations
waste of resources	land and aggregates	noise	less policy considerations
	waste production	visual intrusion	few logistics providers based in cities
		other quality of life issues	little infrastructure

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Figure 2: Impacts of urban freight logistics (Source: CIVITAS Policy Note, Making urban freight logistics more sustainable)

2.4 Good practices for sustainable last-mile logistics

One of the main goals of the European Union is to achieve in its main cities a zero emissions urban logistics model by 2030. The European Commission has set the ambitious goal of CO2-free city logistics by 2030. This does not only call for public policy actions, but for a shift in the paradigm of policies. From a detailed analysis of the “good practices” already developed in the framework of the Innovation and Research financed by the European Commission a set of effective and impact-oriented low-carbon solutions to make more sustainable last mile logistics are as follows:

- Stakeholders’ engagement
- Regulatory measures



- Market-based measures
- Land use planning and infrastructure
- New technologies
- Eco-logistics awareness raising

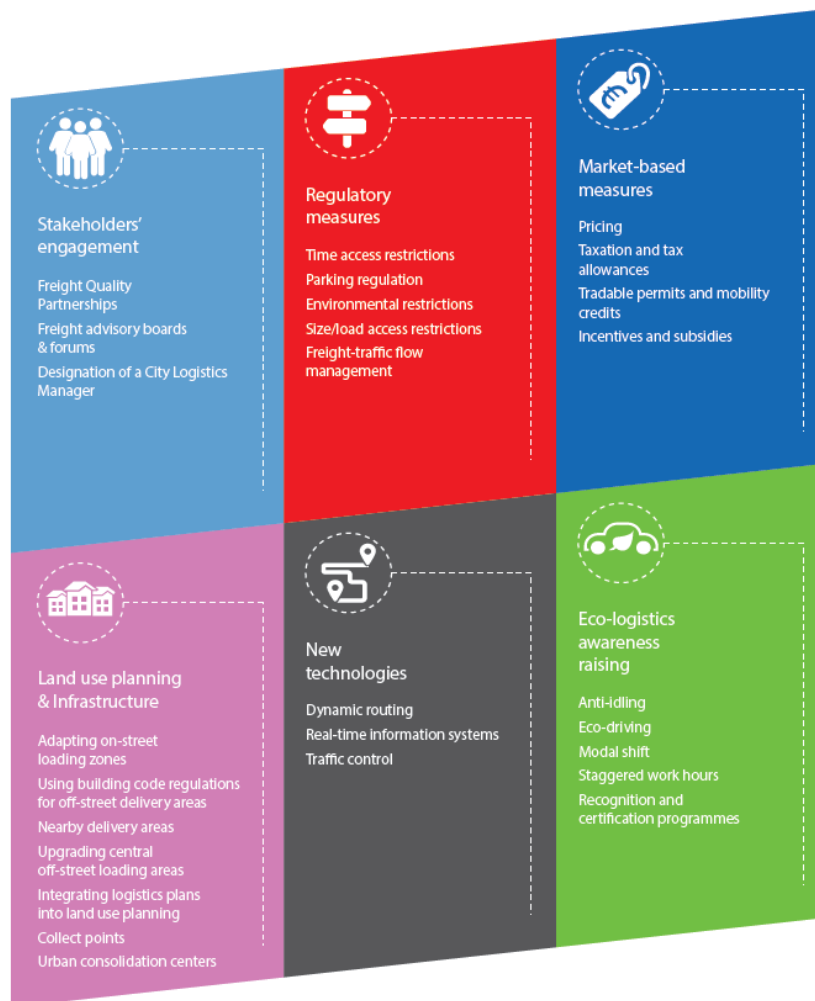


Figure 3: Sustainable last-mile logistics measures (Source: CIVITAS Policy Note, Making urban freight logistics more sustainable)

According with the overall approach of the SOLEZ project, the focus is all about **short-medium (2-5 years) measures** covering “quick wins” actions and policy measures to be planned and implemented in reasonable timelines enabling to achieve tangible results. This represents specifically the target timeframe of SOLEZ low-carbon mobility Action Plans for FUAs that should include push and pull actions to be delivered by involved municipalities of FUA within the project timeframe and beyond.

i) **Access restriction**



Access restrictions for urban freight transport is one of the key soft countermeasures with regard to traffic optimisation, considered as the dominant instrument for authorities to influence urban goods transport in city centres in particular. Access restrictions are widespread in Europe and there are several projects addressing this measure, as per the state of the art review carried out. Due to the diversity in terms of layout and access parameters creating the basis for each individual city access scheme, these are usually based on an analysis of goods deliveries in the city centre that ultimately determine time, type, tonnage and other relevant restriction parameters, the spatial extension of the restricted access area, and the most suitable intelligent control mechanisms.

Currently applied restrictions are of the following types: (a) regulations related to the type of transport means, and most commonly to vehicle emissions, weights and sizes; (b) regulations related to the access time to specified areas; (c) regulations related to preferred truck routes and designated lanes; (d) regulations related to loading and unloading zones; (e) regulations based on licences.

The project START in Bristol sought to prioritize freight vehicle movements and introduce access control measures including the implementation of 3 km priority lane, resulting in a 78% reduction of vehicle movements among the participating companies. Delivery time window restrictions are also popular measures for reducing congestion caused by urban freight vehicles.

There may be a number of consequences for freight transport companies not allowing activities during specified time windows:

- more vehicles may be required to make deliveries in a shorter delivery window
- deliveries may have to be made in periods of greater congestion (reducing vehicle & driver productivity and increasing fuel consumption)
- journey times may be slower and less reliable
- supply chain may be less efficient
- total supply chain costs may be increased

For the main pedestrian area of Broadmead, in Bristol (START), a delivery window has been put in place, notably between 5:00 - 8:00 am. For the new Quakers Friars Pedestrian area in the city the window was 5:00 - 10:00am. This has raised a number of issues between retailers and their suppliers with the beneficiary being the Bristol consolidation scheme as they are able to offer an improved delivery option to retailers, particularly in the Quakers Friars area. The measure has resulted in 8 new retailers joining the scheme, while the city council reached the objective related to reducing the pollution and a creating new pedestrian area that improves the quality of life.

START in Ravenna regulated the access to the city centre through the implementation of the access monitoring system (SIRIO) with 5 detecting points with automatic number plate recognition (ANPR) system, for the enforcement of the new traffic regulations. START in Riga implemented a historical centre access restriction scheme, with regulations governing



access depending on the environmental quality of vehicles. With the aim to reduce congestion and pollution in the Old Riga city centre in Latvia, (START) the Municipality had implemented traffic restrictions addressed to vehicles with a total weight exceeding 5 tons. These were restricted on several bridges and access roads of the city on the peak hours (4 pm to 7 pm) during weekdays. SMILE (Norwich) proposed measures to allow goods vehicles, which met pre-determined clean vehicle standards, to use transport priority lanes.

The Sustainable Freight Distribution in a Historic Urban Centre (Pilot Transport Research Programme) City Centre Access Control project also introduced access control measures in the city of Dublin, Ireland. Brescia in Italy (CIVITAS: MODERN) is introducing access restriction measures for more efficient freight distribution that will decrease delivery times, energy use and pollution, as well as significantly reduce the amount of freight traffic in the city. In addition, CIVITAS MODERN for Vitoria - Gasteiz, Spain proposes a new urban freight strategy that will be an integral part of the city's new mobility concept of so-called superblocks that largely limit traffic to certain main roads and prioritise walking and cycling. The distribution from these centres can be realised during times of low traffic density during the day or at night with energy-efficient vehicles. The advantages associated with access restriction measures are several, the most important being that they reduce congestion and pollutant emissions from urban freight traffic vehicles into the city centre, they reduce conflicts between delivery vehicles and other road users, thus improving the situation for pedestrians and cyclists in the city centre, while freeing up public space for local social activities. In addition, can shorten journey times and improve journey time reliability making the scheme more attractive to both stakeholders and retailers together with changing the attitudes of delivery companies and increasing public awareness about the benefits of a sustainable urban freight transportation system.

As a result of continuing increases in urban traffic in Prague, an extension of the existing environmental zone was implemented (CIVITAS: TRENDSETTER) in order to limit access by heavy goods vehicles to other densely populated neighbourhoods, adjacent to the existing zone.

The areas selected were those where the road network and conditions made implementation feasible, and where limiting heavy goods vehicles could be expected to have a significant impact. Information leaflets were printed and the articles were published in the local newspaper to raise awareness of the extension to the environmental zone. The extension of the environmental zone also put pressure on haulage companies to gradually renew their fleets with modern, light and medium-weight goods vehicles that run on cleaner fuels, create less noise and are less disruptive to other urban traffic. The measure achieved a reduction in emissions of carbon dioxide, nitrogen oxides and particulates, a reduction in energy consumption and a change in the fleet towards cleaner vehicles.



ii) Optimization of freight transport and delivery routes

Optimisation of freight transport and delivery routes is also a common practice with regard to freight transport optimisation. This measure refers to channelling trucks that drive into cities of the urban agglomeration through designated truck routes. Advisory or statutory truck routes can be used by the urban authorities to prevent goods vehicle drivers using unsuitable or sensitive routes.

Methods include the provision of maps and the use of real-time information. Maps can be produced in paper and electronic form. These can be distributed by local trading companies, freight transport companies, freight trade associations, motoring associations and urban authorities.

Tallinn (CIVITAS: MIMOSA) defined freight traffic corridors in the city centre, marked them and installed traffic signs to guide freight vehicles. To this end, signs and devices were installed at 43 critical points along the defined corridor. The city also planned to develop a GPS navigation system to mark routes and guide freight traffic according to truck drivers' needs. This GPS system would be distributed to logistics firms and truck drivers together with general information about the new traffic corridor. The Urban Truck Navigation project was based on two municipalities in the Ruhr District, Germany, which developed 'truck routing plans' for their jurisdiction. These plans identified streets that were particularly suitable, and from an overall city perspective, the 'ideal' routes for freight traffic going into or through the city. However, even though the plans were published on the internet and disseminated to freight companies and lorry drivers, these were not adopted by companies and drivers. It should be noted that whilst advisory truck routes require little or no enforcement, statutory routes (which prohibit lorries from using non-designated routes) require enforcement, and are therefore more complex and expensive to implement and manage.

