

A Introduction

In 2005, the daily traffic in the city centre of Toulouse exceeded 10 000 veh/day. Between 2004 and 2005, the daily traffic had increased by around 3% on the main axes to access to the city hyper centre. The car drivers hardly tolerated the traffic congestion due to the freight delivery operations although it is deeply necessary for the economical life of the city. A municipal regulation¹ existed, but it was quite complex depending of the sectors of the city hyper centre and of the access axes² and it was not well adapted to shopkeeper needs. Therefore the rate of regulation no respect reached 50% for the delivery in hyper centre. To improve freight delivery in the hyper city centre was so a critical issue and a sensitive point on the political agenda in Toulouse, specifically because in the same time, the municipality of Toulouse was engaging the project to enlarge pedestrian precincts in the city hyper centre.

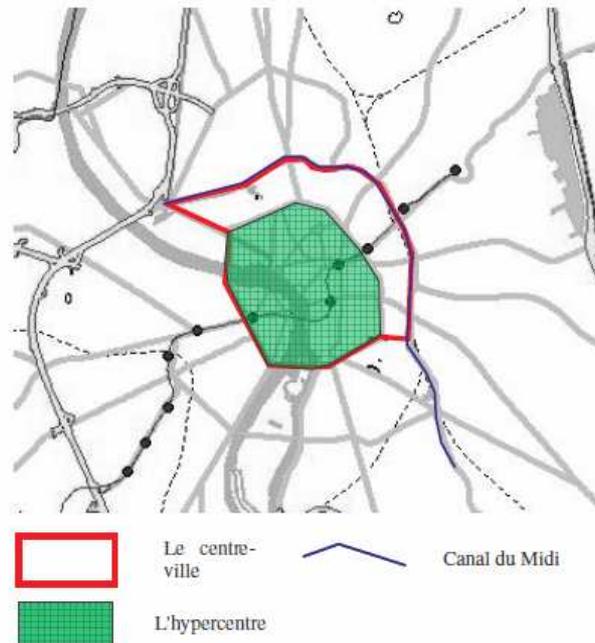


Figure 1: Toulouse centre and hyper centre map.

A1 Objectives

The measure objectives were:

- **To improve the transport and freight delivery in the Toulouse city hyper centre by implementing a new freight regulation; that means:**

¹ The French legislation delegates to the city mayor the legislative power to manage road occupation and traffic.

² The haulage contractors are submitted to two types of regulation: one concerns the tonnage limit to urban traffic for all types of vehicles apart from the activity; the other one concerns the freight delivery.

- **Defining and implementing the basis for the management of freight traffic into the overall policy of the city of Toulouse.**
- **Working in coordination with carriers and shop keepers about determining urban freight controlled delivery areas (“Espace Logistique Controlé) in the hyper centre**
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- **To prepare the development of a logistic platform at conurbation level: a urban delivery centre³ (UDC) through the:**
- **Implementation and evaluation of the Chronopost experimentation of delivery new system**
- **Definition of a new organisation of freight delivering (and the associated exploitation scheme) based on the experiences of developing cooperation with Chronopost and the use of clean vehicles**
- **Integration of the predisposing factors of the UDC in the regulation and in the communication plans**

The expected results of the municipality of Toulouse were the following:

- **to optimize the freight deliveries in the city centre and their associated impacts thanks to/**
- **A structural renew of the freight management regulation and especially a restriction of the city centre access to big lorries**
- **The promotion of clean vehicle use for the freight delivering in the city centre.**
- **The development of the cooperation with the whole stakeholders concerned by the freight delivering**

The updated technical annex of the MOBILIS contract has defined no quantifiable objectives and results.

A2 Description

First, the department of transportation of the city of Toulouse has produced a report⁴ that updated the knowledge about the first experiments of urban delivery centre at European level and freight delivery regulation in other cities, analysed the drivers factors and constraints and determined recommendations for the development and implementation of the measure in Toulouse.

The steering group composed of representatives of the municipality and of the regional trade council have presented this study to the different carriers, then to shopkeepers, first to elaborate a draft version of the delivery vehicles traffic regulation and encourage the shopkeepers to take delivery of the goods out of the peak hours, then to define the delivery areas locations

The municipality has implemented the new regulation and an associated quality chart about freight deliveries in the city centre and also created video-controlled delivery areas according to the decisions validated by the city municipality services and the stakeholders. The carriers and shopkeepers using clean vehicles have received specific stickers offering them priority to enter and park in the city hyper centre. This is detailed in part B3.

³ A urban delivery centre is a logistic platform located close to the city centre. The concept is to concentrate the arrival of the freight of the different carriers to this point such wise the lorries don't drive through the city centre and to organise the goods delivery from this platform with smaller vehicles of less tonnage.

⁴ Etat de l'art des projets de centre de distribution urbaine et des réglementations des livraisons- Diagnostic sur le cas toulousain ; mairie de Toulouse, janvier 2006

The steering group also worked from 2006 to 2007 on the concept and development of urban delivery centre and freight delivery between the UDC and the city centre with clean vehicles whose the city of Toulouse and ADEME would have financially supported the purchase. The project of UDC creation has been abandoned in June 2007. The city of Toulouse produced a process evaluation report analysing the failure of the implementation of the UDC project in the frame of the final approval of the Mid-Term Report.

In 2005, the Chronopost Society, which provides quick delivery of mails and packets services, was wishing to show up as an environment respectful society. So it modified its delivery organisation between its logistic platform located close to the airport and the six areas of the hyper centre previously done with gas oil lorries. The city of Toulouse has put professional premises in the city centre at Chronopost disposal. The society has been able to use them as a micro platform and to initiate the mail and parcels delivery with small clean vehicles in the pedestrian areas.

The city council was interested by this trial and its evaluation to prove to other carriers the benefits of a more environmental friendly freight delivery in the city centre and to point out that companies were making an effort in this field.

