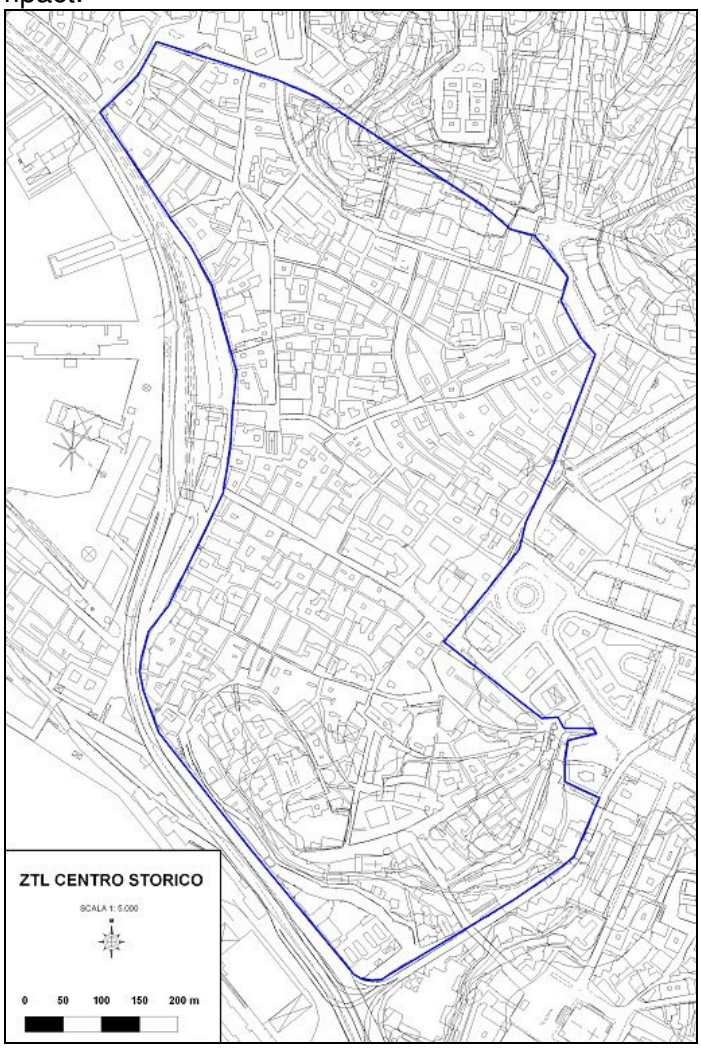
Measure title: **Enlarged goods distribution scheme in Genoa**

City: **Genoa** *Project:* **CARAVEL** *Measure number:* **10.01**

A Introduction

A1 Objectives

The aim of the project is to create an alternative concept of goods distribution for the Historical Centre (view map), less invasive for citizens life, and to diminish the environmental impact.



The *general* objectives are:

- Reduction of the impact of the distribution of goods on urban traffic.
- Optimisation of collection and delivery process, through the direct involvement of the interested stakeholders
- Application of new rules to regulate the access to critical urban areas for commercial vehicles and to improve a rational circulation of the authorized commercial vehicles.
- Implementation of a more rational overall distribution process to reduce the environmental impact and to increase the fruition of the urban areas.

The *specific* objectives related to this measure are:

- To protect the socio-economic tissue of the area.
- To elaborate a "tool box": a series of instruments to be used in a coordinated way and to be customized on the characteristics and the needs of the single target area. The initiatives listed in the following are part of this "tool box".
  - To set up a "Mobility Credits System", which consists of binding the freight vehicles' access in the target area to the payment of a predetermined mobility credits amount, preliminarily distributed by the public administration to all the economic activities in the target area.
  - To set up one or more small "proximity warehouses" (little-sized premises where small goods may be temporarily stored) to discourage the traders to use their own cars to transport goods to the shops.
  - To rationalize the vehicles' use, by the traders who transport goods to the shops with their own cars, through the introduction of a Van-Sharing service (car-sharing service dedicated to goods transport).
  - To elaborate a unitary and coherent regulation for the access of commercial vehicles in the target areas.

A2 Description

The set of measures can be summarised as follows:

- Adoption of an innovative access regulation scheme specially devoted to the freight distribution within the framework of a LTZ (this scheme is called "Mobility Credits")
- Set up of a small "proximity warehouse" devoted to shopkeepers to facilitate the supply using their own vehicles avoiding to enter the target area
- Expansion of the use of van sharing by shopkeepers and other economical operators

While the originally foreseen way to achieve the targets was the set up of a professional centralised delivery service, the new designed approach is to implement a self regulating scheme which encourages the optimisation of the goods distribution through an innovative scheme.

In addition, the cooperation with other measures (M09.04 "Car sharing service" and M07.01 "Integrated access control strategy and road charging scheme") has been strengthened.

In particular a deep integration between this measure and the 07.01 "Integrated access control strategy and road charging scheme" is necessary. In fact, being the mobility credits scheme a pricing scheme, all the technological system needed to implement the scheme is provided within the framework of this last measure. Specific software tools and hardware equipments have been developed and provided.

The set of initiatives is summarized in the following:

- As a necessary premise to the whole intervention, it is necessary to define the target area as a Limited Traffic Zone, and therefore to establish which categories of users have the entrance right and the related conditions. The "Mobility Credits" scheme represents a general pricing scheme, which will be applied in the first

period to the commercial vehicles only. It is based on the expansion of the LTZ and on a general management system which is developed in the framework of the 7.1 measure (access control and pricing). The basic idea of "mobility credits" is quite simple: each economic activity owns a certain number of "mobility credits", compatible with the overall environmental and mobility situation, and can spend them making different transport choices, each one having a different cost in terms of credits.

- Small "proximity warehouses": this initiative is partially complementary to the following, since these structures are small premises where a shop owner may arrive, unload and leave the goods he has just bought in the proper storing spaces, leave the car (its own or a shared vehicle) in the vicinity and then bring its goods to the shop by non polluting means (for instance traditional or electric trolleys).
- Expansion of Van Sharing service: this action consists in the enlargement of the car sharing service operated by commercial vehicles. The aim is to induce the shop owners to abandon the use of their private vehicle to provide their shops and to resort to shared vehicles when the use of professional transport is impossible.

B Measure implementation

B1 Innovative aspects

The innovative aspects are directly connected with the new concept: set up of an integrated system to regulate freight distribution, using different techniques to support the regulations for the access of commercial vehicles, also through software ad hardware developed for the project and tested during the experimental phase.

The innovative aspects of the measure concern the following categories:

- **New conceptual approach:** the new approach is a very innovative one, which requires the special development of a new scheme, new tools and procedures. So the research content of the measure is higher than originally foreseen.
- **Use of new technology/ITS:** gates for access control; portable equipments for the delivery tracking; specific software for the administration of economic activities and transporters data and for the management of "virtual accounts".
- **New policy instrument:** Adoption of an innovative access regulation scheme specially devoted to the freight distribution within the framework of a LTZ (this scheme is called "Mobility Credits") The innovation activities will mainly consist in a social research and analysis focused on the social and economical impact of the overall project Particular attention will be devoted to the protection of the socio-economic tissue of the area, in order to avoid growth in the cost of transport, and in the complexity of the regulations in force or bureaucratic complications, etc. The research activities will mainly consist in the design and development of the integrated regulation scheme, in all its different aspects above mentioned, and in the development of all the related procedures to manage this new scheme. This activity will also imply the management of the political debate with all the stakeholders involved in the adoption of these measures.

B2 Situation before CIVITAS

The historical centre of Genoa has great problems of traffic congestion and air/noise pollution deriving from traffic related to goods distribution. In fact, more than 1.400 vehicles access this area everyday in order to deliver goods in the historical centre, divided in:

- 9% carriers
- 30% directly distributors
- 54% craftsmen and traders
- 7% yards buildings

The reason of this vast amount of transport demand consists in: the great number of economic activities (shop, artisans, …) present in this area; the morphologic characteristics of the area (several narrow streets, difficult social and economic conditions, …). The combination of these different types of factors makes so that it's not possible to solve the problem by simply forbidding the access of vehicles to this area (for example with a traditional Limited Traffic Zone), because the first effect of this kind of actions would be a crisis of the economic fabric.

B3 Actual implementation of the measure

The measure has been developed through the following tasks:

Task 1: Design of the regulation scheme– *The different tools which form the general scheme has been defined and each of these studied in detail, in particular for what concerns the application to goods distribution in the Historical Centre.The most relevant effort have been spent in the application of the mobility credits system to the specific situation.*

Task 2: Study on economical/ social impact– *Phase necessary to evaluate the measure in general; the contents of the study are obviously different from what originally foreseen, since the technical approach of the measure has changed.*

Task 3: Study to select the areas– *the areas where the proposed scheme could be extended have been selected. Subsequently, feasibility studies have been carried out on the selected areas.*

Task 4: Definition of contractual and economical aspects– *All the aspects related to the norms of the street code and the application of this new scheme of pricing and access control have been examined. Other important aspects are related to the permissions, the privacy problems and so on.*

Task 5: Implementation of the "goods distribution management scheme"– *Since the new centralised service won't be realised, the content of this task is modified: it included the actions many actions necessary to implement the general scheme and to prepare the experimental phase (A 10.1.13), contemporarily and after the definition of the scheme.*

Task 6: Evaluation and monitoring– *The chosen indicators have been monitored and evaluated in different times. As a result, the effectiveness of the measure has been evaluated.*

Task 7: Information/promotion campaign– *In addition to the general CIVITAS CARAVEL information, specific information activities have been necessary for this measure, particularly addressed to the category association (shopkeepers, transporters, craftsmen) and to the single economic operators.*

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Task 9: Set up and equipment of a small "proximity warehouse"– *A little-sized warehouse, where small amounts of goods may be temporarily stored, has been renovated and equipped to offer the traders an alternative to the use of their own cars until the shops.*