In addition, Urban Truck Navigation study showed that lorry drivers nowadays rely mostly on onboard navigation devices and not on fold-out maps. However, to implement the project each municipality has to update street information relevant for trucks and designate truck routes, which is a time-consuming and potentially controversial political task.

iii) Low-carbon freight delivery systems: Collection points, Urban Distribution Centres

To reduce the impact of deliveries on both traffic congestion and local air quality in the historic centre of Winchester city, CIVITAS, MIRACLE examined the feasibility of an alternative delivery system. The company Collectpoint plc, offered an alternative to home delivery, primarily to Internet shoppers. Collectpoints were located in convenience stores, the main benefit of the service being the reduction in failed deliveries and the subsequent return of goods by couriers and postal services. With the support of MIRACLES, Collectpoint plc expanded their services within the city to a total of five locations. In addition to the Collectpoint service, a Winchester freight map was produced for road freight operators and



drivers of commercial vehicles, showing appropriate routes, the main delivery destinations, and vehicular restrictions. The benefits of this particular good practice were, however, difficult to evaluate due to lack of public response in the trial, since from the 56 people registered in the collect point exercise, only 8 used the service. Part of the measures of creating an alternative concept for goods distribution with a smaller environmental impact in the city of Genoa (CIVITAS, CARAVEL), was the rationalisation of vehicle use by traders through the introduction of a van-sharing service. The van-sharing service proved successful, with fewer commercial vehicles entering the target area and less road congestion. Main results indicated an increase of 19% in the number of trips using the van-sharing service, 46% in kilometres covered and 69% in hours.

City of Parma in Italy, for example, activated the last mile service (ECOCITY) that uses low environment impact vehicles for urban goods deliveries. The methane and electric vehicles carry full loads to reduce empty traffic and environmental impact. This new urban freight transport service involves every key role of the urban distributive process of the goods in the chosen areas (areas with traffic limitations, environmental pedestrian and cycling areas or areas with urban importance): economic activities operators (e.g. forwarding agents, couriers), logistic platforms and/or intermodal centers, local administrations (e.g. Municipality, Province, Region), trade associations (e.g. transport associations, commercial associations, craftsman associations, industrial associations) and citizens.

CIVITAS SMILE set up a freight consolidation centre on the edge of the urban core of the city of Norwich, UK. In conjunction with other measures, such as engine standards restrictions, a reduction of goods vehicles within the urban core was achieved, while those therein produced lower emissions. Utrecht in the Netherlands has four City Distribution Centres (CDC) that are run by well-known logistics companies (TURBLOG). Carriers and suppliers unload their cargo for the city at a CDC, situated at the edge of the city. As soon as goods are received at the CDC, they are coded in the logistics system and are loaded into buses or small lorries with the right sizes and requirements to enter the inner city of Utrecht. Therefore, these are confronted by fewer restrictions and can easily deliver the goods to the right places. The consolidation of deliveries in urban freight hubs and consolidation/distribution centres at the edge of a city is one of the most successful measures employed to achieve energy efficient urban freight transport, since, as demonstrated by the above projects, it results in significant reduction of trips within the city, and, consequently reduction of congestion and emissions. Nevertheless, such measures are associated with high investment costs, land area requirements, as well as strong cooperation from the private sector.

iv) Zero emissions freight delivery systems: last-mile delivery services by cargo bikes

In the main European cities the delivery by cargo bike is increasingly widespread. Such tendency is strongly expanding especially thanks to the increasing volumes delivered through the channels of e-commerce. The advantages in delivering using bikes instead of freight transport vans are:



- lower costs: lower purchasing costs, lower management costs (taxes, insurances, storage) and no parking costs;
- in central areas bikes are lesser affected than van by the traffic conditions;
- lower environmental impact: CO2 emissions reduction;
- social inclusion: a driving licence is not requested to ride a bike and disadvantaged people may be employed as a first step in their inclusion in the labour market;
- better quality of life: no noise pollution, more space for people.

Many opportunities for using bikes for freight are emerging, in particular in busy, congested urban centres where parking is expensive and journey times by motorised transport are slow. Pollution levels are also becoming more of a concern as air quality controls tighten up. The most powerful argument for using bicycles for goods delivery for the majority of businesses is the lower cost compared with motorised transport. The legal frame conditions surrounding cargo cycle use vary across Europe. Current EU Law says that a vehicle which has pedals, and a motor with less than 250 watts of power which is progressively reduced as speed approaches 25 kph, and cut out at 25 kph is not a motor vehicle. If the motor exceeds 250 watts, or does not reduce & cut out at 25kph, or has no pedals, then it is a motor vehicle and not a bike. The vehicle must also weight no more than 40kg, or 60kg if it is a tandem. Working within these outlined constraints means that cargo cycles may become an economically attractive solution to some organisations providing added-value services.

Several studies proved that the cargo bike model could handle 25% of the delivery of goods in urban areas. The good practices are nowadays widely spread in all the countries of the European Union.

In Germany, in the framework of the Climate Initiative, bike and car couriers are testing the potential of electric cargo bike for urban commercial transport in seven different cities (Ich ersetze ein Auto).

In Romania, the first bike courier service in Bucarest started in April 2012. Tribul (the tribe) delivers packages door-to-door through the whole city. In May 2012, the city of Ghent (Belgium) installed the first cargobike-sharing public service in Europe. \$ cargo bikes are part of the car-sharing service Cambio available in the city. The Flemish government has also started to actively promote bike courier services in the Flanders, after a study of the University of Antwerp (in Dutch) that analysed the potential of involving bike couriers in the logistics of Flanders. Furthermore, in Switzerland since 1997 already, a door-to-door bike delivery service delivers home the products bought at the supermarket. Given its success (21% of the clients changed its shopping habits abandoning the car for the bike or a walk instead), 12 new services have been realised in the whole Switzerland.

The French company La Petite Reine delivers 1 million of packages yearly with electric tricycles (Cargocycles, FR) in four large French cities, including Paris. In the United



Kingdom cargo bikes are used for the transport of several types of goods: digital projectors, office furniture, postal packages (like Yellow Jersey Delivery in Coventry). In Hungary the courier company Hajtás Pajtás freed Budapest from 100 vehicles, with estimated savings in CO2 yearly emissions of around 150 tons.

Using cycles for the ‘last mile’ deliveries is particularly attractive as they offer much greater efficiency and flexibility than motorised transport, saving time and money. Other points in favour of using cycles are the contribution they make to reducing CO2 and pollution which helps to create more ‘liveable cities’. At present, in many cities, deliveries are done in small vans and some of these deliveries could potentially be transferred to cycles. The Transport for London (TfL) scoping study found that where this had been tried by larger companies, there were successes in some European countries with high proportions of cycling, but a pilot in London by a large logistics company had not been successful. It was felt that some changes could prevent the difficulties that company experienced, including improved payload capacity and route planning, both of which have come about in the years since the study was written. Currently, international freight companies - TNT, FedEx and DHL - are experimenting with freight cycles for delivery, especially in cities.

Even within the SOLEZ project there are already success initiatives in this field such as Graz that granted up to 1.000 euro to the companies and institutions like schools, associations, etc. willing to buy cargo bikes and introduced cargo bike in its rent-a-bike services. Vicenza has now a ten years experience in delivering goods within the LTZ with the “VELOCE LOGISTICS” service and, finally, in Torino a start up of the Politecnico di Torino “PONIZERO” is active since 2015 and after years only has already 50 cargo bikes running on behalf of the main express couriers such as TNT, UPS and GLS.

3 Urban freight transport and supply chains

A simple definition of freight transport in cities is as follows: all movements of goods in to, out from, through or within the urban area made by light or heavy vehicles, including service transport and demolition traffic as well as waste and reverse logistics. Household purchasing trips are not considered to be part of urban freight transport as these are considered to be passenger transport trips. Urban freight affects in a relevant way the quality of people’s life, since it is an important traffic component in cities and it is responsible for 25% of urban transport related CO2 emissions and 30 to 50% of other transport related pollutants (particulate matter, Nitrogen Oxide). In this context, it is fundamental to understand the potential for stakeholders’ cooperation, including the need of new business models, in order to improve city logistics efficiency and sustainability. The different interests of actors involved in urban logistics (local authorities, shippers, retailers and logistics service providers and consumers) need to be addressed to find solutions satisfying all of them.

Synergies and collaboration in the supply chain can produce significant gains in terms of efficiency and sustainability; they represent a big step towards the transition from



individually managed supply chains to open supply networks that are expected to provide better asset, vehicles and infrastructure utilization (e.g. load factors, etc.). This is possible through the creation of connected neutral data sharing platforms between shippers, intermodal terminals operators, logistic service providers and added-value service providers to connect freight transport offer and logistics demand. The challenge in this area is to build appropriate business models enabling extensive scale-up of current isolated examples. Building trust among operators and in technology is a key aspect to be addressed.

On the other hand, gains on the freight vehicle side are expected to come from the increased efficiency of vehicles but also from the progressive deployment of alternative fuels and vehicles more adapted to freight transport operations in cities. The aim should be providing commercial vehicles able to fulfil the needs of an integrated logistic system. Achieve a zero or neutral freight logistic emissions by 2050 is a sound objective. Considering the forecasted growth of freight transport and logistics for 2030 and 2050, current emissions and the international agreement to keep average global temperature «well below» 2 °C above preindustrial times, a reduction of about 80-85% of emissions per shipment is needed. The target of a free (neutral) Carbon Footprint City Logistics in 2030 set by the White Paper is as challenging as important. Ambitious targets need to be set for 2050. European Commission and ALICE (*Alliance for Logistics Innovation through Collaboration in Europe*) may embrace these targets in a clearer way within their strategy.

The full integration of urban freight in the city depends on the evolution of people lifestyle. Different models of urban development and regional land uses together with demographic trends and the new behavioural patterns such as teleworking or e-commerce impact the organisation of last-mile delivery. Available technologies allow door-to-door delivery at any time, thus generating many trips that impact strongly on the urban traffic. New business models, like crowd-shipping or crowd-delivering, can have an impact on the demand for passenger transport and goods transport, that could become either complementary or antagonistic. The consequences of these consumption patterns should be evaluated to implement measures able to harness the opportunities offered by technological development and preserve the quality of life of our cities.

3.1 Specific supply chains chain in urban freight transport and delivery services

SOLEZ Action Plans for the FUAs cover short-medium timeframe and vision identifying a set of **low-carbon mobility actions** and measures connected with traffic regulation and access restriction schemes (including LEZ, LTZ, etc.), contributing to reduce the negative side effects of these so-called “push” interventions. These actions are the so-called “pull” interventions being measures designed to encourage more sustainable and low-carbon mobility by offering added-value services, ICT-based applications for low-zero emissions delivery services, for sharing public transport reserved lines, etc.

Urban freight traffic includes many delivery services for private households, from parcel couriers to takeaway delivery services. In today’s world, many of the retail stores belong



to chains. This is the truer for the big supermarkets and department stores, but many specialized chain stores also exist.

These stores in total make up a big share of urban goods traffic. For urban logistics schemes, that is not without consequences: these chain stores have their own delivery strategies, and they are centrally developed by the respective chain. Often, the individual stores of such a chain get their goods mainly via a logistics operator with whom the chain has a contract.