B Measure implementation

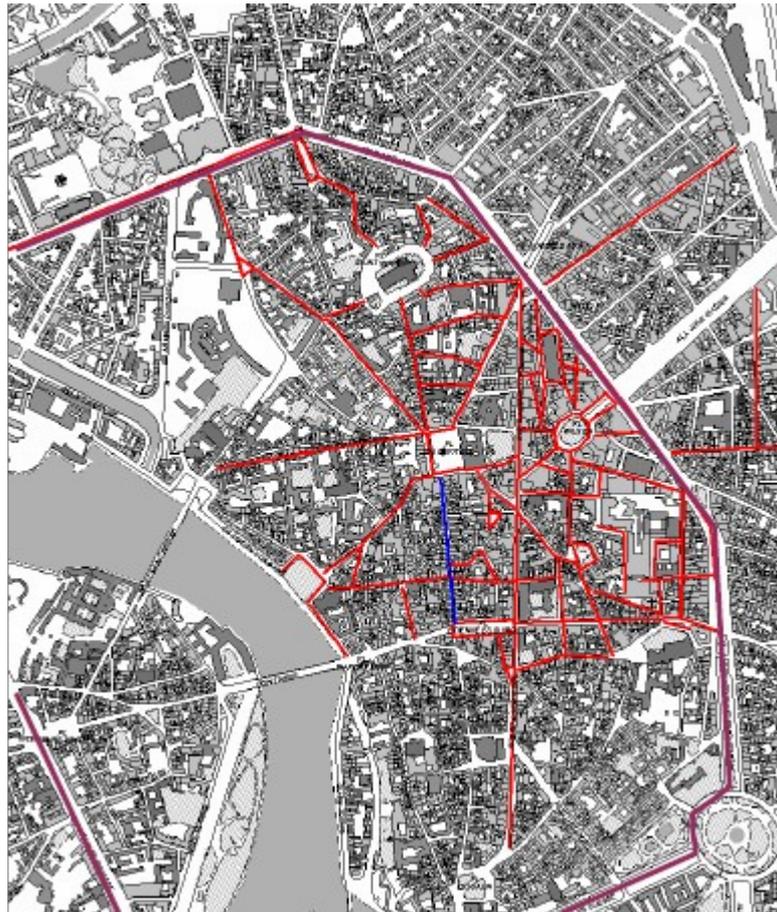
B1 Innovative aspects

Innovative Aspects:

- New mode of transport exploited
- Targeting specific user groups
- New policy instrument

The innovative aspects of the measure were:

- **New mode of transport exploited**–Walking deliverymen using an electrical self-propelled “Chronocity” vehicle has permitted to demonstrate and propose at the national level a new solution to deliver freight in city centre.
- **Targeting specific user groups** – The carriers and shopkeepers were the main target groups involved in the implementation of the new regulation whose objective was to restrict city centre access and also in the discussion about the creation of an urban delivery centre.
- **New policy instrument**– The structural renew of the freight management regulation in relation with the city centre access restriction objective aimed to improve the congestion and environmental conditions in the city centre.



-  pedestrian street
-  hyper centre main roads
-  boulevard

Figure 3: Road type in the hyper centre

- **For the delivery regulation inside the hyper centre**, the allowed tonnage was depending of the day period as shown in the table N°1.

	8 p-m-7 a-m	7a-m-9a-m-	9a-m—11a-m/ noon-1p-m	11 a-m- noon/ 1 p-m – 8 p-m
Deadweight tonnage allowed	<35 t	Delivery forbidden	>7,5 t	Delivery forbidden

Table 1: Freight delivery allowed periods and tonnage.

To have a precise idea of the real situation, the technical services of the city of Toulouse have organised two measure campaigns.

1. In July 2004 to identify the main entries to the city hyper centre.

The main access to the hyper centre and the main roads were these indicated with red arrows in the following map:

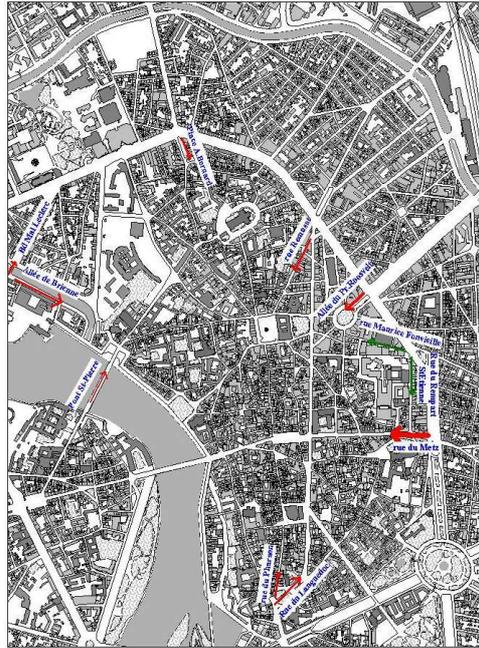


Figure 4: Toulouse hyper centre main axes

2. On the 16th and 18th of November 2004, they counted the commercial vehicles (for all type of activities) and the heavy lorries. The carried out counting survey highlighted the following results:
 - The commercial vehicles and heavy lorries drive mainly on two streets, which share the hyper centre in two parts: North and South.
 - The number of both types of vehicles was similar during the two days: around 2 800 per day (the average results per day are indicated on the map- figure n°5). 71 % are entering in the hyper centre in the morning and 29 % in the afternoon