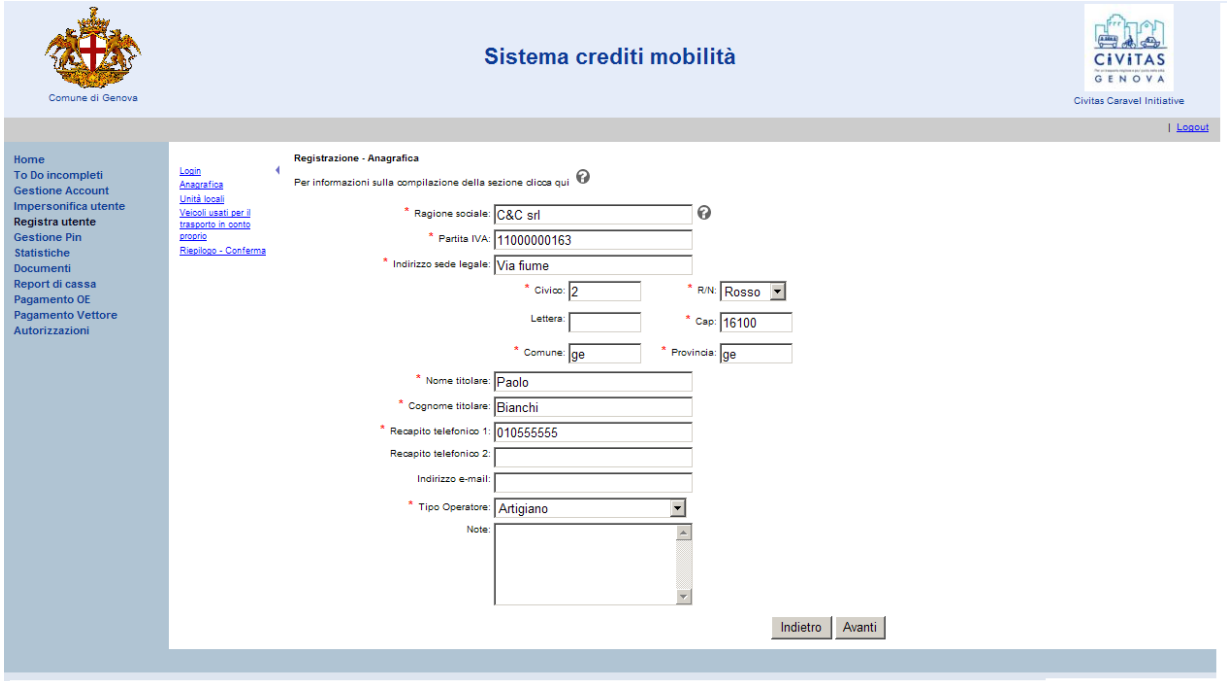
Task 10: Experimental phase of the "goods distribution management scheme"– *From month 40 to month 48, the proposed complex of "tools", which form the goods distribution management scheme, will be operational in the historical centre, for an experimental period (a period of testing, calibration, adjustment is needed).*

Task 11: Van Sharing– *The target of this task is to expand the use of van sharing by shopkeepers and other economical operators of the target area.*

The measure was implemented in the following stages:

- Mobility credits scheme for goods distribution:
  - until the end of 2006, the measure implementation followed the original plans (creation of a centralised distribution structure); only after this moment the mobility credits scheme has been developed (see B4 for details);
  - from January 2007, the work concentrated on the application of the mobility credits scheme (conceived within measure 7.1) to the real case of goods distribution in the historical centre: in this context, we intensified the contacts with the stakeholders;
  - from July 2007 we began to develop the support software (managing the virtual accounts and all their movements, due to deliveries and to vehicles' entrance), in parallel with the work carried out by measure 7.1 (design and development of the technological supporting system);

The RFiD card and its reader device, specially developed for Mercurio, used to transfer credits from economic operators to transporters



A screenshot of the software which manages the mobility credits system

- from the end of 2007, we began to face with "front office" issues: which front end points should be realised, their characteristics and features. The general front office and back office operations management for the mobility credits system have been assigned to the public society "Genova Parcheggi SpA"; a contact point in the heart of the city (Palazzo Ducale) has been prepared; a specific agreement with the stakeholders associations has been reached, so that they can do "front office" operations for their associates. The operational procedures have been drawn up, and the relevant training courses have been held in March, July and November 2008 (participants: the future front office operators of the stakeholders association and of Genova Parcheggi)

Mercurio contact point at Palazzo Ducale

- in the meantime, the first communication and dissemination means have been realised: a "commercial name" has been chosen, since the name "mobility credits" seems too difficult for the users (Mercurio, the winged god of Commerce and trade, also recalling the italian word "merci" = freight) and the relevant logo has been designed; a first informative leaflet has been realised in Italian, English, French, Spanish, Chinese and Arabian;

Mercurio per commercianti, artigiani e uffici

Ogni mese Mercurio attribuisce in automatico alle attività registrate un certo numero di "crediti di mobilità" su un conto virtuale, sulla base delle necessità di approvvigionamento dichiarate dall'operatore stesso.
I crediti possono essere utilizzati per rifornirsi in proprio o per farsi rifornire da terzi. Per ogni accesso all'area con un proprio veicolo (rifornimento in proprio) viene sottratto dal conto virtuale un certo numero di crediti.
Per i rifornimenti effettuati tramite terzi, le attività registrate trasferiscono al trasportatore, tramite la card Mercurio, 1 credito per ogni consegna ricevuta.
Gli uffici possono utilizzare i crediti di mobilità solo per farsi rifornire da trasportatori.
La dotazione mensile iniziale è gratuita; se alla fine del mese il saldo è in attivo, i crediti rimangono per il periodo successivo, altrimenti è necessario richiedere i crediti mancanti e necessari per svolgere la propria attività.

Mercurio per i trasportatori

I trasportatori che abitualmente consegnano merci nel centro storico possono registrarsi indicando i veicoli utilizzati. Il saldo iniziale del conto virtuale dei trasportatori è pari a zero.
Per ogni accesso viene sottratto un certo numero di crediti, che vengono recuperati tramite le consegne effettuate (1 credito per ogni consegna), per mezzo di un lettore portatile in dotazione a ogni veicolo.
Ogni sei mesi viene effettuata una "chiusura contabile" del conto dei trasportatori; se il saldo è in attivo i crediti rimangono per il periodo successivo, altrimenti il trasportatore deve richiedere i crediti mancanti e necessari per svolgere la propria attività.

Informazioni
È possibile ottenere informazioni sul sistema Mercurio presso i seguenti soggetti:

- Sportello Mercurio a Palazzo Ducale, piazza Matteotti piano porticato 42r, tel 010 5574041
- Genova Parcheggi, via Brigate Partigiane 3l r, tel 010 539871
- Ascom - Confcommercio della Provincia di Genova, via Cesarea 8, tel 010 55201
- Confesercenti, via Cairoli 11, Int. 6-8, tel 010 2485120
- CNA, via San Vincenzo 2, tel 010 545371
- Confartigianato, via Assarotti 7, tel 010 816051
- Assodazione Spedizionieri Corrieri e Trasportatori di Genova, via Roma 9/4, tel 010 5451986
- FAI Genova, via degli Artigiani 58 G, tel 010 715494
- Mobi - Laboratorio della Mobilità Sostenibile piazza Matteotti, 74 r, tel 010 5451503

oppure tramite
- http://creditimobilita.comune.genova.it

Comune di Genova
ZTL

Mercurio
Accesso merci al centro storico di Genova

CiVITAS CARAVEL

Mercurio è un sistema innovativo per l'accesso delle merci nel centro storico, sviluppato dall'Assessorato alla Mobilità del Comune di Genova nell'ambito del progetto europeo Civitas Caravel.
Mercurio è attivo nell'area della ZTL centro storico, compresa tra via delle Fontane, via Cairoli e via Garibaldi, via XXV Aprile, piazza De Ferrari, via Ravasco, piazza Cavour, piazza Caricamento e via Gramsci; restano escluse le zone del Molo e di via Prè.
L'obiettivo è il miglioramento della mobilità e vivibilità del centro storico; in particolare, Mercurio si propone di razionalizzare il traffico dei mezzi merci, garantendo allo stesso tempo i rifornimenti e le consegne a commercianti, artigiani e agli altri operatori.

Chi coinvolge Mercurio

Il meccanismo di funzionamento di Mercurio coinvolge gli operatori economici (artigiani, commercianti e uffici) con sede nell'area indicata e i trasportatori che lavorano abitualmente in tale area.
Per aderire al sistema dei "crediti di mobilità" è necessario registrarsi, con le modalità indicate all'interno.

I crediti di mobilità

I "crediti di mobilità" sono la moneta virtuale che consente la distribuzione delle merci nella ZTL del centro storico tramite il sistema Mercurio.
Mercurio premia i comportamenti virtuosi e garantisce il rispetto della normativa in vigore.
L'adesione a Mercurio è volontaria: coloro che non desiderano registrarsi potranno accedere al centro storico solo a pagamento, attenendosi alle norme vigenti per l'accesso alla zona a traffico limitato (ZTL).

Mercurio Italian leaflet, face A

La card

Viene consegnata a ogni operatore economico al momento dell'accreditamento ed è lo strumento che consente a commercianti, artigiani e uffici di trasferire i crediti ai trasportatori che effettuano loro le consegne.

Il lettore portatile

Viene dato in dotazione a ogni trasportatore al momento della registrazione (uno per veicolo), per ricevere i crediti da commercianti, artigiani e uffici che rifornisce. Il trasferimento dei crediti avviene accostando il lettore alla card dell'operatore economico al momento della consegna.

varchi
via Lomellini
via Cairoli
via Garibaldi
via di Porta Soprana
via Ravasco (già attivo)
piazza Giacomo Marina
vico delle Camelie
via San Giorgio (già attivo)
piazza Raibetta
vico Giannini
via del Campo

Come accreditarsi

Le attività economiche con sede nell'area e i trasportatori possono - compilando un apposito modulo - accreditarsi presso:

- Sportello Mercurio a Palazzo Ducale, piazza Matteotti piano porticato 42r, tel 010 5574041; lun - ven 8.30-17.30
- Genova Parcheggi, via Brigate Partigiane 3l r, tel 010 539871; lun - ven 8.30-17.30
- Ascom - Confcommercio della Provincia di Genova, via Cesarea 8/4, tel 010 55201; lun-gio 9-11.30/14.30-17.30, ven 9-12.00/13.30-16
- Confesercenti Genova, via Cairoli 11, tel 010 2485120; lun - ven 9-12 e 14-16.30;
- CNA, via San Vincenzo 2, tel 010 54537 1; lun - gio 8.30-12.30/14-17.30, ven 8.30-13.30 (solo operatori economici)
- Associazione Artigiani della Provincia di Genova - Confartigianato, via Assarotti 7, tel 010 816051; lun - ven 8.30-13.00/13.30-17.00 (venerdì solo mattina)
- Associazione Spedizionieri Corrieri e Trasportatori di Genova, via Roma 9/4, tel 010 5451986; lun-ven 8.30-12.30/14.30-18.30 (venerdì fino 17.30).
- F.A.I. Federazione Autotrasportatori Italiani - Associazione Provinciale di Genova, via degli Artigiani 58 G, tel 010 715494

Attraverso questi canali è possibile avere anche informazioni sul funzionamento di Mercurio e sullo stato del proprio conto virtuale.

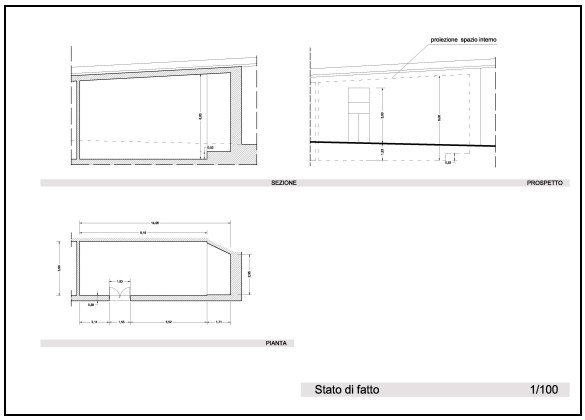
I varchi di accesso

Sono undici i varchi elettronici dotati di telecamere per il riconoscimento dei veicoli. L'accesso al centro storico per consegna e distribuzione merci può avvenire solo negli orari consentiti.