Here follows the overview diagram of the freight transport urban chain:

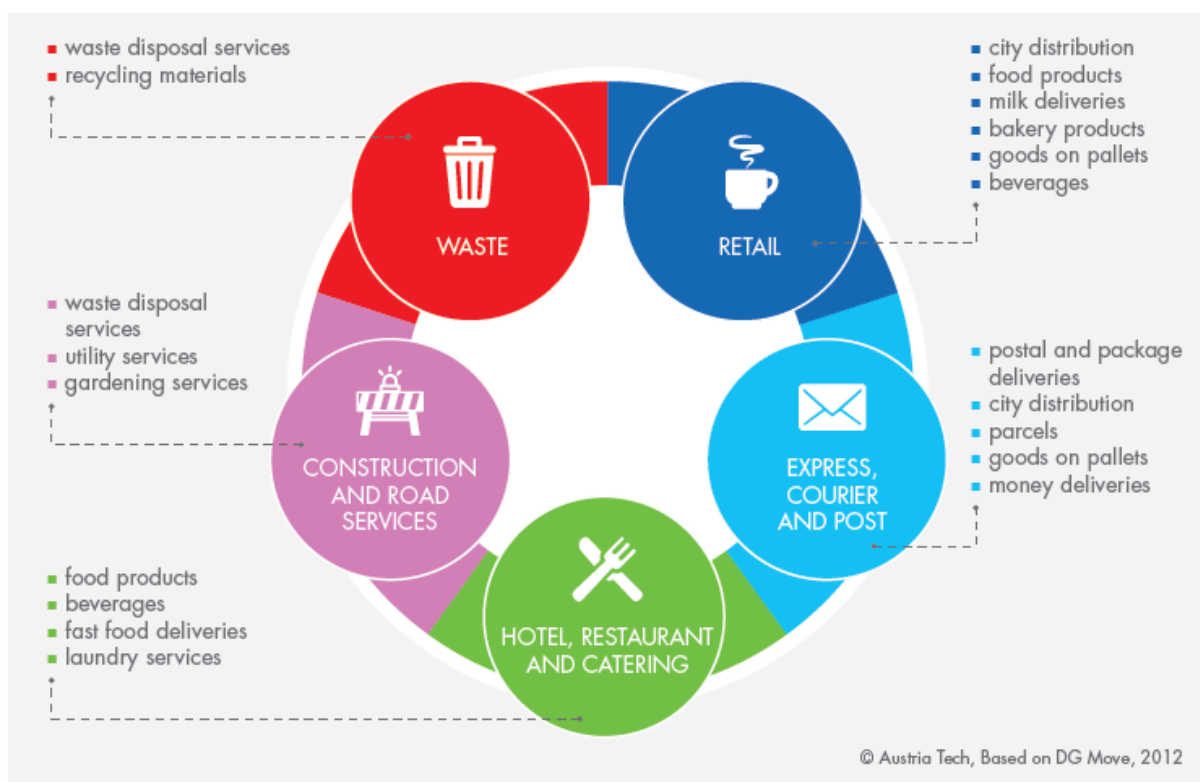


Figure 4: Market sector of urban freight transport (Source: CIVITAS Policy Note, Making urban freight logistics more sustainable)

Here are summarised the main peculiarities and tendencies of the **main supply chains** which might be of interest for the SOLEZ project within value-added services development and piloting in the targeted FUAs, according with the SOLEZ Action plans defined during the planning phase as well.

Retail (including e-commerce)

The retail sector demonstrates how fragmentation of demand for urban freight transport and delivery services (e.g. numerous independent retail outlets located in a city centre, etc.) combined with the fragmentation of supply (e.g. numerous wholesalers and other suppliers using their own vehicles to make just-in-time deliveries, etc.) results in a greater number of freight transport movements with only part-loads than would be possible if both



demand and supply were more concentrated. The larger retail chains have greater volumes of freight traffic and are more likely, by working with their logistics providers, to be able to optimise their deliveries in terms of overall efficiency. While diversity in the retail sector provided by small and medium-sized independent retail outlets offers greater choice for consumers and can be seen as providing wider benefits to society, economies of scale in the provision of freight transport services in all sectors tend to lead to greater logistics efficiency, lower costs and more sustainable distribution.

Since the major retail groups are important players for distributing goods to their stores in urban areas, the evolution of their supply chain has influenced urban freight transport and delivery.

The increased proportion of shop supplies delivered in consolidated loads from retailer-controlled distribution centres and a corresponding decline in the multiple drop deliveries of manufacturers and wholesalers promoted the consolidation of loads in larger vehicles. From the large retail chains' point of view, this has meant an increase in efficiency, making better use of each vehicle's carrying capacity and increasing the fill-rate. This trend has led to issues for the retailers when vehicle weight restrictions are imposed in urban areas because they have been unable to optimise the fill-rates for their vehicles, but, at the same time, the decentralisation of shops to the periphery of urban areas has reduced the need for lorries to penetrate urban centres. However, while the decentralisation of retail activity has decreased freight traffic in urban areas, it has increased the number of shopping trips made by private car, increasing urban and suburban road congestion and pollution emissions.

In this context, the operators of all product groups with no distinction are increasingly exploiting dedicated logistic structures, able to handle with higher efficiency the growing flows of goods generated by the on-line purchases. The main difficulties affect the ones operating in the food sector, where the perishability of the goods, together with the specific conditions of storage and transport needed by the different types of goods, requires a more fragmented and less efficient planning of the deliveries. The most pressing challenge for the operators of such sector is to conjugate profitability, convenience for the final consumer, safe transport and delivery granted.

The growth in the use of the Internet has led to the rapid development of e-commerce, which currently appears to be one of the fastest growing marketing channels for different kinds of products and services. Business-to-business (B2B) e-commerce accounts for by far the largest share of trade, whereas the share of business-to consumer (B2C) transactions is still small, not only compared to B2B transactions but also compared to traditional retailing.

Although B2C e-commerce still accounts for a small market share compared to conventional retail activity, it is growing very fast. In this high value potential market efficient and reliable logistics is a key factor of success, even more than with a traditional retail business.



In B2C e-commerce two physical distribution models are observed:

- the products flow along existing physical distribution channels,
- new physical distribution channel to supply goods to consumers is established by retailers.

Most of the on-line orders are channeled through the “hub and spoke” networks of large parcel carriers or mail order companies. This is because many retailers outsource most of their administrative and logistic activities to these companies. Consequently, e-commerce is becoming a major driving force for growth in the parcel and express market.



Figure 5: E-commerce supply chain (Source: E-COMMERCE AND SUPPLY CHAIN MANAGEMENT)

Usually, major grocery retailers with a strong network of traditional supermarkets try to expand their business through the internet by using existing facilities because it involves them in lower investment costs than establishing dedicated order fulfillment centres. One of the biggest challenges in B2C e-commerce is the last mile delivery to the consumer. Particularly in the e-grocery business it is difficult to combine profitability, customer convenience and security. For acceptable delivery costs and prices for customers, the volume and the number of deliveries have to attain a certain threshold.

Trends seem to indicate that B2C e-commerce increases the total number of urban freight transport movements and leads to greater fragmentation of consignments at the city logistics level. It tends to increase the amount and the frequency of deliveries and decreases the size of a single delivery.

On the other hand, B2C e-commerce can eliminate some journeys by allowing certain products to be downloaded electronically, rationalise home delivery services as well as enable several individual shopping trips to be replaced by a single delivery trip by a commercial vehicle and/or cargo bikes.



Express services, couriers and postal and mail services

Parcel, courier and express transport services are one of the fastest growing transport businesses in cities. This sector uses large vans or small to medium sized trucks and is based on consolidated delivery and collection tours departing from cross dock terminals located in close proximity to suburban areas. An express courier delivery trip can involve 70-90 deliveries, while a traditional parcel delivery tour serves about twenty receivers. This is because the express couriers’ network and planning processes enable them to increase the efficiency of their delivery tours.

The two main operational features of these operators are time pressure and standardization of procedures, so ideally they need to be able to collect and deliver to all the cities they serve in the same time window and move freely to and within the relevant urban areas.

Within this field there are two sectors: the one of the postal services as such (mail , registered mail, and dispatch of publications) and the one of rapid deliveries and delivery of postal packages. Future trends seem to indicate a likely decline in the sector of postal services as such.

The core business of the express delivery industry is the provision of value-added, door-to-door transport and deliveries of next-day or time-definite shipments across the globe.

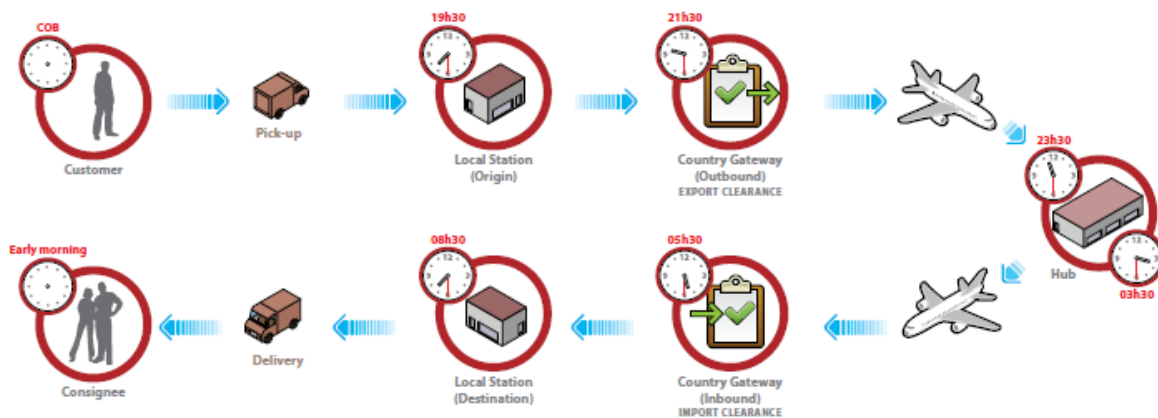


Figure 6: Main steps of the express delivery production process
 (Source: Oxford Economics, “The Economic Impact of Express Carriers in Europe”, 2011)

Four companies - DHL, FedEx, TNT and UPS, also referred to as ‘integrators’ - are the largest operators in the European express delivery industry, but there are many others in this highly competitive sector. The term ‘integrator’ refers to the ability of these companies to offer door-to-door, time-definite integrated services, where the company maintains control over all aspects of the distribution process and with each item being tracked at every step throughout its journey.



The express delivery industry simplifies and accelerates the process of transporting goods allowing companies to reduce inventories and hence save cost. It organizes collection, usually at the end of the business day, allows the sender access to information on the progress of shipments from pick-up to delivery as well as provides proof of delivery. The express delivery industry contributes close to €3 billion to EU27 public finances through the taxes it generates. Of this total, corporation tax, income tax, and social security contributions, both employer and employee, account for around €2.7 billion.

Other taxes, excluding sales taxes such as VAT, paid on the express delivery sectors' sales contribute a further €0.25 billion. There are a number of other ways in which express delivery services and their operators contribute to freight transport and logistics' competitiveness:

- enabling firms to reduce purchasing costs,
- facilitating cost-savings on inventories by enabling better concentration, rationalization and location of warehouses,
- providing extensive logistics support services to companies, enabling them to delegate responsibility to professionals,
- improving companies' handling of returns and complaints,
- facilitating improved stock-management and production techniques, reducing firms' storage costs.