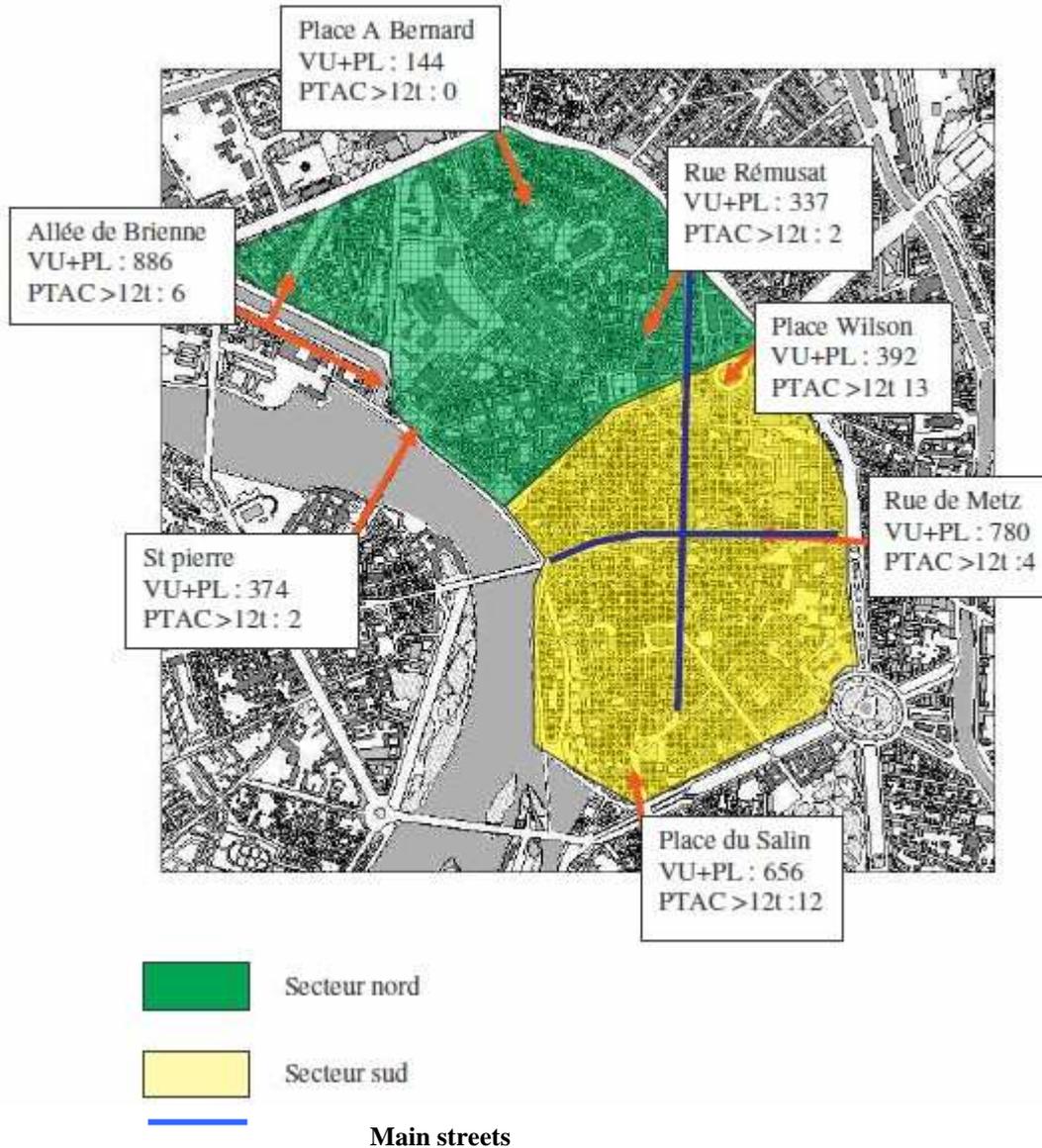


Figure 5: average daily results of the counting enquiry done in November 2004

- the distribution of the type of lorries is presented below (figure N°6). The proportion of commercial vehicles whose tonnage is lower than 3,5 T is very important: 80%.

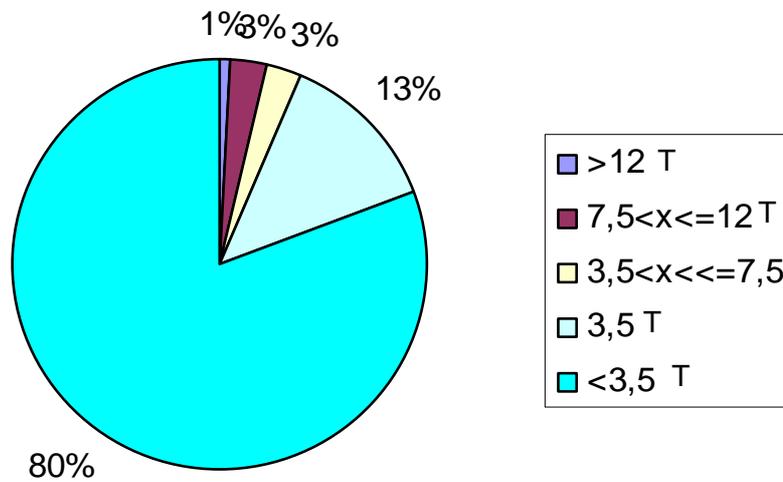


Figure 6 : distribution of the different types of lorries used at hyper centre level

The citizens being mainly disturbed by large vehicles, the study then focused on vehicles whose tonnage is equal or higher than 3,5 T (figure N°6). The average daily results show that:

- the 3.5 T laden weight vehicles represented 65% of the delivery traffic.
- The > 12.5T laden weight vehicles access to the city centre by the two main roads.

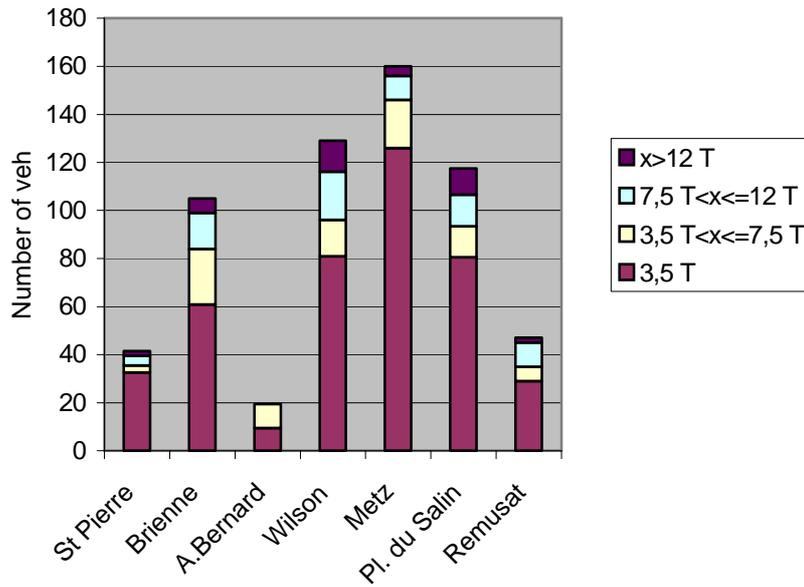
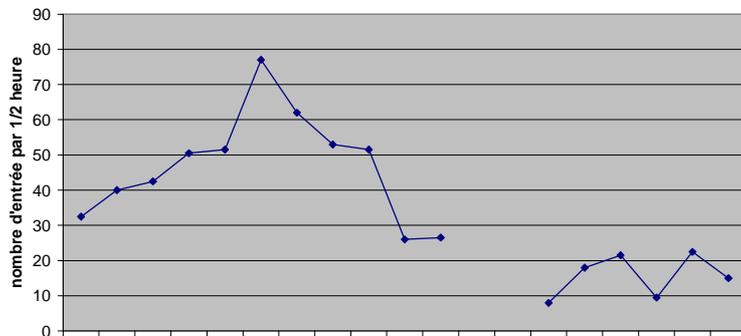


Figure 7 : distribution of the different types of lorries by city hyper centre access

- the different delivery characteristics :
 - the traffic peak of 3.5 or >3.5 T laden weight vehicles is between 9.30 a-m

Nombre d'entrée des véhicules >= 3,5 tonnes



and 10.30 a-m.