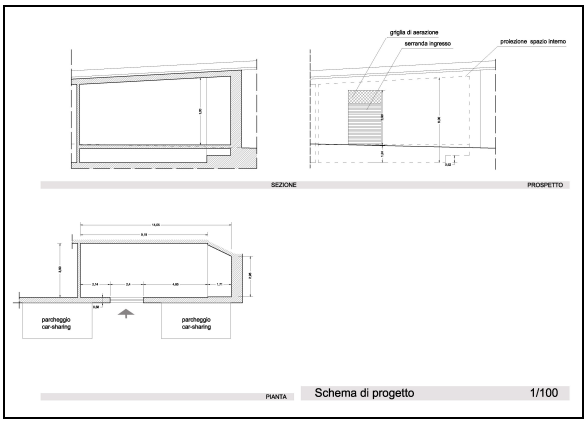
Mercurio Italian leaflet, face B

- **Proximity warehouse**:
  - From February to December 2007 a complex phase of contacts and confrontation with the stakeholders (CIV - Association of the Economic Operators - of Via San Bernardo) has began, in order to identify the potential demand and the needs of the user, and to choose the best technical solutions;
  - the design phase extended during the stakeholders involvement phase and after, until the completion in May 2008; the results of this phase consist in the technical and graphical papers necessary to the tender;
  - the call for tenders has been accomplished between June and July 2008; unfortunately, the call was deserted, so it wasn't possible to assign the civil works and the equipment supply. It has been ascertained that the times of the project

were not compatible with the exploitation of new tender, which would require more than the 5 months left at the moment of the conclusion of the first call.



Current condition of the warehouse



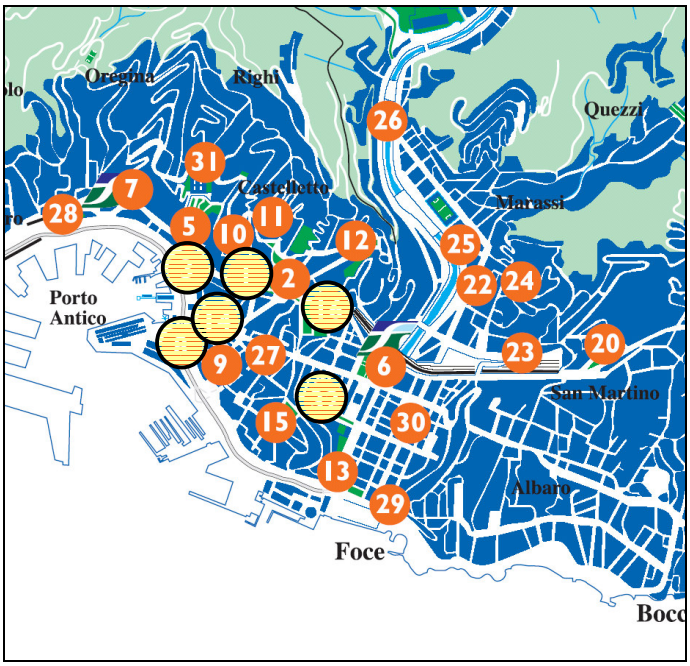
Design situation

The kind of equipment was selected in cooperation with the CIV: the main alternatives were a traditional warehouse equipped with shelves and closed boxes, and an automated warehouse. This second alternative was chosen, mainly for safety and security reasons.

- **Van Sharing:**
  - The first experiment of this service has been set up through an agreement with the CIV (Association of the Economic Operators) of Via della Maddalena. The associations of trade and craftsmanship (ASCOM - Confcommercio, Confesercenti, CNA and Confartigianato) expressed their will to collaborate with the Administration (memorandum of agreement signed on September 22nd, 2006) and adhered to the initiative. The agreement signed with these associations foresees particular tariffs, with a progressive discount depending on the number of adherent economic operators.
  - At the present time, a fleet of eco-compatible vehicles (4 bi-power Fiat Doblò and 2 Fiat Ducato) is displaced over many parking places around the Historical Centre and can be used by artisans and shopkeepers (with the same rules as car sharing) to transport goods to and from their economic activities. The access to the historical centre is allowed for these vehicles in a wider time window than for a traditional goods transport.

The larger kind of van sharing vehicle (Fiat Ducato)

The smaller kind of van sharing vehicle (Fiat Doblò bi-power)



Parking places used for van sharing service around the target area

The leaflet used to promote van sharing service

B4 Deviations from the original plan

The objectives of the project have been confirmed, but the technical framework has been modified.

The basic paradigm has been changed from the idea of a centralised service of goods distribution to an integrated set of measures targeted to limit the number of accesses.

The revision of the technical approach was decided after a deep analysis of the previous experience held in Genoa about the centralised goods distribution service for the historical centre. Additional deeper studies to characterise the goods distribution process in the target area have been carried out. These studies led to the following conclusions:

- The majority of the vehicles entering the target area belongs to the single shopkeepers supplying their shops only. This traffic represents more than 60% of the total but provides only the 10% of the goods.
- Professional transporters already organise their activity in order to optimise both loads and costs; the introduction of a further break in the supply chain proved to be unsustainable over a small area. In fact the experiment already carried out by the Municipality of Genoa in providing a centralised service for goods distribution, showed an economical overhead of about 9 € for each delivery, which is not compatible with a market perspective. So it's evident that a project based on a hub may be more efficient if used at a city-wide level, in this case with the total entrustment of the “last mile” activity to the hub manager.
- Transporters’ responsibilities (together with the opportunity of keeping the visibility of their own brand) prevent them from the possibility of delegating the “last mile” to another subject.
- A set of rules which obliges the operators to use the hub’s service isn’t compatible with the current laws.
- A centralised hub requires the definition of a consortium structure, in which all the interested operators are involved; the definition of the characteristics and the respective roles of the different operators isn’t easy.
- For the considered area, with its goods delivery distribution characteristics, the use of a centralised service would not affect in any case the accesses related to private vans, which represent the majority of the traffic; In fact a warehouse devoted to subjects that transport goods on their own should be located very close to the restricted area, as goods grouping/de-grouping, as seen, is not possible. Given the location of the restricted area and its urban characteristics, there is no real possibility of having huge warehouses that can serve a wide area, small warehouses should be devoted to part of the historical centres.

Given all the preceding considerations, it can be said that, at the moment, the transport operators in Genoa are not ready to built up a centralised distribution structure managing distribution all over the city.

As the focus of the measure and the interest of the City Administration is the historical centre, the result of the studies and of the design process was to change the approach to the measure as previously described.

In particular, the studies carried out in the framework of the measure 07.01 (Integrated pricing and access control strategies), gave the possibility to focus on an advanced solution of innovative pricing scheme based on the “mobility credits” concept, which will constitute the backbone of the access regulation scheme and of the described “tool-box”.

Synthetically, deviations from the original plan comprised:

- **basic paradigm** has been changed from the idea of a centralised service of goods distribution to an integrated set of measures targeted to limit the number of accesses;

- **new technologies** for the small "proximity warehouse"

Other subsequent deviations consisted in:

- the failure of the tender concerning the proximity warehouse: the call was published in May 2008, the offers should have been presented by 7th July 2008 but there was none, so it wasn't possible to assign the supply contract and there was not enough time left within the project to begin a new, different tender: therefore, it was necessary to renounce to this task
- the launch of the mobility credits scheme had been originally foreseen in spring/summer 2008; then, for technical reasons (not mature implementation status) in was postponed to the autumn, but at that time the political part had not taken yet the necessary political decisions (see also MERS 07.01, B4). From the technical point of view, the scheme could have started in November 2008, but it wasn't possible for these political/administrative reasons (lack of the necessary regulations); then, the period immediately before Christmas (late November and December) has been avoided because it's the most critical period of the year for goods distribution, and starting the system in this period would have signified its failure. As a consequence, the launch of the system had to be postponed to January 2009.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure no. 07.01 - Integrated access control strategy and road charging scheme in Genoa** – One of the tools of the proposed "goods distribution management scheme" is part of the Measure 07.01 (mobility credits)
- **Measure no. 09.04 - Car sharing service in Genoa** – One of the tools of the proposed "goods distribution management scheme" is part of the Measure 07.01 (Van Sharing Service)
- **Measure no. 11.17 - Decision support tool for environmental impact assessment of traffic planning measures in Genoa** – Evaluations of environmental impact

In particular, the mobility credits scheme will be developed between measures 07.01 and 10.01, as it involves some common aspects between the two measures:

- the theoretical study of the mobility credits scheme has already been developed under M 07.01;
- the scheme design, including the definition of the general criteria, the rules and the system parameters, as well as the involvement of the stakeholders, is an activity common to the two measures, as it implies to define aspect that will have impact on both the commercial activities related with goods distribution and the definition of the pricing scheme;
- the technological support system will be developed under M 07.01;
- the operational phase will be developed under M 10.01 for what concerns the management of the mobility credits scheme for goods distribution, and under M 07.01 for what concerns pricing and enforcement policies applied to the involved categories.

C Evaluation – methodology and results

Evaluation has been executed following some Meteor indicators (total number of goods vehicles moving in the areas, awareness level, acceptance level…) and some other interesting indicators (vehicles load rate, service effectiveness, …).

C1 Measurement methodology

C1.1 Impacts and Indicators

Evaluation Category	N°	Indicator	Units	Source of data	Methodology for indicator construction	Baseline date
Environment	9	CO emissions	g/vkm	CDG/Arpal	Modelling	05/2004
Environment	10	NOX emissions	g/vkm	CDG/Arpal	Modelling	05/2004
Society	13	Awareness level	%	CDG	Survey	10/2008
Society	14	Acceptance level	%	CDG	Survey	10/2008
Transport	25	Total n° of goods vehicles moving in the demo area	Number of movement s per day	CDG	Measurement	05/2004
		Service effectiveness	%	CDG	Measurement	---
Transport		Modal split between one's own/ third party	%	CDG	Modelling on measurement	05/2004
Transport		Vehicles load rate	Deliveries/ vehicle	CDG	Measurement	05/2007

Detailed description of the indicators' methodologies:

- **CO emissions** – Starting from the traffic counts and net characteristics, traffic flows are calculated by an assignation model (the streets of the target area are modelled in a graph). Traffic flows and the average fleet composition are used as input for the emission model TE-E (Copert methodology).
- **NOX emissions** – Starting from the traffic counts and net characteristics, traffic flows are calculated by an assignation model (the streets of the target area are modelled in a graph). Traffic flows and the average fleet composition are used as input for the emission model TE-E (Copert methodology).
- **Awareness level** – Survey through interviews, to point out the knowledge of the problem and the willingness to change one's own mobility behaviours (in this case, the supply modes).
  The target groups of this survey are economic operators, carriers, and citizens of the target area
- **Acceptance level** – Survey through interviews aiming at revealing the target group's level of knowledge and understanding of the measure and the perceived (positive or negative) impact of the measure on the group itself.
  The target groups of this survey are economic operators, carriers, and citizens of the target area.
- **Total n° of goods vehicles moving in the demo area** – Traffic counts are carried out regularly, when necessary associated with drivers interviews, so that the number of commercial vehicles entering the target area in a predetermined time window can be estimated.