Express delivery services generate significant supply-chain value for European businesses. Being able to respond quickly to customer demand is essential to winning and maintaining business in an increasingly competitive global economy. In addition to this, given the growing weight of e-commerce and because of the problem of non-delivery door-to-door in case of absence of the recipients, the express couriers have realised in some cities some pick-up point networks allowing the clients to autonomously pick-up their online purchases. This approach removes the need of rescheduling the non-deliveries and allows the operator to reduce the delivery trips and as a consequence the emissions. The pick-up points, together with the drop-off points (points where the sender of the goods delivers to the operator), are located in high-traffic areas, like train stations, in order not to generate further trips. DHL, for example, realised a pick-up point network in the main German cities in the framework of the Pack Station initiative. Local authorities took part in the initiative in the phase of planning the network making public spaces available for it.

Ho.Re.Ca

The term Ho.Re.Ca. refers to the food service industry and is an acronym formed by linking the words HOtel, REstaurant and CAtering. The Ho.Re.Ca. sector in urban areas mainly consists of the servicing of hotels and other short-stay accommodation (with and without restaurants), bars and restaurants, canteens and catering. The Ho.Re.Ca. sector is generally described as an homogenous market sector, but its commercial activities present



very different logistics and organisational constraints according to the specific service offered to the final consumers.

The distribution sector related to the Ho.Re.Ca. chain is characterised by a high unpredictability. The orders are generally for small amounts of goods and the deliveries happen at a very high rate. For these reasons the costs of delivery in this sector are sometimes even four times higher than those deriving from retail selling. However, the main restaurant and hotel chains show interest in achieving economies of scale foreseeing more centralised and consolidated supplying modes, even with less deliveries. The majority of manufacturers distinguish between the “organized” Ho.Re.Ca. distribution channel and the “non-organized” one. The first type (“organized” Ho.Re.Ca.) involves hotel and restaurant chains, the organised services for supplying hospitals, schools, cafeterias, communities. The second type (“non-organized” Ho.Re.Ca) involves bars, independent hotels and restaurants.

Despite the success of the large hotel, fast food and takeaway chains and franchises, the sector is still dominated by the small, independent, family-owned “non-organized” Ho.Re.Ca. channel.

Every operator tends to address different types of suppliers and the choice is influenced by several factors like price, type, quality and range of the products as well as the service offered (opening hours, customer care, door-to-door delivery, time of delivery). Furthermore, they tend to reduce to a minimum the spaces for stocking, giving priority to the space for selling and preferring small and frequent deliveries. In conclusion, the Ho.Re.Ca. industry remains dominated by small, family-owned and run restaurants, bars and hotels, despite the presence of some large multi-national chains.

Pharmaceuticals

The distribution of pharmaceuticals in one of the most complexes in Europe, because of the high number of pharmacies, the restriction imposed and the supplying schedules to be met. Despite that, the pharmaceutical supply chain is one of the most integrated and efficient, with only a few hours long responding time to orders and very high levels of quality. Other subjects can be identified upstream of pharmacies and hospitals in the same supply chain: pharmaceutical firm, storages, pharmaceutical intermediaries. The pharmaceutical industry is the one with the highest added value. Such companies had the need to entrust with logistics (storage and primary distribution) specialised operators able to move large stocks of goods in order to achieve economies of scale. For this reason almost all pharmaceutical companies opted for outsourcing primary distribution.

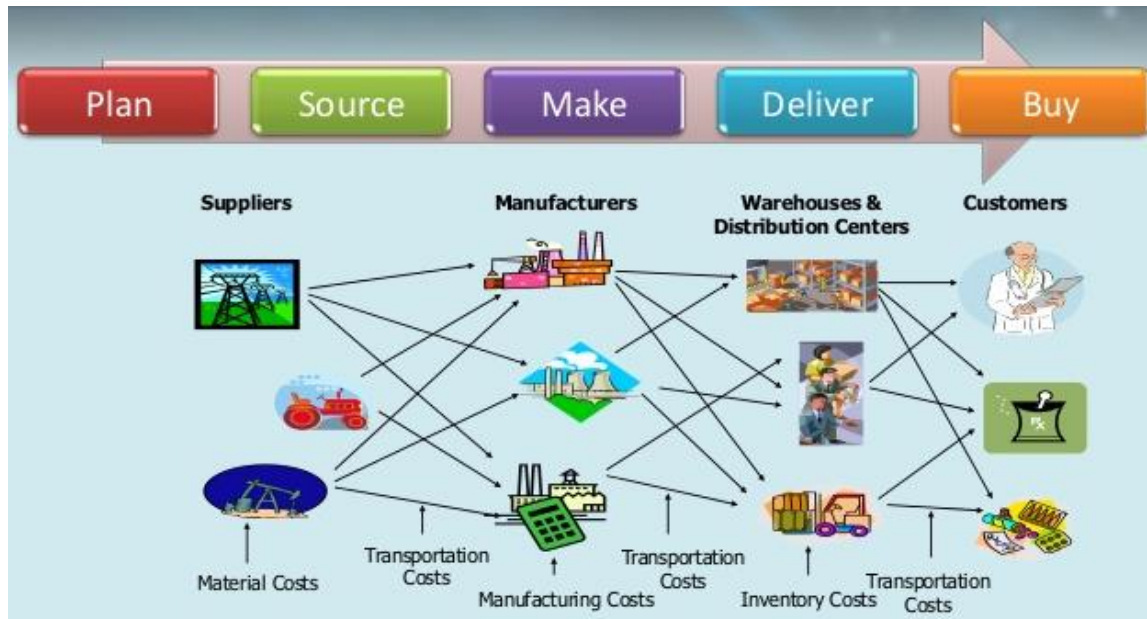


Figure 7: Typical pharmaceutical supply chain (Source: Cipla 2013)

Downstream of the pharmaceutical industry there are the intermediate storages and distributors. The main difference between them is related with the ownership of the goods: the owner of storages works on consignment and is paid on the basis of a fee-for-service, while the intermediate distributor acquires ownership of the goods, together with the business risk.

The supplier of the pharmaceutical storage is the pharmaceutical company that sends the goods mainly in the form of pallets of one single product. The storage works both as a temporary stocking facility of the goods and as an operator able to reassemble pallets of more than one medicinal product and send them to intermediate distributors, hospitals and nursing homes. In brief, mainly pallets go in and out of storage facilities.

Instead, the intermediate distributors, generally has an inbound flow of pallets coming from the firms or the storage facilities, but has very fragmented outbound flow with few units of medicinal products. The average number of pieces per row is generally not exceeding 2 or 3, with an average number of rows per delivery often below 30.

The logistic complexity of the delivery of pharmaceuticals depends on several aspects:

- need to cover all national territory;
- average order response time between 1 and 3 hours;
- limited time of validity and marketability of the products;
- controlled-temperature carriage;
- for some products the unit value is elevated.



The solution to such limits is represented by technology, actually, up to 70-75% of the order rows in the most advanced facilities are moved automatically (dispensers and conveyors).

The last ring of the supply chain are pharmacies and hospitals which are the distribution points for the final consumers/patients. Pharmacies dispense around 85% of pharmaceuticals, while hospitals around 15% and almost all medicinal products are granted by the intermediate distributor service. Pharmacies, given the peculiarity of the product and the high number of references on the market, tend to stock the smallest possible amounts, storing only those medicinal products that are highly requested on the market. By doing so they minimise the space needed for stocking inside and reduce or eliminate the risk of obsolescence of the goods. These needs lead to an integrated JIS approach characterised by the absence of a stock between the distributor and the consumer and frequent shipments. In the hospitals instead, pharmaceuticals and other hospital materials are generally stocked, in order to ensure a backup stash both for the central pharmacy and mainly for the wards.

Medicinal products are delivered by distributors to the central pharmacies of hospital, stored in warehouses and then taken to be distributed to the wards in the same package in which they came from the pharmaceutical companies.

In general, the flow of pharmaceuticals within a hospital involves two main macro-actors: the wards and the pharmacy, which perform a series of intertwined activities. It is foreseeable, given the continuous research activity for new and different formulas, the ageing trend of the population and the growing urbanisation rate, that the sector will manifest a high rate of growth in the next decade.

3.2 Public-private partnership as a success factor

To promote the cooperation between private operators and public subjects in the field of urban freight transports, the mostly used tool are local, regional or national forums, where the stakeholders jointly discuss about possible actions to be implemented.

In Germany for example the so called Güterverkehrsrunde (local consultation programmes) have been activated in several cities, like Hanover and Düsseldorf. In other cases the consultations between private and public subjects has been promoted at national or federal level, like in Australia (Advisory Groups and Councils) and in the Netherlands (Platform Stedelijke Distributie). In Japan, consultation programmes have been realised both at regional and national level.

In some European countries consultation forums consist of city network like the Forum for city logistics in Denmark, involving the cities of Aalborg, Arhus and Copenhagen and the Ministri of Transport or the GART network (Groupement des autorités responsables de transport) that puts together 150 French cities. Such forums are generally managed by the public sector, actively involving the stakeholders of the private one.



A specific approach in promoting public-private partnership that succeeded to a certain extent, realised in several cities in the United Kingdom and then exported in other national contexts, is the one of **Freight Quality Partnerships (FQP)**. These are basically local forums where the municipal administration and the representatives of the logistic chains as well as representatives local stakeholder or environmental groups meet to discuss about issues relate with urban freight transport. FQP are effective when they rapidly bring to the implementation of practical interventions benefiting both the community and the freight transport operators with their customers.



Figure 8: The Central London Freight Quality Partnership (CLFQP) and South London Freight Quality Partnership (SLFQP)

The consultation and cooperation of the public administration with all the involved actors are key elements for the development and implementation of policies and plans at local level for a sustainable urban distribution of goods. Local administrations should understand the impact of every planned intervention before implementing it in the freight transport sector together with its clients should contribute in defining and designing the most appropriate interventions.

The cooperative approach described above is important for achieving forms of coordination and integration among the subjects involved in the urban distribution of goods, in order to rationalise the flows and reorganise the chains and the distribution patterns. These forms of cooperation among actors could arise spontaneously, but can also be promoted by the public authority with direct or indirect incentives.

The consolidation of the loads directed to the same urban area is probably the potentially most effective tool to reduce the number of deliveries and increase the load factor of vehicles, but requires a radical behavioural change by senders and recipients of goods and by the transport operators. It would be necessary, for example, to promote forms of aggregation among the traders located in the same urban area to schedule the deliveries the same day and at the same time or to create small purchasing groups for the supply of the products needed by all the activities.

Also single activities should be encouraged to rationalise their supply flows and their demand of urban freight transport. Transport of London (the mobility agency of London) promoted the adoption of Delivery Service Plans (DSP) in both the public and private



sector. Thanks to this approach every organisation is encouraged to monitor its supplies in order to identify how to rationalise and reduce the number of deliveries.