Nombre d'entrée des véhicules de marchandise de PTAC supérieur à 12 tonnes

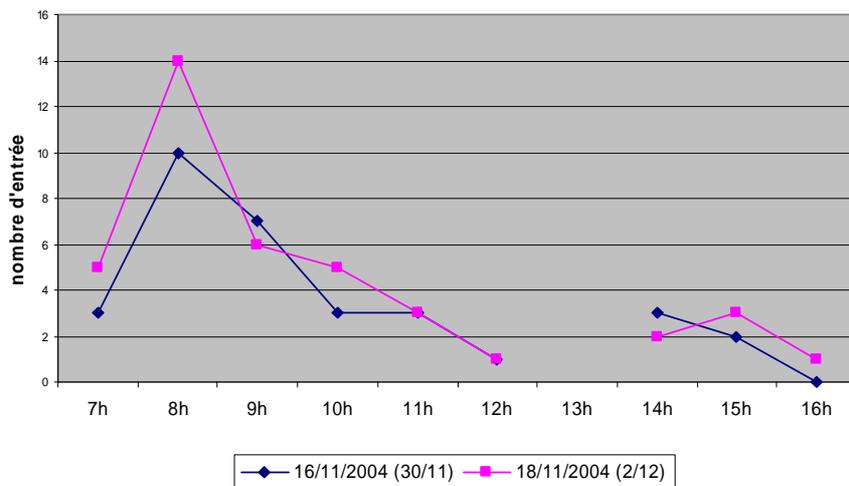


Figure 8: Number of vehicles of a tonnage >3,5 and < 12 T entering in the hyper centre

- The traffic peak of >12.5 T laden weight vehicles is between 7.30 a-m and 8.30 a-m.

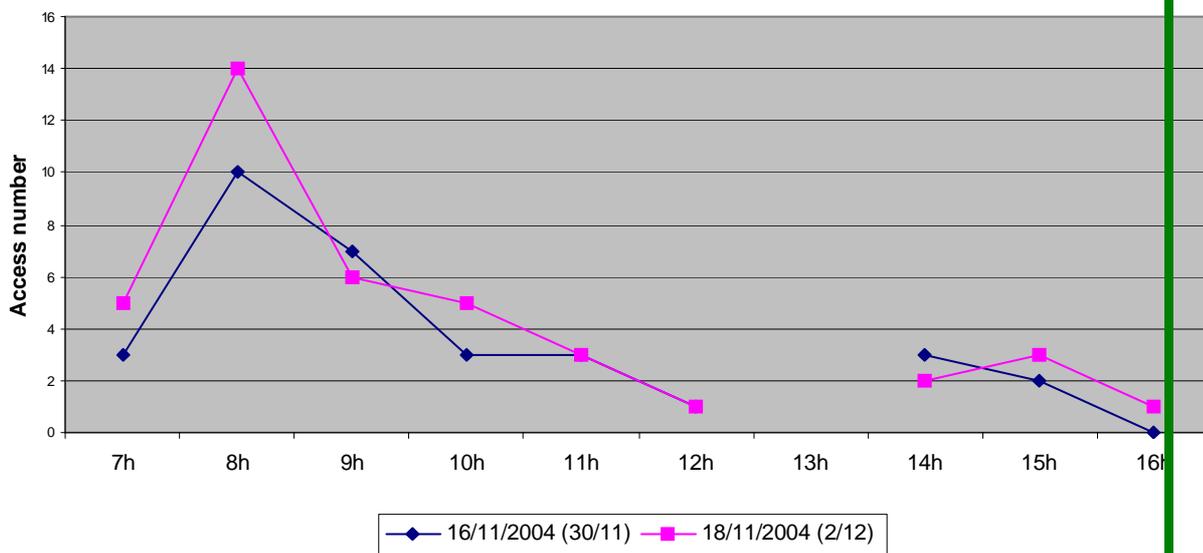


Figure 9: Number of vehicles of a tonnage >12 T entering in the hyper centre.

- The freight delivery regulation in Toulouse hyper centre was not respected by around half of the carriers.

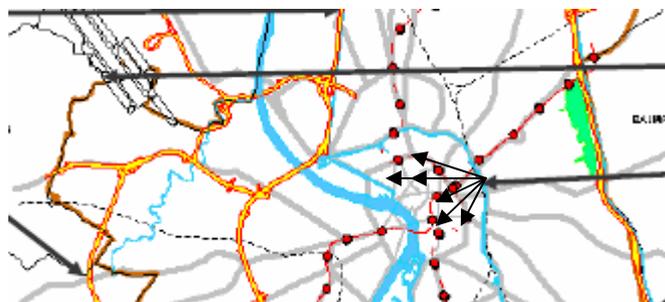
7h-9h	Delivery forbidden	all	166	166
		Whose >7,5 t	45	
		Whose >12 t	17	
9h-12h	>7,5 t forbidden	all	348	47

13h -20h	Delivery forbidden	Whose >7,5 t	47	95
		Whose >12 t	16	
		all	95	
		Whose >7,5 t	14	
		Whose >12 t	6	
		total >3,5 t	608	308 (51%)

Table 2: Rate of no respect of the delivery regulation on average usual day in November 2004

B-2 C Chronopost

Before MOBILIS project, Chronopost delivered mail and parcels from Blagnac (a city in the suburb area) with 6 gas oil commercial vehicles of 10 m³ capacity to the six areas of the city hyper centre in the morning and with four of them to four areas in the afternoon. The average distance between Blagnac and the centre areas is 9,5 km. The average speed of these commercial vehicles was 30 km/h.



Chronopost in Blagnac

six delivery areas in the Hyper centre

Figure 10: Chronopost origin and destination areas

B3 Actual implementation of the measure

The different sub measures were implemented in the following stages:

B3-A New management of freight delivery and urban delivery centre

Stage 1: February 2005 the city of Toulouse has created a measure steering committee including politicians, engineers of the technical services and representatives of the local trade Council;

Stage 2: (17 May 2005). The urban freight steering group decided during the first meeting to launch feasibility studies for UDC

Stage 3: From June 2005 to January 2006, the transport service of Toulouse elaborated the state of art in urban delivery centres and delivery regulations and the assessment of the freight traffic flow in the city of Toulouse.

Stage 4: 17th and 19th of January 2006: The steering group launched a stakeholders' consultation by two meeting with, first the 153 carriers of the over companies with more than 20 employees, then with these of the other companies, to present the urban delivery centre concept and debate of the propositions for new freight delivery regulation. The idea was to consider that the tonnage of a vehicle in no longer a

structural (resistance of roadway) but an organisational criterion and that other criterions may also intervene as surface, clean vehicle, rate of loading and so on.

The results of the debates were that:

- The small carriers companies were not favourable to the creation of an urban delivery centre, which appeared to be too much in favour of big carrier companies
- They agreed with a new regulation and the definition of delivery areas in the hyper centre, but with conditions to precise with the shopkeepers and act in a delivery quality chart.

Stage 5: Delivery regulation definition. Between January and March 2006, the city representatives have acted in concert with the shopkeepers and the carriers to define the new freight delivery regulation and the location of dedicated delivery areas in the city hyper centre. The new regulation is described in the table below:

	8 pm-7am	7am-9am	9am-11am	11am-20pm
Lorry length allowed	<9m (<12t)	Delivery forbidden except on dedicated parking places	<9m (<12t)	Delivery forbidden except on dedicated parking places

Table 3: new delivery and tonnage regulation for the hyper centre

A specific stickers system for carriers using clean vehicles as been tested; it allows them to deliver freight until noon in the morning.