- **Service effectiveness** – This indicator is related to the proximity warehouse, whose utilisation should have been monitored through the entrance cards distributed to the users. Through the card, the number of times when a shopkeeper accesses the warehouse can be known, and the utilization rate of the facility can be calculated, as well as the number of vehicular accesses to the target area avoided through the use of this temporary warehouse. Since the proximity warehouse could not be realised, this indicator can't be measured (incl. baseline).
- **Modal split between one's own/ third party** – Traffic counts are carried out regularly, when necessary associated with drivers interviews. In particular, interviews allow the evaluation of the modal split between one's own/ third party.
- **Vehicles load rate** – This new introduced indicator represents the average amount of deliveries effected by a goods vehicle. It is calculated dividing the total number of deliveries received by the economic activities of the target area by the total number of goods vehicles entering the area.

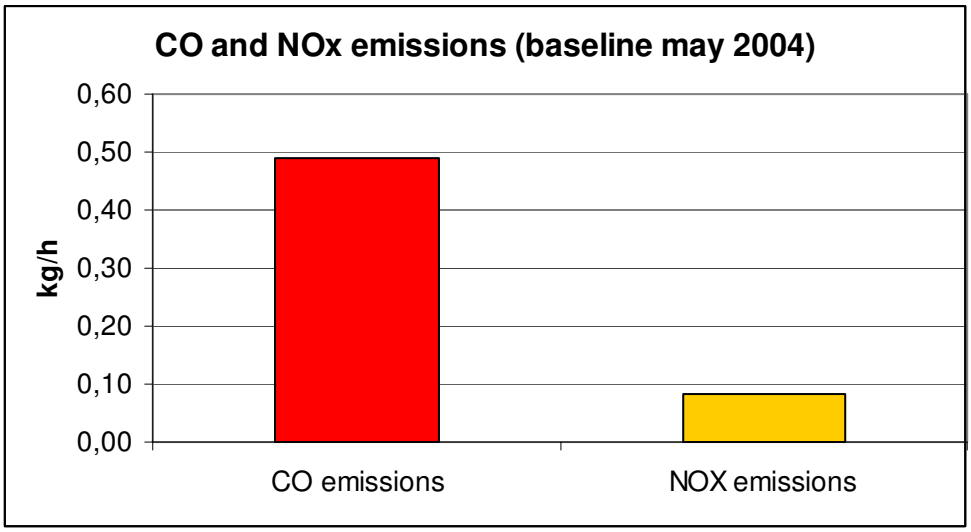
C1.2 Establishing a baseline

The baseline was established, for some indicators (CO and Nox emissions, Total n° of goods vehicles moving in the demo area, Modal split between one's own/ third party), already in May 2004.
The indicator "vehicles load rate" has been introduced only after the new measure description following the Mid-Term Assessment, and measured for the baseline in May 2007.
The indicators "awareness level" and "acceptance level" have been measured through a campaign of telephone interviews addressed to shopkeepers and artisans residing in the target area, executed in October 2008.

A second round of interviews to measure these indicators is foreseen after a few months of operation of the system to have an ex-post data, but this survey will reasonably be out of the Caravel time horizon.
The indicator "service effectiveness" refers to the small proximity warehouse and its use by subscribers, and the baseline should have been measured in the first month of the operational period, but it wasn't possible since the service didn't start.

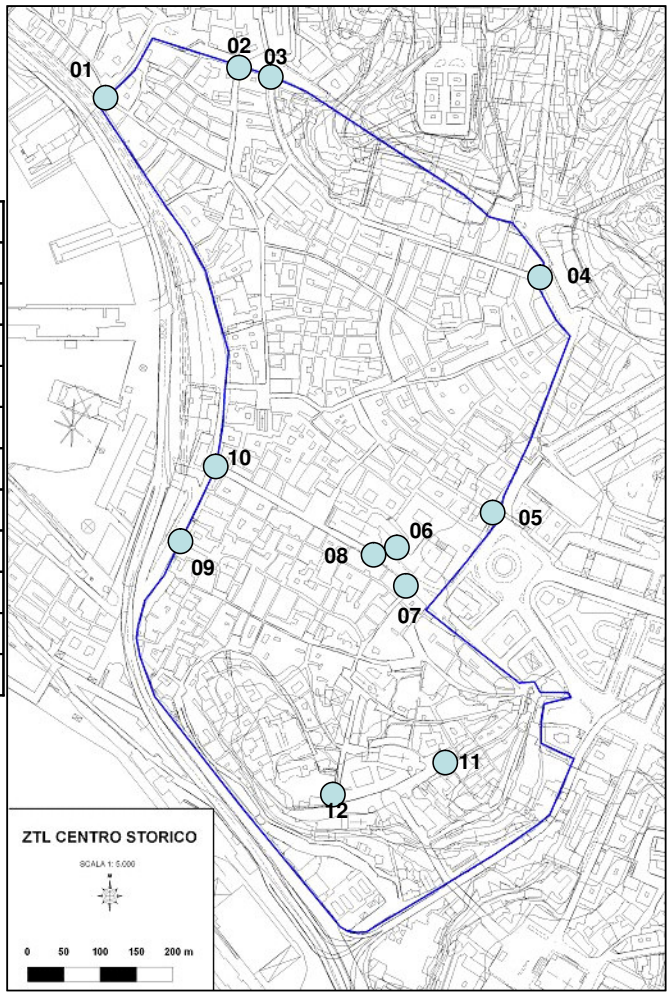
Indicator	Baseline value	Unit	Baseline date
CO emissions	0.49	kg/h *	05/2004
NOX emissions	0.0825	Kg/h *	05/2004
Awareness level	--	%	10/2008
Acceptance level	--	%	10/2008
Total n° of goods vehicles moving in the demo area	1379	Number of movements per day	05/2004
Service effectiveness	--	%	--
Modal split between one's own/ third party	60% one's own, 40% third party	%	05/2004
Vehicles load rate	7 Average Deliveries/ vehicle; 14 for carriers; 11 for distributors	Deliveries/ vehicle	05/2007

* for these indicators the right measurement unit is instead kg/h as the one indicated in the (g/vkm)

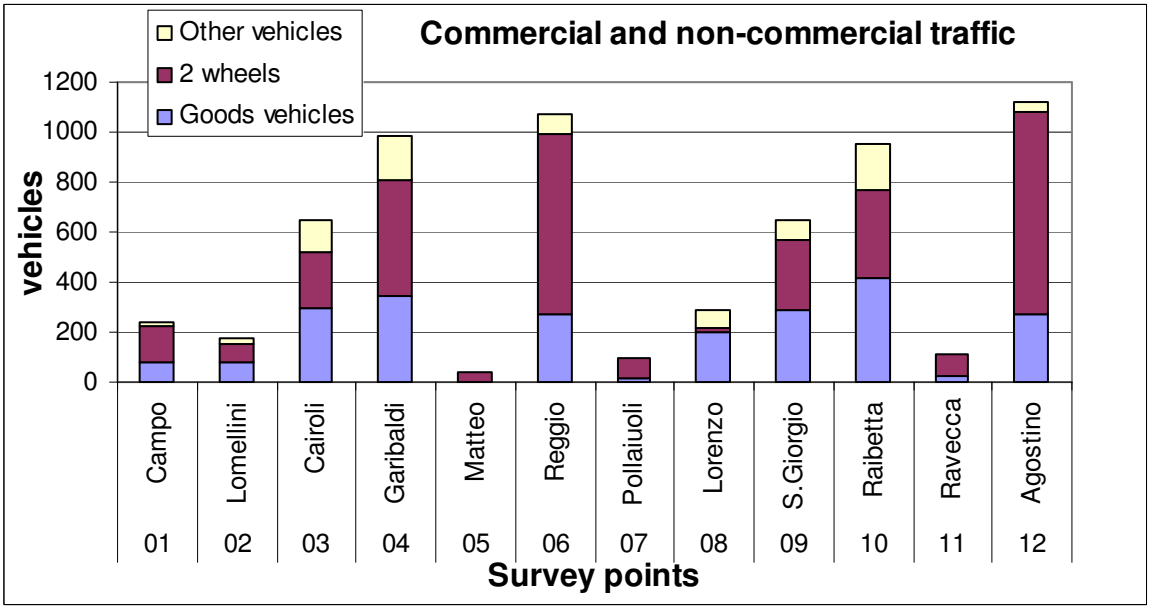


Some traffic surveys have been carried out in order to measure the total n° of goods vehicles moving in the demo area, the modal split between one's own/ third party and the vehicles load rate.
The first surveys date back to May 2004 and consist in traffic counts in the points shown below.

01	Via del Campo (access from Via delle Fontane)
02	Via Lomellini (access from Via Bensa)
03	Via Cairoli (access from Largo Zecca)
04	Via Garibaldi
05	Salita di S. Matteo (access from Largo Pertini)
06	Via Reggio (access from Piazza Matteotti)
07	Salita Pollaiuoli (access from Piazza Matteotti)
08	Via S. Lorenzo (access from Piazza Matteotti)
09	Via S. Giorgio (access from Via Turati)
10	Piazza Raibetta (access from Via Turati)
11	Via Ravecca (access from Piazza Sarzano)
12	Stradone S. Agostino (access from Piazza Sarzano)



The results of these counts are represented in the following graphic (including both goods traffic and other vehicles, divided between motorcycles and other vehicles):



Within the counted vehicles, 60% was entering the area (1378 goods vehicles out of 2207) and 40% was leaving the area (909 out of 2207).