With the PUMAS project (Interreg Alpine Space 2007-2013) the city of Torino promoted meetings with Transport, Commerce and Industry Associations and the Chamber of Commerce and the final result was an agreement with which it was possible to launch a pilot project with the chain of express couriers for the replacement of the most pollutant vehicles with new generation ones. Given the good performances of the project, Torino continued that way with the project H2020 “NOVELOG”.

In 2016 the Italian Government decided to mention precisely the experimental model of last mile delivery developed by Torino in its economic planning document (DEF 2016) as a “good practice” to be followed in all the national territory.

3.3 Analysis of baseline scenarios in FUAs and possible interventions

The first activity to be carried out is represented by the definition of a knowledge framework on the goods transport demand and supply, currently existing in the surveyed FUAs context.

The objective of this activity is to collect and analyze relevant information and data available, in order to build a complete cognitive picture of the phenomenon of the distribution of goods in cities.

Specific field surveys (e.g. survey for flow generators, survey for transport and logistics operators, survey for freight vehicles drivers, etc.) to integrate and complete the collected data might be needed. The objective is to outline and analyze the current **freight transport demand** (transportation and related prevalent logistics activities) in the urban area (including FUAs) in its typical components and in its quantitative and territorial aspects while highlighting local needs, requirements, expectations, both by generators/attractors of goods demand flow and by freight operators (professional and own-account transport). The design and execution of the activities necessary to define the reference framework should be subjected to the identification and selection of zones/areas of the city (e.g. city center, Limited Traffic Zones, pedestrian areas, area enclosed by the ring road network, etc.) and logistics supply chains (e.g. parcels, fresh retail, frozen chain, pharmaceuticals, etc.) on which it is intended to intervene to reorganize the distribution and collection of goods. These should be identified on the basis of their representativeness/criticality with respect to the reference universe represented by the overall urban area and the combination of logistics supply chains. On the basis of the reference scenario and problems identified, it will be possible to define the most appropriate strategies for the reference urban context at FUA level.

Strategies of intervention have to lead to a more efficient management of the demand for urban haulage of goods. The collection and interpretation of the data set should enable to better plan and implement strategies of intervention to be adopted on the regulation and reorganization of the goods distribution system, which will be designed and constructed in a the short-medium term.



Possible interventions to be implemented in the **short-medium term** should necessarily be of organizational and management character and do not provide for assistance in infrastructure or technological interventions, as they require more extensive implementation time intervals and economic resources. For this reason, **organizational and management measures** (including value-added services), technical and regulatory interventions aimed at improving the efficiency of distribution of urban freight should be identified to optimize the use of existing infrastructures and the system of logistics and mobility in urban area as well as at FUA level.

The purpose of the interventions must always ensure the delivery of goods to commercial activities of the area subject to restrictive measures (e.g. LTZ, LEZ, pedestrian areas, etc.), while allowing free competition without imposing a monopoly system to benefit some private companies. If the purpose is a reduction of indirect costs on society, it must be considered that the distribution by third parties (professional operators) is a large part of urban freight transport market in terms of goods volumes, but at the same time, it is the portion that has less impact on accesses and traffic flows, compared to own-account and self-procurement distribution of goods. The importance of undertaking targeted interventions and appropriate measures is immediately clear, with the aim of moving portion of the freight traffic flows generated by own account operators, professional operators or alternatively transferring them onto a last-mile alternative delivery system. Organizational measures designed to create **alternative distribution and eco-friendly systems** (e.g. alternative delivery systems) to ensure continuity of good delivery and collection within the area subject to restrictive (push) measures.

These alternative distribution systems allow to compensate negative effect (for users' perspective) of restrictive measures already in place (or under designing) in city centers and/or FUAs, enabling to regulate the urban freight transport market and for freight demand management and planning.

Measures of intervention should then be discussed and shared with key stakeholders in local meetings during round tables meetings, to agree on concerted action and shared policies, avoiding potential conflicts between main key players directly or indirectly involved in freight distribution

3.4 Focus on the commercial activities in the LEZ of Torino

From the analysis of the data retrieved from the database made available by the Commerce Directorate of the City of Torino within the portal of open data (<http://www.comune.torino.it/geoportale>) the commercial activities within the central LEZ of Torino have been extrapolated. **3.190 commercial activities** are located in this portion of the city as follows:

Type of activity	num.	%	Type of activity	num.	%
Restaurants and Bars	653	20,47	Grocery stores	7	0,22
Retail sellers and Clothing	1339	41,97	Delis	46	1,44
Food	196		Ice cream parlors	25	



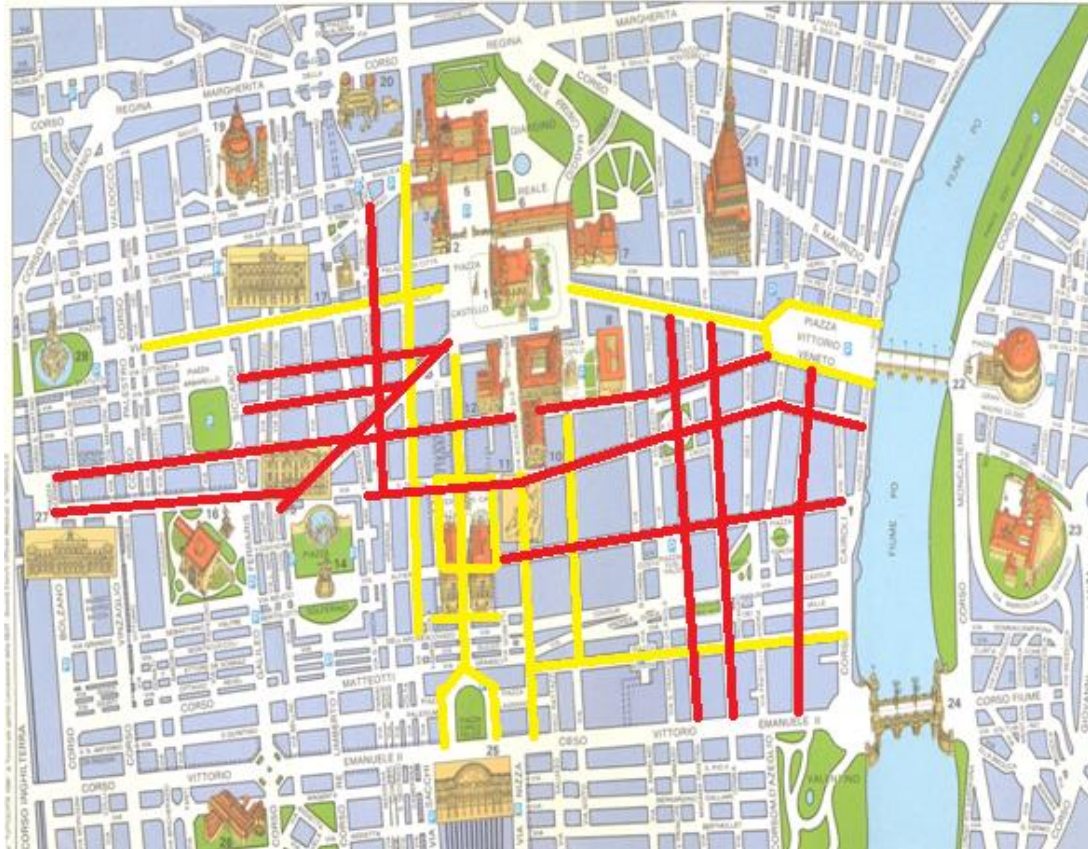
		6,14			0,78
Products for animals	4	0,13	Toys	13	0,41
Products for the house, household articles	78	2,45	Dairies	4	0,13
Sanitary ware and orthopaedic goods	3	0,09	Book stores	54	1,69
Sport articles	21	0,66	Butcher shops	14	0,44
Audiovisuals	11	0,34	Furniture	52	1,63
Auto vehicles and motor vehicles	6	0,19	Shops with automated appliances	9	0,28
Costume jewellery	32	1,00	Numismatic and philately shops	3	0,09
Shoes	54	1,69	Precious objects and works of art	71	2,23
Fuels	1	0,03	Opticians	11	0,34
Stationery shops	32	1,00	Bakeries	24	0,75
Fair and equitable trade	1	0,03	Para-pharmacies	3	0,09
Informatics, Electronics, Household appliances and/or spare parts	29	0,91	Cake shops	59	1,85
Wine shop	7	0,22	Fish markets	3	0,09
Herbalists	10	0,31	Phone center	3	0,09
Pharmacies	28	0,88	Pizza by the slice	23	0,72
Hardware stores	3	0,09	Perfumeries	83	2,60
Flowers and plants	10	0,31	Newsstands	29	0,91
Photography	4	0,13	Spare parts and accessories for cars	1	0,03
Telephony	21	0,66	Supermarkets	22	0,69
Tissues	7	0,22	Tobacconists	47	1,47
Second hand/antiquities retail sellers	34	1,07			



Analysis of areas/streets in LEZ with high concentration of commercial activities is indicated below.

street/mai street/ square	Num.	Pedestrian area	Area with porches
Via dei Mercanti	30		
Piazza Emanuele Filiberto	33		
Via Fratelli Calandra	36		
Via Milano	38		
Via S. Quintino	40		
Via Arsenale	40		
Via Andrea Doria 46	46		
Via Santa Teresa	47		
Via Accademia Albertina	51		



Via San Francesco d'Assisi	53		
Via Cavour	56		
Via Pietro Micca	57		
Via Antonio Giuseppe Bertola	61		
Via della Rocca	60		
Via San Francesco da Paola	62		
Via Cernaia	64		
Via Principe Amedeo	69		
Via Barbaroux	70		
Piazza Castello	70		
Via San Massimo	71		
Via Giovanni Giolitti	74		
Via San Tommaso	75		
Via Monte di Pietà	77		
Via Maria Vittoria	94		
Via Carlo Alberto	102		
Via Luigi Lagrange/ p.zza Lagrange	126		
Via Giuseppe Mazzini	131		
Via XX settembre 132	132		
Via Giuseppe Garibaldi	173		
Via Roma, P.zza San carlo p.zza Carlo felice p.zza CLN e Galleri San Federico	180		
Via Po/ p.zza Vittorio	188		



-  Streets with commercial activities >50 e <100
-  Streets with commercial activities >100

3.5 The experience of last-mile logistics in Torino

The project on last mile logistics of the city of Torino started in 2012, after approval by the Council of the Ministry of Transport of the Logistics Plan, where for the first time the importance of sustainable urban logistics is mentioned as a priority in this sector. The first act is the signature of a memorandum of understanding between the Ministry of Infrastructures and the cities of Torino, Milan and Naples. Following the memorandum a working table is established in order to study already existing good practices and jointly develop new projects about “last mile logistics”.