The delivery chart signed by the city, the carriers and the shopkeepers precise the good delivery practices and information circuit between the stakeholders.

The regulation and delivery chart were implemented in May 2006.

By the end of 2006, the city services have created 156 video controlled freight delivery areas. 175 were at disposal in 2007.

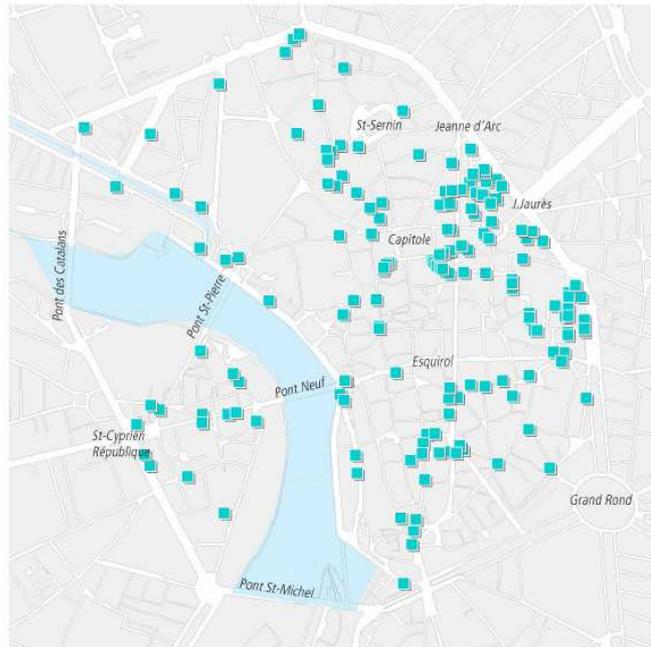


Figure 11: controlled freight delivery areas in 2006

Stage 5 Bis: Urban freight centre (January 2006 to Mai 2006). The steering group and the carriers syndicated have discussed on several juridical forms of the urban freight centre.

Stage 6: (June 2006- January 2007) The technicians of the city of Toulouse have performed an economical analysis of the carriers locations and established a business plan as experience shows that only an economically viable project will be sustainable in the long run. In January 2007, the city of Toulouse launched a consultation for the management of this project. Soon, the transporters formed a large lobby against its implementation, as its touches on there present business plans: they considered that the public management of the UDC was not useful. Therefore the steering group decided that the carriers themselves should take the lead of this project with an initial support from the city council.

Stage 7: (from April 2007). It became clear by February 2007 that it will not be possible to develop the urban freight centre. In April 2007, the project to implement a urban distribution centre has been abandoned.

B3-B Chronopost new organisation

Stage 1: (January 2005- April 2005). In 2004, the Chronopost society, which provides a quick delivery of mails and packets services, had proposed to the city of Toulouse to modify its parcels and mail delivery organisation in the city hyper centre to pay more into account economical, social and environmental criteria. The freight would be delivered from a dedicated location in the city centre and for, the first time in this area, with electric and CNG freight clean vehicles bought by Chronopost. The city of

Toulouse validated the proposal and then has helped the Chronopost society to find appropriate premises and has participated to the necessary investment to adapt them. In April 2005, the City mayor has inaugurated the city Chronopost platform called “City” in the following text.

Stage 2: (April 2005 to now) Implementation of the new organisation.

For a usual day, the delivery organization is the following:

A heavy lorry (10 or 12T) and a large CNG commercial vehicle (Citroen Jumper 10 m3) carry the mail and parcels from Blagnac to the City area;

The morning rounds from the City to six areas are provided by three electrical commercial vehicles (Citroen Berlingo 3 m3), one CNG commercial vehicle (Fiat Doblo Cargo 5 m3) and two Chronocity that are electrical self-propelled moved y a walking deliveryman. A CNG commercial vehicle does one more round, if necessary, for large parcels.

The afternoon adopted organization is close to the morning one, but uses only the three electrical vehicles and the CNG one.

The parcel collection is unchanged.

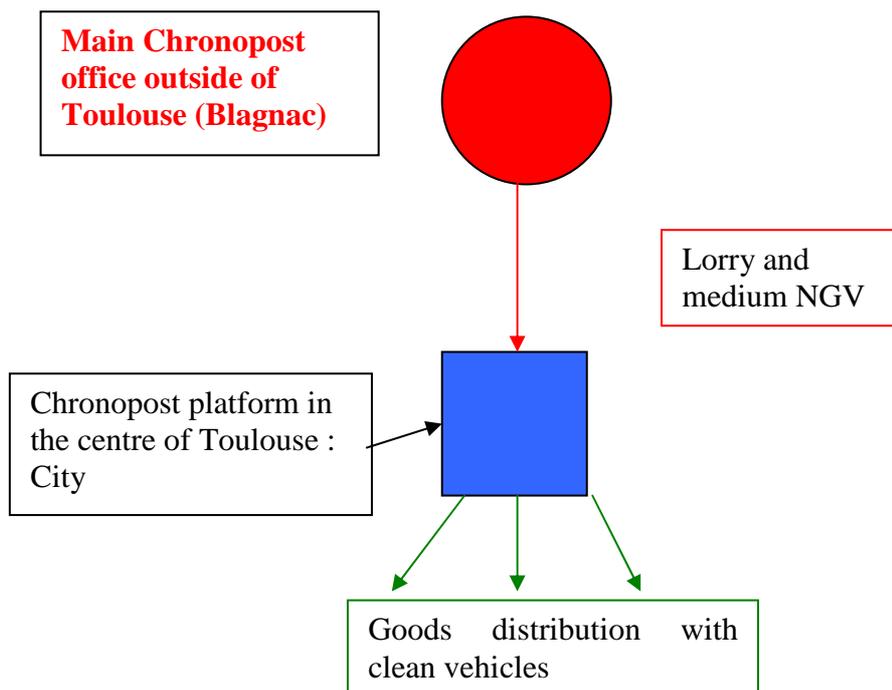




Figure 12 : principle of the new organisation and Chronocity

B4 Deviations from the original plan

The deviations from the original plan comprised:

Deviation 1: the urban freight delivery centre failure –The original target to motivate all urban carriers to merge and to operate together the urban freight centre could not be achieved. The stakeholders have discussed several juridical forms of the urban freight centre. As public management was not considered useful, the City of Toulouse has adopted a new strategy. The new idea was to attract one carrier, or that the carriers themselves, or a small group of them, should take the lead to initiate the urban freight centre with an initial support from the city council.

Deviation 2: Abandon of the Urban Distribution Centre project - In the frame of the Mid-Term report, it has been proposed and accepted to abandon the UDC project. The city of Toulouse has realised the first part of the project (preliminary studies, and consultation process of the UDC) and has produced, for the final approval of the Mid-Term Report, a process evaluation report analysing the failure of the UDC project.