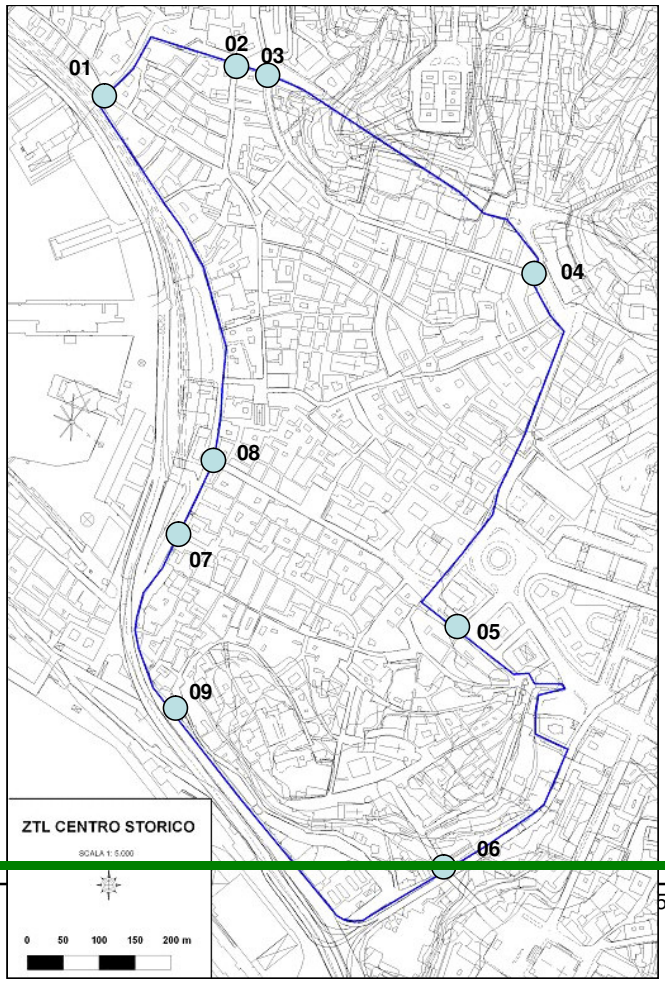
C1.3 Building the business-as-usual scenario

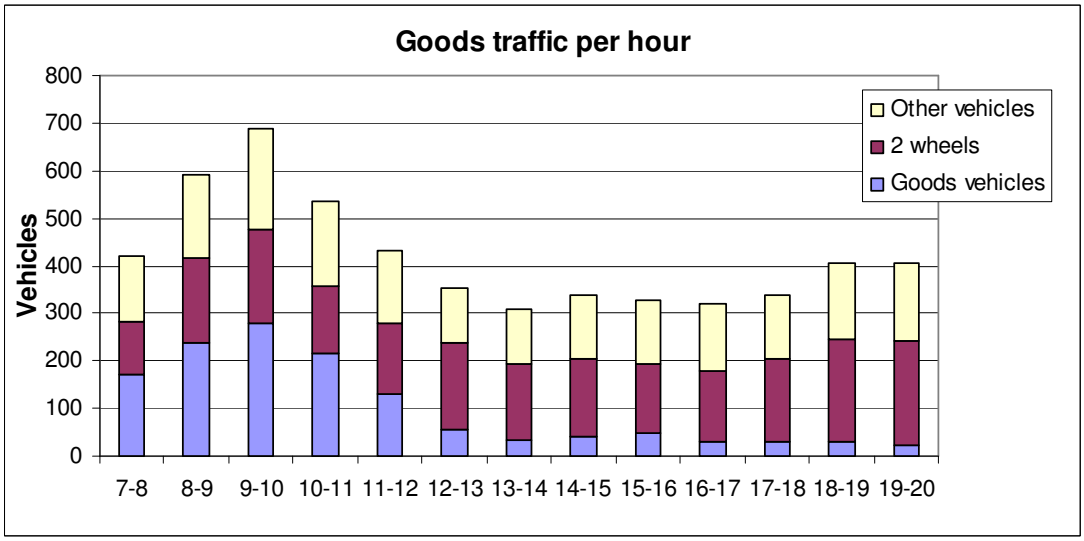
The "do nothing" scenario can be built using the data of the survey carried out between November 2006 and March 2007 (in fact, at that time only the van sharing service has started, but in the first months it had only a modest relevance), which show the following results:

Average accesses to the Historical Centre per hour

	Goods vehicles	2 wheels	Other vehicles
7-8	170	112	140
8-9	237	180	176
9-10	278	198	212
10-11	215	142	178
11-12	130	148	154
12-13	57	180	116
13-14	34	158	118
14-15	39	165	133
15-16	49	143	134
16-17	30	151	139
17-18	29	175	136
18-19	31	216	157
19-20	24	219	162
TOTAL	**1322**	**2187**	**1955**

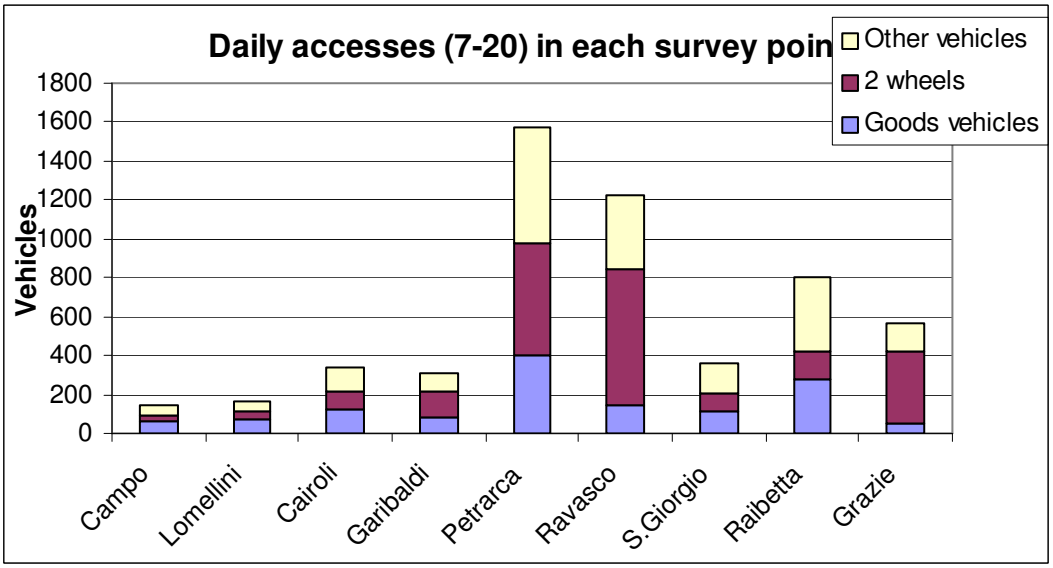
01	Via del Campo
02	Via Lomellini
03	Via Cairoli
04	Via Garibaldi
05	Via Petrarca
06	Via Ravecca
07	Via S.Giorgio
08	Piazza Raibetta
09	Via delle Grazie

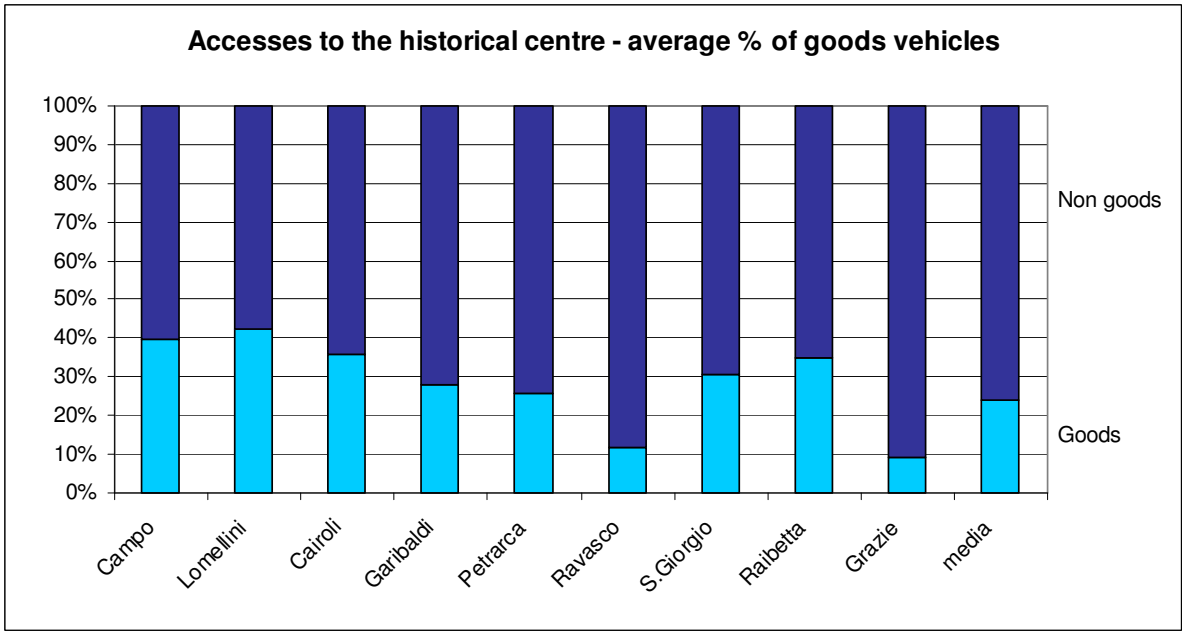


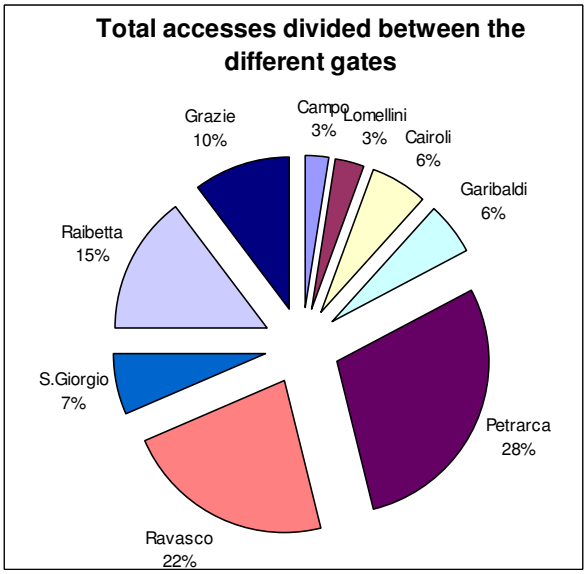


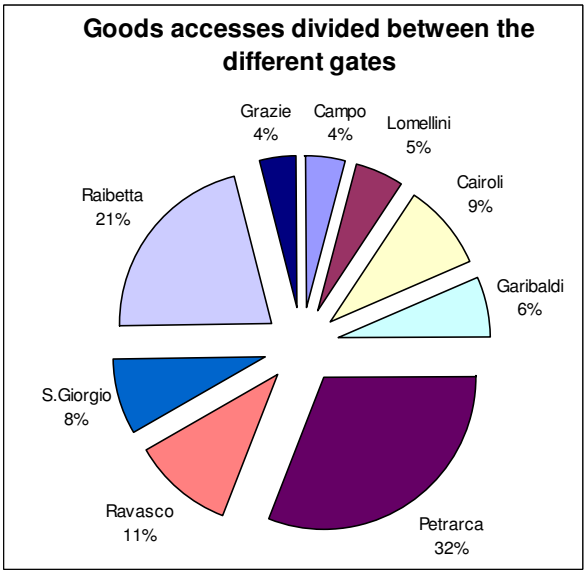
Daily average accesses (7-20) in each survey point