The work is put in to practice by taking part in the Smart cities call for proposal launched by the Ministry of Instruction, University and Research with the URBELOG project (*URBan Electronic LOGistics*) - the philosophy behind it being the one of experimenting new smart system to be financed at a later stage with funds of the National Operational Plan Metropolitan Cities.

Then, thanks to the PUMAS project, financed by the Alpine Space 2007-2013 programme, the City of Torino planned and realised a pilot project for the delivery of good in the LTZ.



The main outputs of the PUMAS project were:

- the collection of freight transport and delivery data;
- the involvement of the freight stakeholders and the signature of a Memorandum of Understanding among the City, the Chamber of Commerce, Transport and Commerce Associations and the signature of a Freight Quality Partnership;
- on field testing of the pull measures defined in the Memorandum of Understanding.

Data collection

By cross referencing the data collected by the cameras controlling the LTZ and the database of the Provincial Motor Vehicle Offices for the first time in Italy a complete picture of the delivery of goods in urban areas was made possible. Here some figures synthesising the whole work performed:

- around 90.000/120.00 vehicles access the LTZ every day;
- on average 2.500 freight transport vehicles access the area daily for a total of 4.000 trips (1,5 trips per vehicle);
- maximum number of trips detected per single vehicle in one day: 14

The Freight Quality Partnership (FQP)

Thanks to the PUMAS project a confrontation started among the numerous transport and commerce associations and it's still ongoing. After a long negotiation with the commerce association (they were defending the interests of proprietary transport) a joint agreement was reached among all the involved parties finalised with a Memorandum of Understanding (MoU) among the City, the Chamber of Commerce, Transport and Commerce Associations. This MoU was designed in the form of Freight Quality Partnership (FQP) namely "PROTOCOLLO D'INTESA TRA COMUNE DI TORINO CAMERA DI COMMERCIO E LE ASSOCIAZIONI FIRMATARIE - PATTO PER LA LOGISTICA E PER LA RAZIONALIZZAZIONE DELLA DISTRIBUZIONE URBANA DELLE MERCI" (signed FQP is provided as annex)

The FQP of Turin aimed at replacing the most pollutant vehicles and at introducing ITS in order to improve the environmental, economic and social performances of the distribution of goods in the city. The main innovation of the document was the introduction, for the first time in Italy, of pull measures, that would have rewarded the participating operators in the initiative.

A brief synthesis of the pull measures:

- access to the LTZ of the city without limitations;
- use of preferential lanes.



The operators to profit of these facilitations would have had to use:

- environmental friendly vehicles, at least EURO 5 with particulate filters or methane engine;
- with a maximum gauge of 35q (es. Ducato)
- with installed an On-Board Unit connected to the traffic control room of Torino (5T).

Bans were also in the memorandum forbidding by 2018 the entrance of EURO 4 vehicles in the LTZ.

On field testing

The PUMAS project was concluded by testing on field of the pull measures foreseen by the FQP.

From the test it turned out that a freight vehicle drives on average 40 km per day against the 10 driven on average by a vehicle fro people transport.

Considering the fuelling and the cylinder capacity of the engines (2500cc vs 1400cc), it is possible to affirm that a commercial vehicle pollutes around 8 times as a vehicle for passenger transport.

The on field testing is ongoing since 2015 thanks to the Horizon 2020 project NOVELOG.

Actually the pilot involves the main international couriers (FEDEX, TNT, BARTOLINI, SDA, DHL, UPS), that nowadays access the LTZ with EURO 5, methane or electric vehicles only.

More in detail on the basis of environmental, economic and social KPI it is being achieved as follows:

Environmental KPI

Using EURO 5 vehicles with particulate filters we reduced the emission of pollutants.

Here follows the confrontation among EURO 4 or lower categories and EURO 5, EURO 5B and EURO6.

Limits of maximum emissions established by law

Stage	Date	CO	HC	HC+Nox	Nox	PM
		g/km				
Euro 1	1.994,10	6,9	-	1,700	-	0,25
Euro 2IDI	1.998,01	1,5	-	1,200	-	0,17
Euro 2 DI	1998,01a	1,5	-	0,86	-	0,2
Euro 3	2.001,01	0,95	-	0,860	0,78	0,1
Euro 4	2.006,01	0,74	-	0,460	0,39	0,06



Euro 5a	2006,09c	0,74	-	0,350	0,28	0,005f
Euro 5b	2.011,09	0,74	-	0,350	0,28	0,005f
Euro 6	2.015,09	0,74	-	0,215	0,125	0,005f

Economic KPI

The number of deliveries increased, the number of freight vehicles being the same.

By overcoming the concept of time windows for the delivery in LTZ less vehicles are needed to allow the commercial performances granted by the express courier.

Social KPI

Accidents decreased (the on board unit act as a deterrent to incorrect behaviours).

4 Conclusions

This report provides an overall presentation of urban freight transport ecosystem in terms of key actors and involved stakeholders, main requirements and peculiarities of specific supply chains focusing on last-mile delivery services, relevant policies and measures for better managing urban freight transport and delivery services for understanding of the phenomenon in cities and beyond.

The objective is to provide a common baseline scenario of actual dynamics and characteristics of professional urban freight transport and delivery services at urban level with specific focus on LEZs.

These areas are from one hand high freight transport demand attractors and from the other hand specific areas characterized by restrictive policies and regulations (“push” measures) for freight vehicles entering and parking for loading/unloading operations.

In this respect, low-carbon freight delivery solutions should be addressed by responsible administrations (at the different policy levels) in order to effectively overcome negative effects of unsustainable (environment, society, economy) freight transport and mobility services towards greener, energy-efficient and safer solutions. This process should lead to reduce disadvantages produced by traffic restriction policies in the concerned areas (including FUAs) and to potentially increase business opportunities for most efficient and “virtuous” mobility survives freight suppliers.

Based on the defined and analyzed low-carbon mobility framework conditions in project target FUAs, the further step will be development of a specific toolbox for the overall



design of low-carbon value-added services which will be customized in the SOLEZ pilot sites based on FUA-based requirements.

ICT-based tools will be investigated (exploiting existing innovative ICT systems and/or apps) for the implementation and operation of value-added services for both freight and passenger transport.

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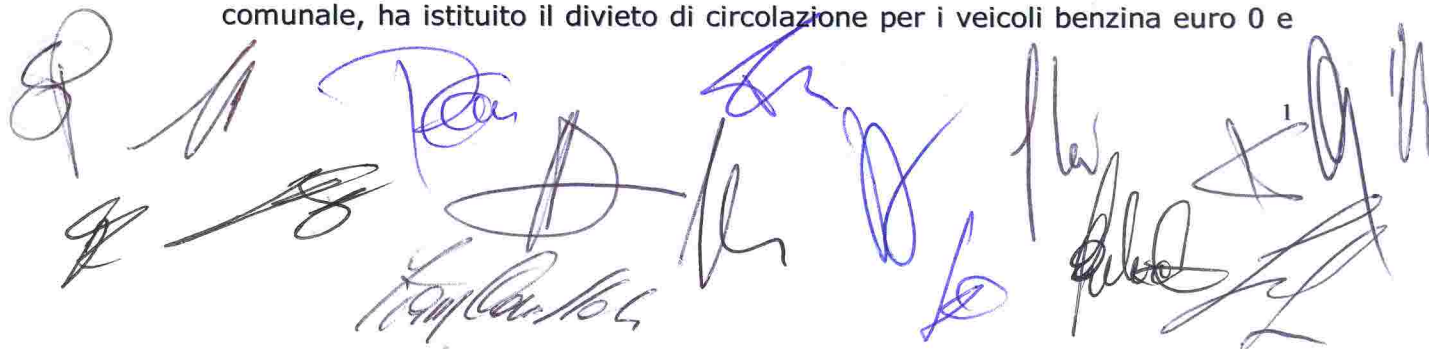
**PROTOCOLLO D'INTESA TRA COMUNE DI TORINO
CAMERA DI COMMERCIO E LE ASSOCIAZIONI
FIRMATARIE**

-

**PATTO PER LA LOGISTICA E PER LA RAZIONALIZZAZIONE
DELLA DISTRIBUZIONE URBANA DELLE MERCI**

PREMESSO CHE

- l'Amministrazione, con deliberazione MECC. 20103195/006, ha adottato il Piano della Mobilità Sostenibile in data 9 febbraio 2011;
- l'Amministrazione è risultata assegnataria del progetto "PUMAS - Mobilità Sostenibile", elaborato ai sensi dei "Finanziamenti per il governo della domanda di mobilità (Mobility Management)";
- l'Amministrazione intende sperimentare progetti Smart Cities a valere su fondi Miur;
- in data 7 Luglio 2010 la Commissione Europea ha adottato la Direttiva 2010/40/UE del Parlamento Europeo e del Consiglio, sul quadro generale per la diffusione dei sistemi di trasporto intelligenti nel settore del trasporto stradale e nelle interfacce con altri modi di trasporto, recepita attraverso il Decreto-Legge del 18 Ottobre 2012 numero 179 convertito, con modificazioni, dalla legge 17 Dicembre 2012, numero 221, "Ulteriori misure urgenti per la crescita del Paese", nell'ambito dell'art. 8 - "Misure per l'innovazione dei sistemi di trasporto";
- in data 28 Marzo 2011 la Commissione Europea ha adottato il "Libro Bianco, Tabella di marcia verso uno spazio unico europeo dei trasporti - Per una politica dei trasporti competitiva e sostenibile" COM(2011);
- il Piano d'Azione ITS Nazionale pone all'interno del paragrafo dedicato all'Asse prioritario 2 particolare attenzione alla diffusione dei sistemi ITS per la logistica cittadina (city logistics);
- l'Amministrazione, con specifica ordinanza valida nell'intero territorio comunale, ha istituito il divieto di circolazione per i veicoli benzina euro 0 e





diesel euro 0, 1 e 2 dalle ore 8.30 alle ore 13.00 e dalle ore 14.30 alle 19.00;