The commission has approved the modification of the measure description. The following main activities remain UDC preliminary study and consultation process, implementation of a new regulation in the city centre, realisation of experimentation with the Chronopost society.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

No.	Measure title	Relation
5.1.T	Large-scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	The trucks that would be used may be CNG trucks. The relation with the measure concerning CNG micro-compressor and optimisation of the CNG motors.
5.2.T	Solutions for alternative fuels in Toulouse and complementary measures to achieve a 100% clean fleet	
6.1.T	Definition and implementation of a new parking management policy in Toulouse.	The car parks management and the freight delivering management are extremely linked, especially in the city centre.
6.2.T	Public space redesign in Toulouse	The new freight management policy definition would take into account the new organisation of the city centre that will be drawn through this measure.
10.2.V	Clean urban logistics in Venice	These 2 measures are linked and will be the support of a share of experience.

C Evaluation – methodology and results

C1 Measurement methodology

C1 –A New regulation.

The new freight delivery regulation has been evaluated from the point of view of the shopkeeper's acceptability through a questionnaire distributed to 2000 shopkeepers. No evaluation of the quality chart, controlled delivery areas and the sticker system for clean vehicles had been planned as was these different points result from the consultation with the stakeholders. As the implementation of the measures 6.1 and 6.2: "parking management in Toulouse" and "Resign of public space in Toulouse centre" have in the same time deeply modified the access and parking to the city hyper centre , no evaluation has been perform because it would have been difficult to identify the origin of some impacts.

C1 –B Urban delivery centre

A process evaluation has identified more clearly the barriers in relation to the urban freight centre and lead to recommendations how this could be overcome in the future.

C1 –C: Chronopost new organisation

The Chronopost platform has been evaluated from the points of view of:

- 1) Its environmental assessment,
- 2) Its economic assessment,
- 3) Its acceptability by employees,
- 4) Its acceptability by users,
- 5) The qualitative evaluation of the project in accordance with the sustainable development approach.

C1.1 Impacts and Indicators

Table of Indicators.

No.	Impact		Indicator	Use d	Etc. .
2	Economy	<ul style="list-style-type: none"> Costs 	<ul style="list-style-type: none"> Cost of personnel per month, Rental cost of the m² per year, Investment cost (building and vehicles) Energy consumption cost (electricity, CNG and diesel fuel), Operating cost. 	YES	
1	Economy	<ul style="list-style-type: none"> Benefits 	<ul style="list-style-type: none"> Number of packages per week, Number of deliveries per week, Number of rounds per week, Total weight per week, Employees' cumulated working time per week, Number of employees per week, The utilisation rate of active employees. 	YES	
8,9,10	Environment:	<ul style="list-style-type: none"> Reduction of the mass of pollutants emitted, according to the use of the vehicles and their characteristics 	<ul style="list-style-type: none"> CO, NOx, Particles, SO2, NMVOC, CO2 equivalent. 	YES	
	Society	Acceptance	Acceptance level	YES	
4	Functional quality of the project		Economic and financial efficiency indicators.	YES	

Evaluation of the Chronopost platform

- The project performance data in the area of environmental protection have been evaluated in accordance with the ADEME's software application IMPACT 2.0. This application determines the mass of pollutants emitted, according to the use of the vehicles and their characteristics. The types of pollutants taken into consideration for this environmental assessment are CO, NO_x, particles, SO₂, NMVOC and CO₂ equivalent.

The data used for this study were:

- Number of rounds per week,
 - Number of vehicles used,
 - Length of rounds per vehicle and per week,
 - Average speed,
 - Average load of the vehicles per week,
 - Vehicles' motor type and tonnage.
- The functional quality of the project has been evaluated by using economic and financial efficiency indicators.
 - The acceptability evaluation is composed of:
 - Acceptability by the delivery agents,
 - Acceptability by the users (Quality of Service, customer relations, punctuality, delivery quality, etc.), use of clean vehicles, and delivery regulations.

The acceptability of Chronopost was revealed through two different questionnaires distributed in May 2007:

- The first one was sent to Chronopost customers: Chronopost distributed 500 copies to their customers (excluding shopkeepers), enclosing a stamped addressed envelope for reply by the first week of September 2006. 28 of them (around 5%) answered.
- The second one has been distributed to the Chronopost delivery employees working in this new organisation and the replies were collected directly from them, as they are only six. It included questions about the new regulation

Evaluation of the new regulation:

The same questionnaire as for Chronopost customers, but including an additional part concerning the feelings about the new delivery regulation were distributed in May 2007 to shopkeepers (2000 copies were sent by post with a stamped addressed envelope for reply, to all the shops in the city centre). 131 shopkeepers answered

The response rate for both questionnaires to Chronopost customers and shopkeepers was about 6%, what is quite low for this type of survey. Among the answering shopkeepers 97, which mean 77% of the global sample, were Chronopost customers (34% of the answers came from occasional Chronopost customers but 20% from usual one).

So the results about the Chronopost organisation include the answers of all clients of Chronopost in the global sample.

C1.2 Establishing a baseline

For the new regulation, the baseline is the acceptance level of the shopkeepers before the modification of the regulation.

For the Chronopost new delivery organisation, the base line is the situation before CIVITAS, called in chapter C2 basis 100, defined by:

- The renting and gas oil cost of the vehicles used before the experiment as well as the emissions of pollutants during the travels
- The location investment costs and,
- The productivity of the deliverymen in the previous organization.

C1.3 Building the business-as-usual scenario

The business as usual for the freight delivery regulation and the Chronopost delivery organisation is the continuation of the situation observed before MOBILIS.

C2 Measure results

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

Due to the shopkeeper’s questionnaire answers, which include Chronopost clients, the results regarding Chronopost new organisation assessment are presented fist.

C2-A CHRONOPOST new organisation

C2.1 Economy

The cost of the new organization with clean vehicles is roughly the same one that the cost of the previous organization with diesel vehicles. (Cf. Annex N° 1)

To use the Chronocity and CNG Doblo vehicle compensate for the additional cost of the new organization: the travels between Blagnac and the City area by CNG vehicles, the cost of the City location and the electrical vehicle use.

The deliverymen productivity has stayed roughly the same, but it is important to notice that the new organization have permitted the adaptation to the increase of the activity (about 16%).

C2.3 Environment

The table N° 4 below synthesis the changes in pollutant emissions and highlights the part due the travels between the Chronopost centre in Blagnac and the city centre; this part benefits from the use of two vehicles in comparison to six before, and the part due to the rounds, which benefits from the clean vehicle use.

Almost 75% of the CO² emission decreases are due to the use of the clean vehicles.