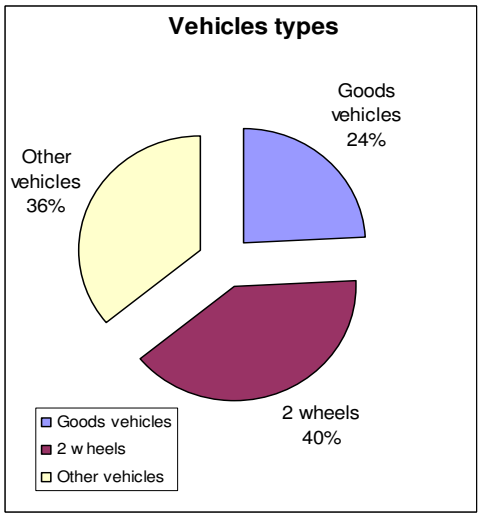
	Campo	Lomellini	Cairoli	Garibaldi	Petrarca	Ravasco	S.Giorgio	Raibetta	Grazie	**TOTAL**
Goods vehicles	57	70	120	86	405	142	109	281	52	**1322**
2 wheels	38	48	94	127	568	705	98	141	367	**2187**
Other vehicles	48	47	123	91	597	376	150	380	143	**1955**
TOTAL	143	165	336	304	1570	1223	357	802	563	**5464**



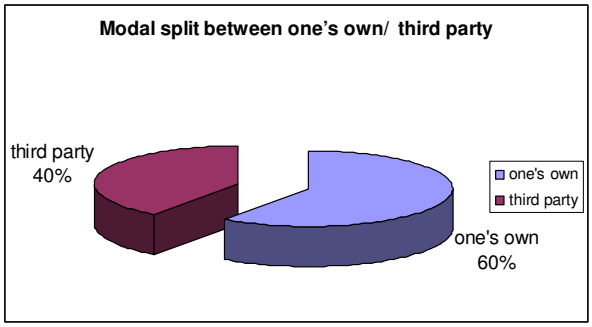

Accesses to the historical centre - average % of goods vehicles
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Non goods
Goods
Campo
Lomellini
Cairoli
Garibaldi
Petrarca
Ravasco
S.Giorgio
Raibetta
Grazie
media

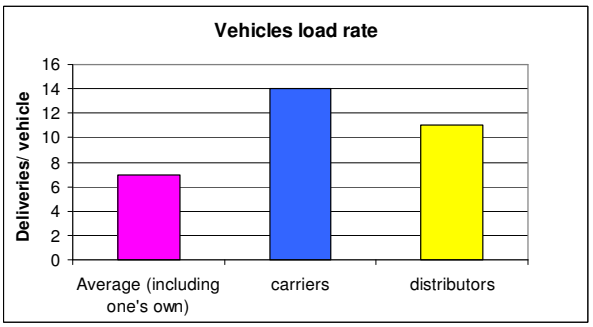

Total accesses divided between the different gates
Grazie 10%
Campo 3%
Lomellini 3%
Cairoli 6%
Garibaldi 6%
Raibetta 15%
S.Giorgio 7%
Petrarca 28%
Ravasco 22%


Goods accesses divided between the different gates
Grazie 4%
Campo 4%
Lomellini 5%
Cairoli 9%
Garibaldi 6%
Raibetta 21%
S.Giorgio 8%
Ravasco 11%
Petrarca 32%


Vehicles types
Goods vehicles 24%
Other vehicles 36%
2 wheels 40%
Goods vehicles
2 w heels
Other vehicles

The modal split between one's own/ third party and the vehicles load rate have been measured through direct interviews to transporters and economic operators a first time in May 2004 and then between the end of 2006 and the beginning of 2007: the resulting data have been interrelated and elaborated through a modelling.





The available data also allow the appreciation of the variations in traffic entering the historical centre during the year: during the peak period immediately before Christmas (from mid November to mid December), the number of goods vehicles is +9% in comparison to the average (total vehicles +5%); during the moderate period the number of goods vehicles is -12% in comparison to the average (total vehicles –8%); during a standard period the number of goods vehicles is +4% in comparison to the average (total vehicles +3%).

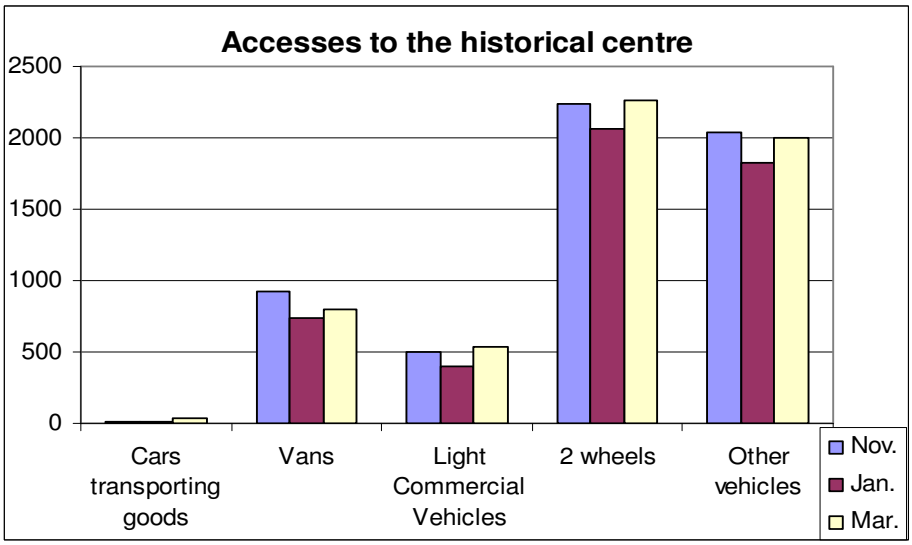
	Via del Campo			Via Lomellini			Via Cairoli		
	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.
Cars transporting goods	1	1	1	0	1	5	5	1	2
Vans	63	41	50	32	41	47	65	59	40
Light commercial vehicles	3	6	4	43	16	24	69	53	66
Total goods	***67***	***48***	***55***	***75***	***58***	***76***	***139***	***113***	***108***
2 wheels	44	37	34	87	31	25	96	93	92
Other vehicles	46	64	34	64	36	42	144	108	116
TOTAL	**157**	**149**	**123**	**226**	**125**	**143**	**379**	**314**	**316**

	Via Garibaldi			Via Petrarca			Via Ravasco		
	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.
Cars transporting goods	0	3	20	1	2	0	4	4	0
Vans	63	61	38	258	221	231	109	68	64
Light commercial vehicles	16	10	46	168	162	172	54	60	64
Total goods	***79***	***74***	***104***	***427***	***385***	***403***	***167***	***132***	***128***
2 wheels	127	126	129	608	566	529	691	724	701
Other vehicles	81	107	86	620	635	537	381	360	386
TOTAL	**287**	**307**	**319**	**1655**	**1586**	**1469**	**1239**	**1216**	**1215**

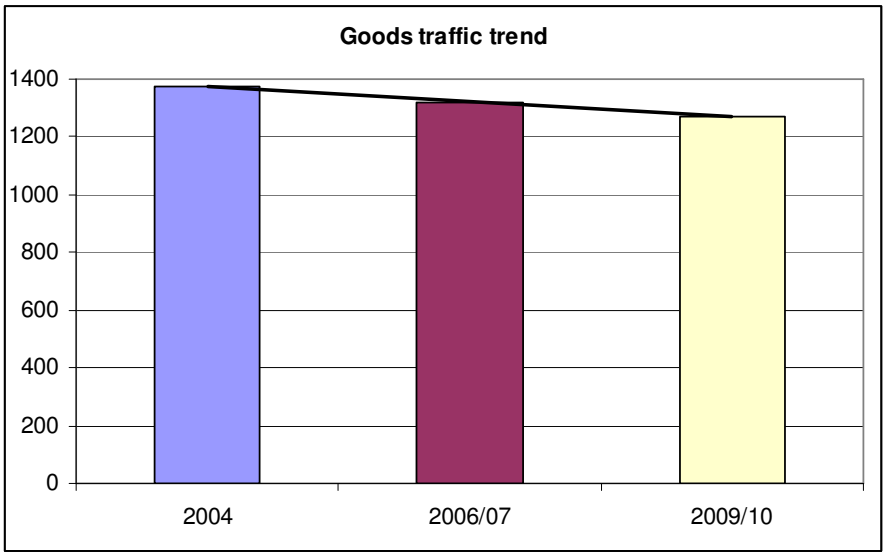
	Via S.Giorgio			Piazza Raibetta			Mura delle Grazie		
	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.	Nov.	Jan.	Mar.
Cars transporting goods	2	0	0	1	0	6	1	3	3
Vans	96	75	99	194	137	195	46	37	38
Light commercial vehicles	30	24	2	110	62	137	2	9	18
Total goods	***128***	***99***	***101***	***305***	***199***	***338***	***49***	***49***	***59***
2 wheels	127	72	95	158	76	190	296	338	468

Other vehicles	160	132	158	429	245	466	118	135	176
TOTAL	**415**	**303**	**354**	**892**	**520**	**994**	**463**	**522**	**703**

	TOTAL		
	Nov.	Jan.	Mar.
Cars transporting goods	**15**	**15**	**37**
Vans	**926**	**740**	**802**
Light commercial vehicles	**495**	**402**	**533**
Total goods	***1436***	***1157***	***1372***
2 wheels	**2234**	**2063**	**2263**
Other vehicles	**2043**	**1822**	**2001**
TOTAL	**5713**	**5042**	**5636**



In comparison to the baseline, these data point out a reduction of 4% in three years (considering only goods traffic), which is a modest variations (about –1% per year).



C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – economy, energy, environment, society and transport.

C2.1 Economy

No impact indicators are foreseen in this evaluation category.
However, an important remark on the economical impact is that the "mobility credits" system contains in itself the risk of causing a cost increase for the economic activities in the target area. So, a neutral economical impact is a positive result.
Instead, for van sharing service, it must be remarked that, from a direct interview to companies who use this service, the 22% states that the adhesion to car sharing caused a decrease in transport costs, and the 45% declares that the benefits deriving from car sharing exceeds the costs.

C2.2 Energy

No impact indicators are foreseen in this evaluation category.
However, positive results on energy use and consumption derive from the optimisation of the supply chain and the goods delivery process.

As for van sharing service, deductions from general car sharing data show the following results:

- The average reduction of consumption is about xxx liters fuel per year (data will be soon available).

- The vehicle fuel efficiency related to cargo vehicles in the fleet used for van sharing is quoted in the table below:

2008	
Vehicle fuel efficiency	**Vehicle fuel efficiency [MJ/(v*km)] URBAN**
Cargo: 13,1/9,1/10,7	5,30

C2.3 Environment

The main results in the environmental area consist in the decrease of CO and Nox emissions, deriving from the reduction of the number of goods vehicles entering the target area.

The fact that both mobility credits scheme and proximity warehouse haven't already started doesn't give, at the moment, the possibility to calculate the relevant environmental results.

As for van sharing service, deductions from general car sharing data show that globally, with the level of use of the last year, an overall saving of xxx kms/year about with a saving of pollutans as the table in kg/year.