- l'Amministrazione ha aderito all'Accordo di Programma sottoscritto il 27 settembre 2012 tra Ministero dei Trasporti, Comune di Napoli e Comune di Milano, avente come oggetto l'attuazione di un piano d'azione per l'efficientamento della logistica nelle grandi aree urbane e metropolitane del Paese;
- la Camera di Commercio di Torino garantisce tra le sue attività le funzioni di supporto e promozione allo sviluppo dell'economia locale e delle imprese del territorio, favorendone anche la propensione all'innovazione e supportando inoltre attività rivolte alla mobilità sostenibile; l'ente camerale gestisce gli interventi per lo sviluppo economico locale integrando le proprie azioni con quelle degli altri interlocutori pubblici ed associativi del territorio, attraverso un sintesi che concili le esigenze di tutti i settori;
- le parti, nell'ambito dei rispettivi settori di attività, sono interessate a instaurare un rapporto di reciproca collaborazione, al fine di individuare e porre in essere iniziative congiunte relativamente alla mobilità sostenibile in ambito urbano;
- la distribuzione urbana delle merci è l'elemento cruciale per assicurare vitalità e qualità della vita nella città di Torino;
- in relazione alla necessità di mettere in campo misure strutturali tese all'abbassamento dei limiti di immissione di sostanze pericolose nell'aria, stabilito dalle nuove norme comunitarie, l'Amministrazione ha avviato un insieme di azioni volte a migliorare la qualità dell'aria, nel rispetto delle legittime esigenze delle attività economiche e sociali;
- studi svolti nell'ambito urbano attribuiscono il 20% delle emissioni nocive al traffico privato e commerciale e che, i veicoli commerciali vetusti contribuiscono in quota parte alla formazione delle polveri fini, le quali destano allo stato attuale le maggiori preoccupazioni per la tutela della salute dei cittadini;
- tutti i soggetti coinvolti convengono sulla assoluta necessità di avviare un processo virtuoso e condiviso, un Patto per la Mobilità Urbana che metta insieme l'Amministrazione Comunale, gli operatori economici, le competenze pubbliche e private per definire un percorso che riesca ad



accrescere congiuntamente accessibilità ed a fronteggiare adeguatamente le emergenze ambientali connesse alla qualità dell'aria nel territorio della costituenda area metropolitana di Torino; il Comune di Torino si farà promotore presso la Commissione Europea, i Ministeri interessati (Ambiente, Sviluppo Economico e Trasporti), gli Enti Locali per il reperimento di incentivi per la riconversione del parco circolante e l'acquisto di veicoli eco-compatibili (es. GPL, metano, ibrido, elettrici, biometano, biocombustibili, idrogeno, bifuel benzina-metano, diesel-metano, benzina-GPL) nell'ambito degli aderenti al protocollo. Si impegna inoltre a promuovere con le associazioni di categoria condizioni incentivanti per lo svecchiamento del parco veicolare attraverso la sostituzione dei veicoli fino ad Euro 4 con veicoli Euro 5 e successivi.

TUTTO CIO PREMESSO

L'anno 2013 il giorno 27 del mese di settembre, si conviene e si stipula il seguente protocollo di intesa. La premessa costituisce parte integrante del presente protocollo.

Art. 1. Finalità ed obiettivi del protocollo

Il presente protocollo ha come finalità di sancire l'impegno da parte dei firmatari ad adottare tutte le iniziative e/o azioni rivolte a sostenere il programma per il contenimento delle emissioni inquinanti derivanti dalla circolazione dei veicoli commerciali, mediante il progressivo rinnovamento del parco circolante nel territorio del Comune di Torino.

Gli obiettivi del protocollo sono rivolti al raggiungimento della sostenibilità (economica, ambientale e sociale) per la distribuzione delle merci in città mediante un progressivo processo di accreditamento dei veicoli e delle piattaforme logistiche. Resta inteso che l'utilizzo di ogni piattaforma accreditata non è requisito obbligatorio per svolgere attività di distribuzione, attività che potrà comunque essere svolta con qualsiasi veicolo accreditato secondo quanto previsto dal successivo Art. 7.



Le azioni che dovranno essere intraprese sono le seguenti:

1. riorganizzazione dell'orario del carico-scarico delle merci all'interno della Zona a Traffico Limitato (ZTL) Centrale, istituendo un processo di accreditamento attraverso il quale verranno registrati i veicoli commerciali secondo i requisiti minimi indicati nel presente protocollo;
2. adozione di misure premiali per la circolazione dei "veicoli accreditati" così come indicati di seguito nel presente protocollo;
3. utilizzo di piattaforme logistiche e veicoli rispondenti ai requisiti minimi richiesti per l'accREDITAMENTO al servizio di distribuzione urbana delle merci;
4. sostituzione progressiva dei veicoli maggiormente inquinanti di cui all'Art. 4 nei tempi e con le modalità concordati nel presente protocollo;
5. ricerca di finanziamenti per attuare le azioni intraprese non esclusa la richiesta alla Provincia di Torino dell'azzeramento delle imposte Provinciali di Trascrizione nei casi di sostituzione dei Veicoli commerciali per le finalità contenute nel presente protocollo.

Il presente protocollo si applica a tutte le filiere della distribuzione delle merci con esclusione di quelle aventi caratteristiche specifiche (a titolo indicativo e non esaustivo: valori, farmaci, giornali, carburanti e combustibili, surgelati, manutenzioni ordinarie e straordinarie, traslochi, commercio ambulante, etc.) o per quei soggetti che utilizzano veicoli con allestimenti specifici. Il Comune si impegna a stipulare accordi specifici con gli operatori di suddette filiere.

Art. 2. Definizione dell'area assoggettata alla nuova regolamentazione

L'area urbana scelta per attuare le politiche premiali relativamente ai veicoli commerciali per la distribuzione urbana delle merci è la "ZTL Centrale" del Comune di Torino e include le "ZTL Trasporto Pubblico, Pedonale e Area Romana". Qualora la sperimentazione generi risultati positivi le parti sottoscrittrici del presente protocollo potranno concordare l'estensione di tali politiche all'intero territorio della città e della costituenda Area Metropolitana.



Art. 3. Contrassegno di accreditamento per i veicoli

Il Comune di Torino rilascerà appositi contrassegni (provvisori e definitivi) di circolazione da apporre sul veicolo in modo da rendere lo stesso immediatamente riconoscibile e per testimoniare l'impegno del proprietario del veicolo al rispetto delle misure di miglioramento della qualità dell'aria e dell'ambiente. Tali contrassegni saranno dotati di apposita tecnologia che consenta di usufruire delle agevolazioni riservate agli operatori accreditati come da successivo Art.9.

Art. 4. Tempi di attuazione del protocollo

L'attuazione del protocollo avrà durata quinquennale ed avverrà in tre fasi come di seguito indicato.

Fase 1:

- dal 1 aprile 2014, rilascio dei contrassegni provvisori (nuovi e rinnovi) di circolazione nelle ZTL per gli autoveicoli adibiti al trasporto merci appartenenti al gruppo A e al gruppo B;
- dal 1 aprile 2014, si rilasceranno, altresì i permessi per gli accreditati secondo le disposizioni dei successivi articoli.

Fase 2:

- dal 1 dicembre 2014 entrata in vigore delle misure premiali di cui al successivo Art. 9 e divieto di accesso nelle ZTL per gli autoveicoli del Gruppo A (Euro 3) e precedenti motorizzazioni (Euro 0,1,2);
- dal 1 dicembre 2014 non avranno più validità i permessi precedentemente rilasciati per gli autoveicoli del Gruppo A.

Fase 3:

- dal 1 dicembre 2017 entrata in vigore delle misure premiali di cui al successivo Art. 9 e divieto di accesso nelle ZTL per gli autoveicoli del Gruppo B (Euro 4) e precedenti motorizzazioni (Euro 0,1,2);

[Handwritten signatures in blue and black ink, including a large signature on the left and several smaller ones at the bottom.]



- dal 1 dicembre 2017 non avranno più validità i permessi precedentemente rilasciati per gli autoveicoli del Gruppo B.

Si intendono per veicoli del Gruppo A i "veicoli commerciali leggeri" (categoria N1) alimentati a benzina o diesel con portata a terra fino a 35 q.li conformi alla direttiva 98/69 CE immatricolati dal 1 gennaio 2001 (Euro 3).

Si intendono per veicoli del Gruppo B i "veicoli commerciali leggeri" (categoria N1) alimentati a benzina o diesel con portata a terra fino a 35 q.li conformi alla direttiva 98/69 CE immatricolati dal 1 gennaio 2006 (Euro 4).

L'Amministrazione Comunale provvederà ad adottare tutti gli atti necessari a dare attuazione al presente protocollo.

Entro il 1 dicembre 2014 il Comune si impegna a realizzare le azioni incentivanti di cui al successivo Art. 9, con particolare riferimento all'innalzamento dei livelli di qualità del servizio ed all'aumento dell'accessibilità dell'area ed al conseguente aumento della velocità commerciale. Al contempo il Comune si impegna all'interno del Comitato di Monitoraggio alla definizione e conclusione di un lavoro puntuale di verifica dell'attuazione delle misure incentivanti intraprese attraverso il confronto fra le rappresentanze delle aziende di autotrasporto e le rappresentanze degli operatori logistici firmatari del presente protocollo.

Nel mese di febbraio 2014, in prossimità della data di partenza dei divieti di accesso per i veicoli Euro 3, il Comitato di Monitoraggio effettuerà una analisi sullo stato dell'arte degli incentivi reperiti dal Comune o da esso stanziati per favorire la sostituzione del parco veicolare Euro 3 o Euro 4. Qualora i fondi stanziati/reperiti non fossero idonei a rendere ragionevolmente prevedibile il completamento del processo di sostituzione volontaria dei veicoli Euro 3 (con nuovi veicoli, anche immatricolati in conto proprio o attraverso il volontario affidamento della merce ad operatori in conto terzi accreditati) entro la scadenza del 30 novembre 2014, il Comune procederà all'adozione delle misure opportune a tutela delle attività economiche (adeguamento degli incentivi o, in caso di impossibilità, nuova scansione temporale di entrata in vigore dei divieti). Analogo procedimento



avverrà a settembre 2017 con riferimento all'entrata in vigore dei divieti di accesso per i veicoli Euro 4.

Art. 5. Modalità di applicazione della nuova regolamentazione

I proprietari dei veicoli utilizzati per finalità di consegna e ritiro merci appartenenti al Gruppo A (Euro 3) per poter accedere all'area ZTL Centrale, alla scadenza dei permessi attualmente in uso, devono ritirare gratuitamente presso il Comune o presso sua società di scopo il contrassegno provvisorio di circolazione. Tale contrassegno sarà valido fino e non oltre il 30 novembre 2014.

I proprietari dei veicoli utilizzati per finalità di consegna e ritiro merci appartenenti al Gruppo B (Euro 4) per poter accedere all'area ZTL Centrale, alla scadenza dei permessi attualmente in uso, devono ritirare gratuitamente presso il Comune o presso sua società di scopo il contrassegno provvisorio di circolazione. Tale contrassegno sarà valido fino e non oltre il 30 novembre 2017.

Gli operatori di trasporto che si intendono accreditare secondo quanto previsto all'Art. 6 e/o all'Art. 7, che consente di beneficiare immediatamente delle agevolazioni previste per i soggetti accreditati, devono ritirare gratuitamente presso il Comune o presso sua società di scopo il contrassegno definitivo di circolazione.

Il Comune di Torino si impegna a monitorare l'applicazione del protocollo e dell'accredito nei confronti dei soggetti ai quali vengono appaltati servizi che necessitano dell'utilizzo dei veicoli per la consegna delle merci.