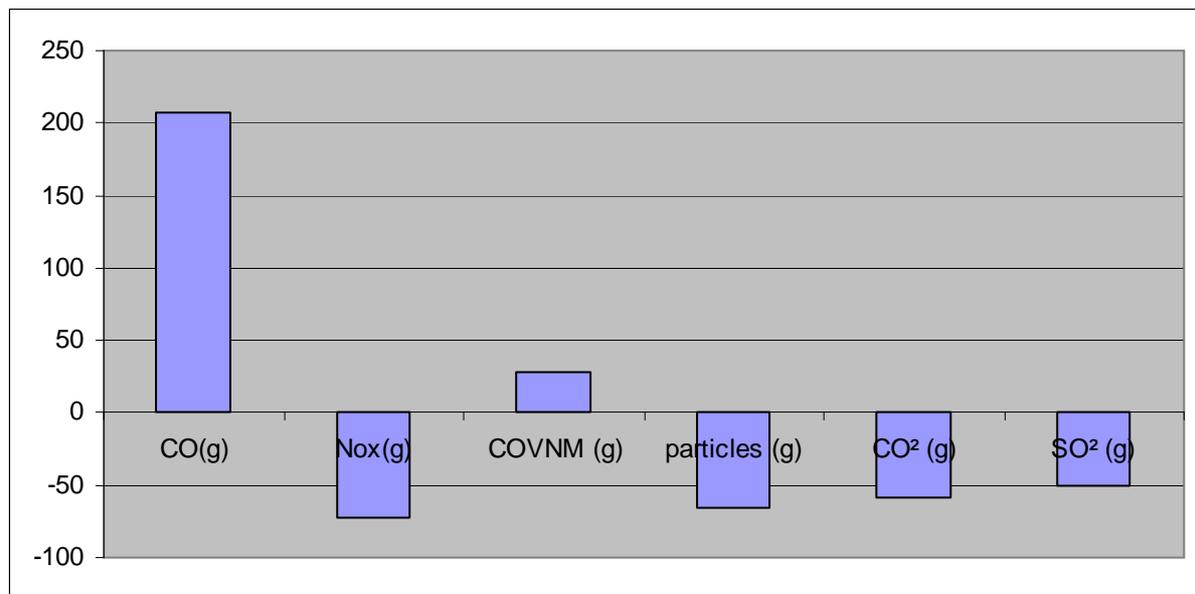
	CO(g)	Nox(g)	COVNM (g)	Particles (g)	CO ² (g)	SO ² (g)	All pollutants (g)
Blagnac- city centre travels							
Without City location	78,11	208,53	18,51	10,8	44481	1137,1	45934,05
With City location	265,74	115,65	39,6	8,65	28906	835,07	30170,71
Rounds							
Without City location	102,75	239,06	19,05	13,87	52875	1351,25	54600,98
With City location	290,29	10,2	8,63	0	11561	388,08	12258,2

Difference With and Without (g)							
Blagnac-centre travels	187,63	-92,88	21,09	-2,15	-15575	-302,03	-15763,34
Rounds	187,54	-228,86	-10,42	-13,87	-41314	-963,17	-42342,78
TOTAL	375,17	-321,74	10,67	-16,02	-56889	-1265,2	-58106,12
Contribution part to the difference							
Blagnac-centre travels	50,01%	28,87%	197,66%	13,42%	27,38%	23,87%	27,13%
Rounds	49,99%	71,13%	-97,66%	86,58%	72,62%	76,13%	72,87%
Difference With and Without (%)							
Blagnac-centre travels	240,21%	-44,54%	113,94%	-19,91%	-35,01%	-26,56%	-34,32%
Rounds	182,52%	-95,73%	-54,70%	-100,00%	-78,14%	-71,28%	-77,55%
TOTAL	207,4	-71,9	28,4	-64,9	-58,4	-50,8	-58

Table 4: Average weekly day environmental assessment

The change in type of pollutant emission is characterized by:

- an increase of CO (200%) and COVM (28%)
- a decrease of CO2 (58%), NOX (72%), SO (50%) and particles (65%).



The CO² emissions represents 99,6% of the total weight of the studied pollutants. So we focus on the change in CO² emissions that represents a saving of around 15t/year.

C2.4 Transport

Not relevant

C2.5 Society

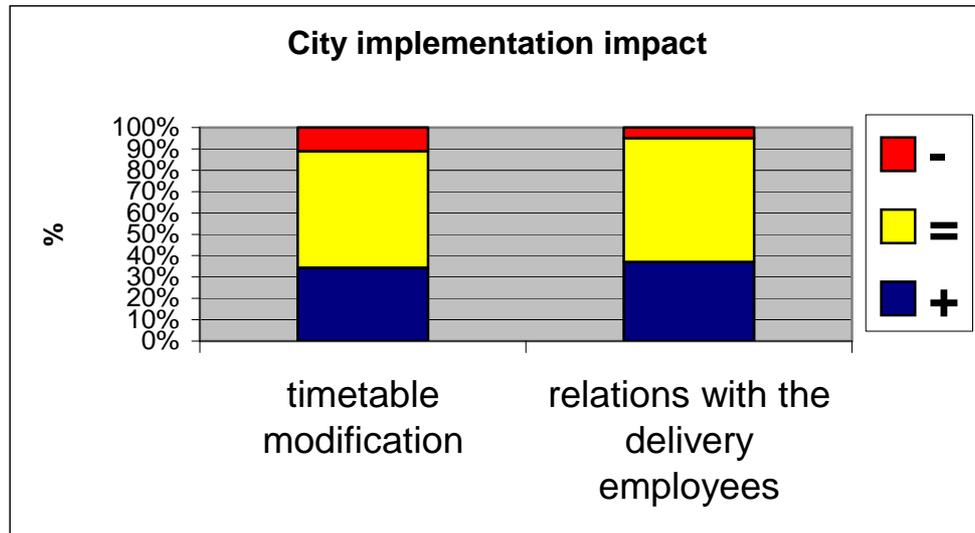
C2.5 A Chronopost new organisation

The new organization is mostly well accepted by clients and deliverymen.