CO	NOx	VOC	TSP	N20	C6H6	PM10	CO2

(data will be soon available)

C2.4 Transport

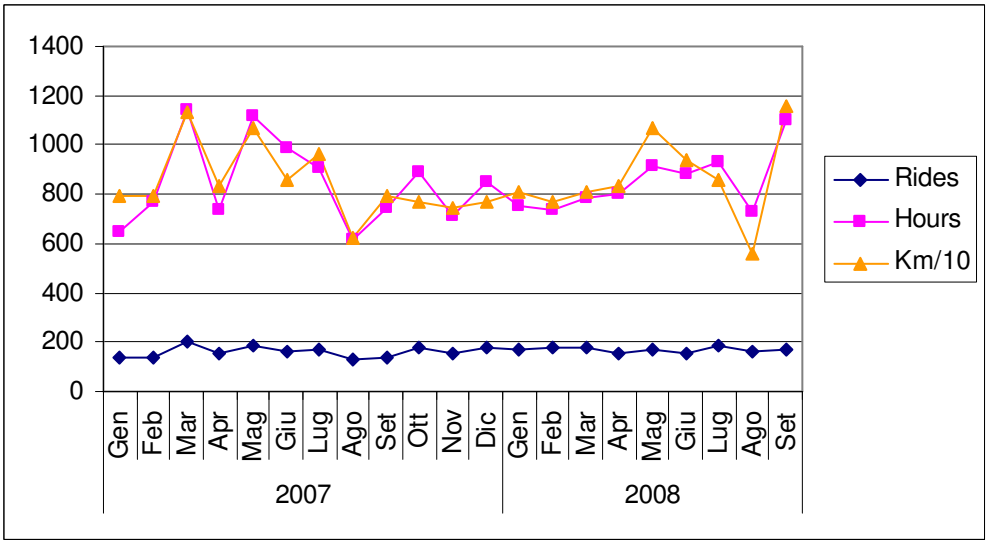
The most important results in the transport field consist in:

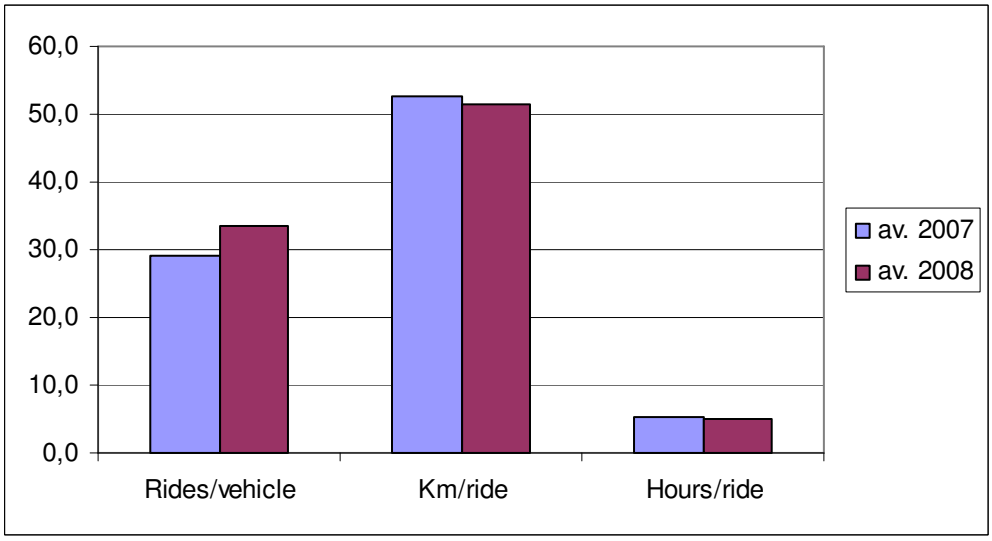
- Reduction of the number of goods vehicles entering the target area;
- Modal split between one's own / third party: decrease of one's own transport and increase of third party deliveries;
- Increase of vehicles load rate, especially for one's own transport.

The fact that both mobility credits scheme and proximity warehouse haven't already started doesn't give, at the moment, the possibility to calculate the relevant results.

The main results deriving from the operational phase of the van sharing service (from January 2007 to September 2008) point out a positive trend in the use of service, as shown below:

	January 2007	September 2008	% variation from the start
Rides	139	166	+ 19%
Km/10	7893	11553	+ 46%
Hours	651	1098	+ 69%





The variation of some important parameters between 2007 (average) and the first 9 months of 2008 (average), gives the following information:

- The use of the fleet has been optimised (increased rides/vehicle)
- The trips effected by the users have been optimised: a better choice of the route led to a reduction in the average km/ride and hours/ride

These factors have get better also thanks to the increase of the parking places where cargo vehicles are available.

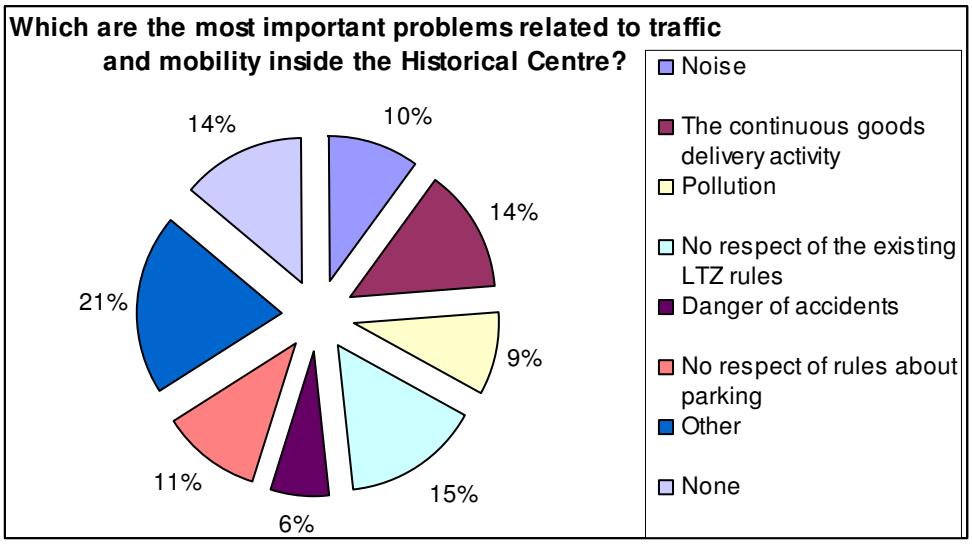
Moreover, deductions from general car sharing data show that:

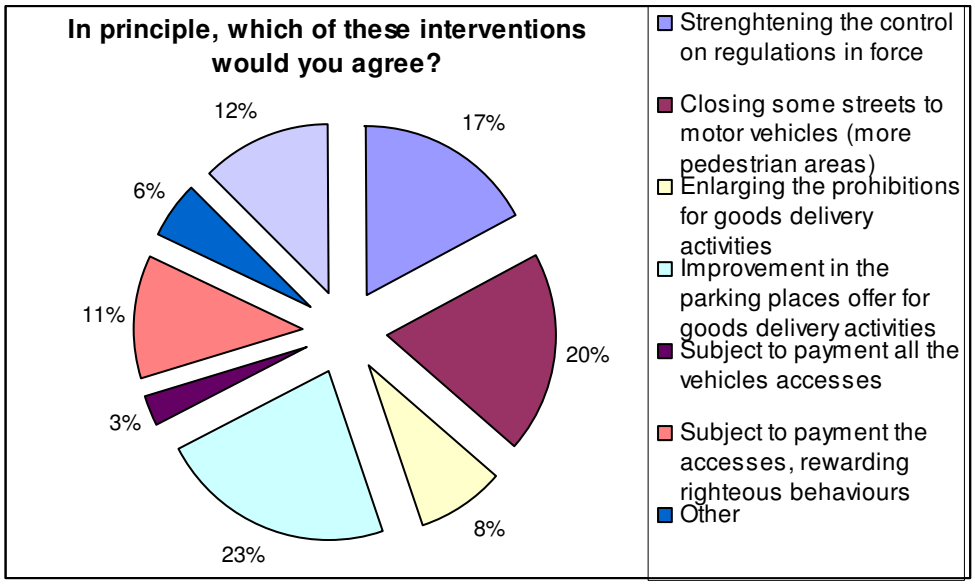
- The use of van sharing reduced the km driven by each user of an average of xxx km/year about which represents the xx % about of the mileage driven before the adoption of van sharing.

- The adoption of car sharing led up to now to a reduction of xxx about of circulating cars in Genoa; in fact (derived by on-field study) each car sharing car substitutes x private cars. (data will be soon available)

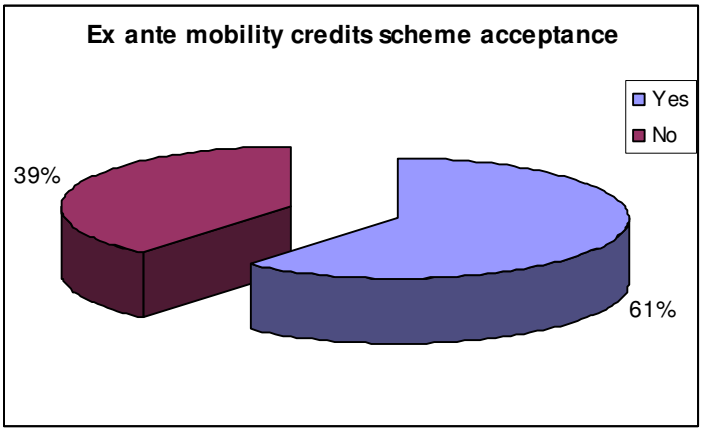
C2.5 Society

As for this measure, the main impacts in the area "society" regard the awareness of the importance of the problem and the acceptance of the proposed solution.
These kind of measures, such as access control and similar ones, presents huge problems of acceptance by the directly interested subjects and by the general public opinion.
In this case however, the problem awareness was quite high from the beginning; in particular, transporters feel strongly the problems related to the lack of parking places and to the coexistence of different traffic regulations in different parts of the target area (= LTZ); on the other hand, economic operators feel a general problem of liveability, attractiveness and safety of the area.
The telephone interviews effected in October 2008 point out the following results:





At the question "Do you think that mobility credits may help to better the mobility situation in the historical centre?", the 61% of the interviewee answered affirmatively.



C3 Achievement of quantifiable targets

Since both the mobility credits scheme and the proximity warehouse haven't already started, and considering that they form the main part of the measure (from the point of view of the quantifiable results), this situation doesn't give, at the moment, the possibility to calculate the relevant results.