Art. 6. Modalità di accreditamento al servizio per le piattaforme logistiche

I gestori e/o proprietari di piattaforme logistiche che vogliono accreditare la propria piattaforma per la distribuzione urbana delle merci debbono soddisfare una serie di requisiti minimi, che siano in grado di garantire elevati standard di performance del servizio offerto con l'obiettivo di centralizzare il coordinamento tra la domanda e l'offerta ed ottimizzare i processi di gestione delle piattaforme stesse.

L'insieme dei requisiti minimi richiesti - autocertificati - per l'accredito al servizio sono:



- localizzazione in prossimità del centro urbano (distanza massima 18 Km), e in corrispondenza delle principali direttrici di traffico stradale e/o ferroviario;
- localizzazione in aree con un adeguata urbanizzazione primaria dell'area di insediamento (illuminazione, fognature, sistema idrico);
- disponibilità di aree supplementari per eventuali ampliamenti successivi della parte operativa della piattaforma (magazzino, area di manovra arrivi e partenze), per attività di transit-point, per eventuale stoccaggio delle merci e per attività di reverse logistics (recupero imballaggi);
- struttura modulare dell'area adibita a magazzino in modo da garantire successive espansioni in base ad eventuali incrementi di domanda di merci (dimensioni minime del magazzino per la fase di avvio: 500 mq);
- impegno ad effettuare le consegne in città entro 12 ore dal ricevimento delle merci;
- effettuazione delle partenze per il primo "giro" di consegne compatibilmente con l'effettivo orario di disponibilità di accettazione della merce da parte degli esercizi;
- utilizzo di sistemi di tracciamento per l'identificazione del collo e l'abbinamento allo specifico trasportatore in modo da garantire una tracciabilità continua delle merci lungo l'intera catena di distribuzione;
- applicazione puntuale dei criteri del sistema di Gestione per la Qualità nell'ambito dei processi aziendali in conformità della norma ISO EN 9001:2008.

Art. 7. Modalità di accreditamento ed accesso alle misure di premialità per i veicoli

Gli operatori di trasporto (es. spedizionieri, corrieri, padroncini, ecc.) che vogliono usufruire delle misure premiali indicate nel presente protocollo, debbono possedere veicoli commerciali in grado di soddisfare semplici requisiti minimi di accreditamento in funzione della necessità di ottimizzare il processo distributivo e di contribuire al miglioramento delle condizioni di vivibilità della città in termini di inquinamento ambientale ed acustico.

Le misure premiali di cui al presente protocollo sono riservate agli operatori che effettuano la distribuzione delle merci in città con veicoli Euro 5 o



superiore o eco-compatibili (es. GPL, metano, ibrido, elettrici, biometano, biocombustibili, idrogeno, bifuel benzina-metano, diesel-metano, benzina-GPL) di dimensioni ottimali rispetto al livello del carico trasportato ed alle caratteristiche dell'area servita, al fine di ridurre l'occupazione del suolo stradale.

In tal senso, i requisiti minimi richiesti per l'accreditamento e successivo accesso alle misure premiali di cui al successivo Art. 9 sono:

- utilizzo di veicoli ecocompatibili (GPL, metano, ibrido, elettrici, biometano, biocombustibili, idrogeno, bimodali con funzionamento in elettrico, bifuel benzina metano, diesel metano, benzina GPL) o comunque conformi almeno alle norme Euro 5;
- utilizzo di veicoli ecocompatibili con massa totale a terra minore o uguale a 70 q.li ed aventi sagoma equivalente a quella del corrispondente veicolo da 35 q.li;
- utilizzo di dispositivi telematici, anche già installati per altre funzioni, comunque in grado di rilevare e trasmettere a distanza dati riguardanti la localizzazione del veicolo, finalizzati a facilitare gli accessi alle aree individuate, per l'utilizzo delle corsie riservate e delle piazzole dedicate al carico/scarico merci.

Resta inteso che l'utilizzo di tali dispositivi non comporterà oneri aggiuntivi per gli operatori e che tali dati saranno raccolti, custoditi e trattati dal Comune o da sua società di scopo in modo anonimo, nel totale rispetto della normativa vigente in termini di privacy e senza fornire gli stessi a parti terze.

Art. 8. Verifiche di conformità per l'accreditamento e l'accesso alle misure di premialità

Al fine di verificare la conformità delle piattaforme logistiche e dei veicoli rispetto ai requisiti minimi richiesti per l'accreditamento e successivo accesso alle misure di premialità, verrà individuata presso il Comune un'apposita funzione responsabile dell'accreditamento al servizio. Tale verifica sarà effettuata come di seguito indicato:



- Ricevimento e controllo di documento di autocertificazione da parte del soggetto che intende accreditarsi e quindi accedere alle misure di premialità, relativa alla conformità delle piattaforme logistiche e/o dei veicoli rispetto ai requisiti minimi richiesti.
- Verifiche a campione successivamente al rilascio del contrassegno.

Art. 9. Misure di premialità per i soggetti accreditati

Gli operatori accreditati in possesso dei requisiti di accesso alle misure di premialità di cui all'Art. 7 del presente protocollo possono usufruire delle seguenti agevolazioni:

- allargamento della finestra oraria di accesso in ZTL Centrale – Accesso consentito per le operazioni di carico e scarico dalle ore 6:00 alle 24:00;
- gratuità del costo dei contrassegni per la circolazione in ZTL Centrale per i primi due anni;
- utilizzo di specifiche aree di carico/scarico in ZTL Centrale;
- utilizzo di corsie di transito destinate all'accesso in città dei veicoli impiegati nella distribuzione urbana delle merci, ripercorrendo l'esperienza delle "corsie olimpiche", per creare veri e propri corridoi di raggiungimento delle zone di consegna finalizzati ad accorciare i tempi di percorrenza.

Art. 10. Comitato di monitoraggio

Tra le parti firmatarie del protocollo è costituito il Comitato per il sostegno ed il monitoraggio del presente protocollo d'intesa (task force).

Il Comitato, con funzioni consultive a supporto delle decisioni del Comune di Torino, è composto da un rappresentante territoriale per ognuno dei firmatari del protocollo più un incaricato tecnico con funzioni di coordinatore.

La presenza della Camera di Commercio di Torino all'interno del Comitato si pone in modo innovativo l'obiettivo di svolgere la funzione di garante del rispetto delle necessità e delle esigenze dei diversi attori ed assicurare la continuità istituzionale delle attività del Comitato.



Alle riunioni del Comitato partecipano a titolo consultivo un rappresentante per ognuna delle associazioni che hanno firmato il protocollo in qualità di sostenitori.

L'attività del Comitato ha per oggetto il sostegno ed il monitoraggio all'applicazione delle azioni previste dal presente protocollo e di tutte quelle azioni a supporto che si dovessero rendere necessarie per il raggiungimento delle finalità del protocollo. Il Comitato ha quindi un ruolo fondamentale di ascolto e condivisione delle problematiche ma è da intendersi come organo consultivo; pertanto nessuna decisione verrà assunta con votazioni specifiche sui punti tenendo conto di eventuali maggioranze che andranno eventualmente a formarsi.

Il Comitato svolge compiti di sostegno all'azione del Comune al fine di determinare una linea unitaria di intervento, attraverso riunioni periodiche nonché delle ulteriori problematiche di rilievo che scaturiranno dall'applicazione dei nuovi provvedimenti legislativi e/o interventi diretti a dirimere gli eventuali conflitti insorti.

In ordine alle predette attività, il Comitato svolge una funzione di esame delle problematiche di maggior rilievo e maggiormente ricorrenti e di determinazione di indicazioni da parte dei firmatari del protocollo, ivi compresa una più puntuale definizione delle filiere e delle tipologie di veicoli specifici esclusi dall'applicazione delle disposizioni di cui all'Art. 1 nonché l'eventuale esclusione di ulteriori filiere o tipologie di veicoli.

Il Comitato condivide con il Comune un piano di realizzazione di nuove piazzole di sosta destinate al carico ed allo scarico merci, anche in modalità mista. Il comitato terrà in considerazione per confermare i provvedimenti del presente protocollo anche l'andamento economico complessivo, proprio per la piena consapevolezza delle difficoltà di effettuare nuovi investimenti dei soggetti interessati in caso del confermarsi della crisi attuale.

Viene inoltre costituito un gruppo di lavoro specifico costituito dai soggetti firmatari del presente protocollo con riferimento all'attività di monitoraggio dei livelli di qualità del servizio di distribuzione urbana delle merci, con esplicito riferimento all'osservanza delle norme di sicurezza, al rispetto del Codice della Strada, alle condizioni economiche e lavorative degli operatori delle filiere interessate.



All'interno del Comitato, in caso di esigenze specifiche, sarà possibile istituire tavoli bilaterali di confronto tra le parti.

Il Comitato è convocato dal coordinatore ogni qualvolta si renda necessario, e comunque almeno una volta al mese, per la trattazione di problematiche di particolare rilevanza.

Il Comitato svolge in forma temporanea e transitoria le funzioni di "Task Force" nell'ambito del progetto PUMAS. La segreteria del Comitato ha sede presso l'Assessorato alla mobilità viabilità e trasporti.

Resta inteso che con la sottoscrizione del presente protocollo i firmatari danno inizio ad una fase di illustrazione con le varie realtà territoriali delle singole associazioni delle procedure di accreditamento e di premialità ad essi riservate attuando quindi nello spirito stesso del Comitato un percorso virtuoso che non potrà che migliorare il contenuto dello stesso.

Art. 11. Ufficio relazioni con il pubblico

Il Comune di Torino o sua società di scopo metteranno a disposizione degli interessati e dei soggetti coinvolti al progetto i materiali informativi di competenza e per la successiva attività di accreditamento attraverso l'attivazione di un apposito sito web da cui sarà possibile avere le informazioni richieste e scaricare la relativa modulistica. Tale attività potrà essere svolta con il supporto delle Associazioni interessate ad assistere i soggetti interessati alla normativa.

[Handwritten signatures in blue ink]



FIRMATARI DEL PROTOCOLLO

Città di Torino	<i>[Signature]</i>
Camera di Commercio Torino	<i>[Signature]</i>
AICAI	<i>[Signature]</i>
Apsaci Torino	<i>[Signature]</i>
ASCOM - Confcommercio Torino	<i>[Signature]</i>
C.N.A. Torino	<i>[Signature]</i>
Confesercenti Torino	<i>[Signature]</i>
Confartigianato di Torino	<i>[Signature]</i>
Confartigianato Trasporti di Torino	<i>[Signature]</i>
Confcooperative Torino	<i>[Signature]</i>
FITA C.N.A. Torino	<i>[Signature]</i>
FAI Torino	<i>[Signature]</i>
FEDIT	<i>[Signature]</i>
Unione Industriali di Torino	<i>[Signature]</i>
Confindustria Piemonte	<i>[Signature]</i>

API TORINO
SOSTENITORI DEL PROTOCOLLO

ANFIA	<i>[Signature]</i>
Federauto	<i>[Signature]</i>
Federdistribuzione	<i>[Signature]</i>
UNRAE	<i>[Signature]</i>