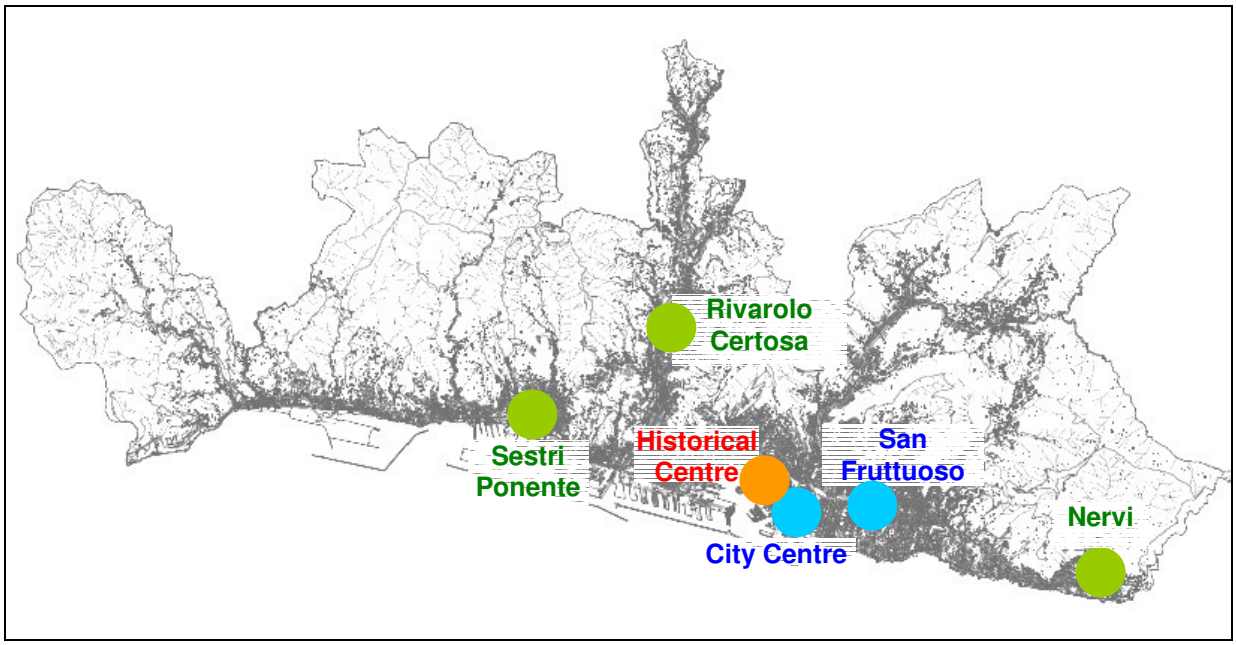
No.	Target	Rating
1	15-20 % reduction of commercial vehicles traffic in the target area	NA
2	CO and NOx emissions reduction	NA
NA = Not Assessed ★ = Not achieved ★★= Achieved in full ★★★= Exceeded		

C4 Up-scaling of results

The measure, in particular the mobility credits scheme, might be up-scaled to other areas of the city, for instance:

- Other small commercial areas (Nervi, Sestri Ponente, Rivarolo-Certosa, San Fruttuoso, …)

- The whole city centre



Areas where the scheme has already been implemented
Areas where the up-scaling has been studied
Other areas where the scheme could be applied

As a consequence of the new structure of the measure, described in paragraph A2, the up-scaling of the mobility credits scheme is completely correlated to the up-scaling of measure 7.1: see the corresponding paragraph of measure 7.1 MERS for the complete up-scaling approach.

The up-scaling of the van sharing service may follow the same expansion scheme of the general purpose car sharing service (see measure 09.04).

The up-scaling of the proximity warehouse should foresee first of all the extension to the whole Historical Centre: in fact, the logical functioning of this kind of structure is related to the possibility to reach the final point of distribution without motorized vehicles from the boundary of the area (with manual or electric trolleys). Therefore, each proximity warehouse has a sphere of influence which can be estimated in 200-300 m.
In the following illustration, a preliminary design of the spatial distribution of the proximity warehouses around the historical centre.

C5 Appraisal of evaluation approach

The main difficulties in the evaluation activities are due to the fact that two main parts of the measure (mobility credits scheme and van sharing service) started very late. But other considerable problems derive from the complete re-definition of the specific objectives of the measure (see B3 and B4), which led to an important change in the definition of the indicators (some indicators have been cancelled, others changed their meaning).

C6 Summary of evaluation results

The key results are as follows:

- **Van sharing** – the van sharing service showed a good level of appreciation by the users, and therefore its introduction led to good results; future expansions of the service, related to car sharing service enlargement, give good prospects.
- **Proximity warehouse** – this initiative had a good appreciation by the potential users and an innovative suitable technological solution has been found; only the setback in the tender did not permit the realisation of the structure within Caravel.
- **Mobility credits scheme** – this very innovative scheme has been developed with a great effort and is now ready for its application: for what concerns the functioning scheme all the possible particular cases have been taken into account; as for the

technological supports, all the systems have been developed, integrated and tested; The scheme is ready for its first application, as soon as political decisions will be taken.

D Lessons learned

D1 Barriers and drivers

D1.1 Barriers

- **Institutional barrier –** The implementation of the measure required many administrative authorizations, involving different offices and institutions: the Town Council as for the adoption of the new access regulation scheme, the Municipal Police for its application, the urban aesthetics and the Monuments and Fine Arts Office for what concerns the installation of remote access control equipment and the relevant road signs.
- **Political barrier -** The Municipality has to deal with the impact of the new goods distribution scheme, mainly "mobility credits" and the new access regulation, valid for all vehicles. The slowness of the political decisions, strictly related to the decision about the new LTZ rules and their road charging option (measure 7.1), deeply influenced the last phases of the measure implementation, when the uncertainty about the future rules caused a delay of some months in the activities, as well as the impossibility (up to now) to evaluate the results of the mobility credits scheme.
- **Acceptance barrier -** All the stakeholders (shopkeepers, transporters, ...) would not accept a cost increase for their economic activity.
- **Acceptance barrier -** "Opposition": bad starting point with stakeholders, which have low confidence in the Public Administration.
- **Acceptance barrier -** Information and public relation: it's very difficult to overcome negative connotations and prejudices that each interlocutor has at the beginning.
- **Technical barrier -** this scheme has never been experienced anywhere, so all techno-logical systems have to be developed, tested and harmonized.

D1.2 Drivers

The main drivers are:

- **Driver 1** - synergy with other measures (in particular 7.1),
- **Driver 2** - key individuals (our referents in the Associations and the positive relation established with them have been essential),
- **Driver 3** - partnership and involvement (when interlocutors are convinced of the good quality of the project, they are very involved in its implementation).

D2 Participation of stakeholders

The involved stakeholders are:

- **Shopkeepers' associations:** Confcommercio, Confesercenti
- **Artisans' associations:** CNA, Confartigianato
- **Transporters' associations:** FAI, CNA - FITA, Confartigianato, Associazione Spedizionieri
- **Local economic operators associations:** CIV La Maddalena and CIV San Bernardo are two small bodies which represent the economic operators and citizens who work and care for a determined small area (a main street and its surroundings)

The different association have been involved in different ways in the different parts of the measure:

- **Mobility credits:** These stakeholders have been deeply involved in the design process: in autumn 2006 there was the first presentation of the new technical approach to the stakeholders: the new concept (above described) had just been elaborated and only the basic elements of the "mobility credits" system were defined: application of the concept only to goods distribution; assignation of the credits amount to the economic operators, not to transporters; exchange of the credits at the moment of the delivery.

  The first meetings with the stakeholders were focused on the explanation of the basic concepts and the first reaction, if this system could be accepted or not. The reaction was good, notwithstanding some objections: first of all, stakeholders hadn't confidence in the Public Administration, due to past experiences where they hadn't been consulted on important decisions, or had been consulted but the decision had been taken independently. Then, they wanted to be assured that this system would not turn into a cost (a "tax") for firms and companies, and this included the point that the initial amount of credits (related to the real mobility needs of the subject) would have been free of charge. In addition, they had some other requests, for instance: improvements in parking situation (it's hard, especially for transporters, to park regularly because of the lack of parking lots and because they are often occupied by unauthorized vehicles), more surveillance by the Municipal Police in order to obtain a better observance of access and parking authorizations.

  During the frequent meetings, many specific aspects of the system have been defined together with the stakeholders, for example the conventional "measure unit" to define the delivery, which resulted to be the individual delivery document (LDV, delivery note or packing list), the average number of deliveries per distribution trip for professional transporters, the usual distribution modality (only one trip per day for couriers and other transporters, six deliveries per day for medicines, anticipated hours for press distribution, …), the delicate relations between big transport companies and small artisan transporters, and many others.

  After some months, in May 2007, a specific memorandum of agreement has also been signed between the Municipality and the Associations of Shopkeepers and Artisans. In this agreement the Associations stated that they share the objectives of the project and want to collaborate with the municipality for its realization.

  After this agreement, the stakeholders cooperated in the realization of a first "census" of the economic activities, to extract the main data about economic operators of the target area: supply needs; relevance of one's own supply respect to third party transport; frequency of supplying and deliveries, use of informatic technologies (internet, etc.). This work covered 700 economic activities out of about 2500 and has been very useful to configurate the system, and to understand the possible objections raising from the final users of the system.

  Meanwhile, in addition to the meetings with the above mentioned Associations, some other subjects have been involved: representatives of medicine distributors, of

specific food transporters (deep-frozen food), of security services, and so on. These meetings have been very useful to understand the specific issues of each cathegory, and so to include their needs in the scheme.

In the last months, the stakeholder have also been involved in the definition of the new access regulation for the target area (LTZ regulation): specific meetings have been held to discuss the new rules, and many useful suggestions emerged from the discussion.

The involvement in the definition of traffic regulation has been appreciated by the stakeholders, because normally these measures are decided unilaterally by the Municipality, causing sometimes difficulties to economic operators and transporters: so, these measures are seen as a restriction and penalization, causing difficulties in the relationship and reciprocal confidence between the stakeholders and the Municipality.

- **Proximity warehouse**: The main contents of the cooperation with CIV San Bernardo (local business association) have been the selection of the kind of equipment (automated warehouse) and the direct contact with the local economic activities.
- **Van sharing**: The involvement of the stakeholders led to the definition of a memorandum of agreement, and the direct cooperation of CIV La Maddalena permitted a more effective contact with the directly interested people.

D3 Recommendations

- To take into account the times necessary for the development of such complex systems, which are considerable for what concerns political decisions, administrative procedures (for instance long times for the tenders) and the theoretical elaboration of completely new systems;
- To pursue, from the beginning of the project and in each phase, the contact and communication with the politicians responsible of the decision regarding the project.

D4 Future activities relating to the measure

- End of the test phase of the mobility credits scheme applied to goods distribution in the historical centre: the foreseen duration of this phase in six months, to have the possibility to tune and improve the logical scheme, the technological systems and the operational procedures;
- Development of the governance scheme, aimed to reduce gradually the number of distributed credits and therefore the traffic related to goods distribution;
- Application of the mobility credits scheme in a mostly definitive configuration;
- Starting again with the preparation of the proximity warehouse (new call for tenders);
- Up-scaling of the proximity warehouse service (to cover at least the perimeter of the historical centre);
- Expansion of the van sharing service (new parkings, new vehicles and promotion actions).