For the clients:

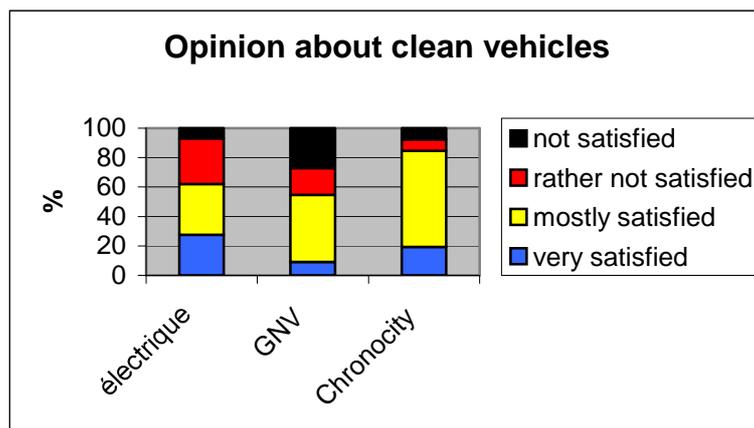
- 34% consider that the delivery new timetable is an improvement
- 54% think it does not introduce constraints

- 11% consider it is worse.
- 37% consider that the relation with deliverymen have been improved, 58% that it is the same than before and 5% that it is worse than before.
-



For the deliverymen:

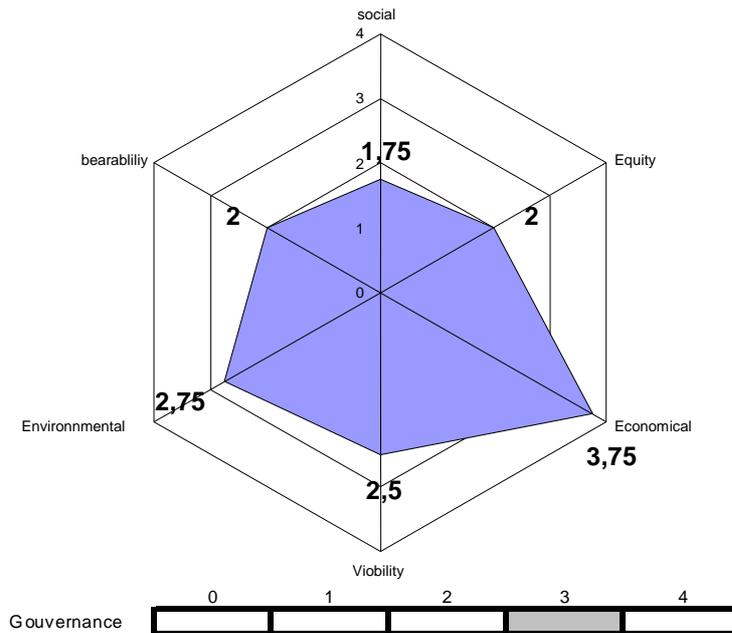
- The new organization of the rounds is well accepted even if the City small room is a little small to ensure perfect work conditions (It is very difficult to find large room in Toulouse hyper centre).
- They are mostly satisfied to use clean freight delivery vehicles for their rounds: 85% of them approve the Chronocity use for the pedestrian areas. For the other areas, electrical vehicles are preferred to GNV ones.



Sustainable development integration

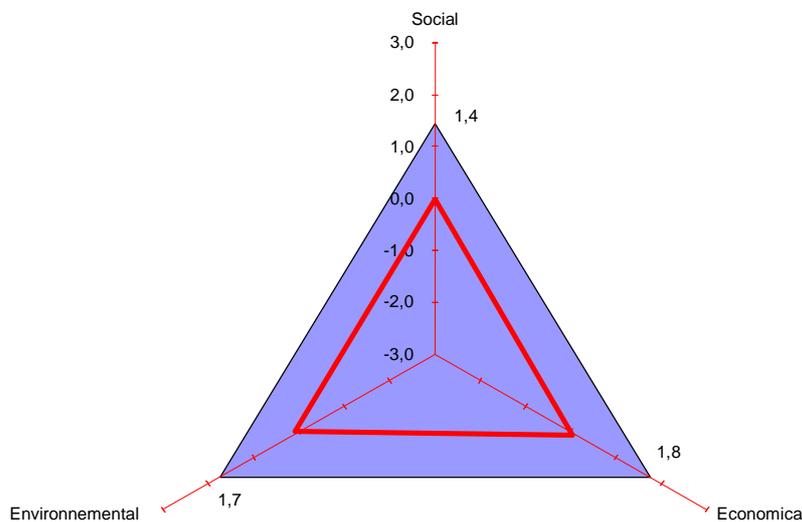
The analysis of the experiment results related to sustainable development through RST 01 chart shows that Chronopost has taken in account all the selected criteria and especially the economical and environmental ones.

Six fields radar type chart for “durable development profile”



Multicriteria analysis

The multicriteria analysis of the project leads to a mark included between 1 and 2 on a scale (-3 ; +3), the experiment is advantageous on all the environmental, economical and social (users and deliverymen acceptability) axes.



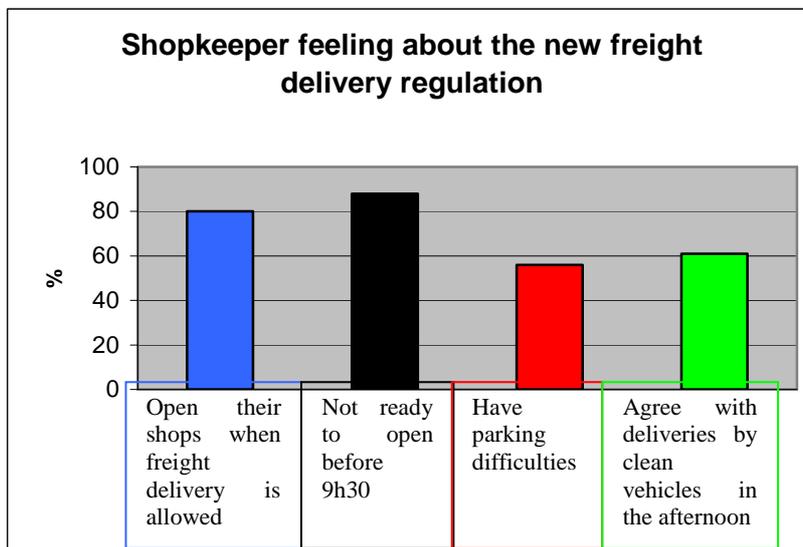
C2-B NEW FREIGHT DELIVERY REGULATION

The Chronopost deliverymen know the regulation, but admit to infringe it sometime in order to increase the productivity. To their opinion, delivery area locations are often not appropriate and to many private cars use them as parking space.

The shop keepers are quite satisfied: one third of them find it appropriate, one third admit not to know it and one third thinks it creates to much constraints.

The following points need to be underlined:

- More than 80% of the shops open when the delivery is not forbidden (before 7 am or between 9 am and 11a. m). 31% of the shopkeepers of the global sample open their shops before 9.30 a. m and 69% after 9.30 a. m or later.
- 88% of the shopkeepers opening after 9.30 am or later are not inclined to open earlier.
- 92% of the interrogated shopkeepers never receive freight at night.
- 61% of the shopkeepers are favorable to an extension of the deliveries in the afternoon if clean vehicles are used.
- 56% of the shopkeepers know constraints with freight deliveries, especially when delivery areas are not available because they do not exist or because they are occupied by illegally parking private cars. Many remarks evoke difficulties connected to the organization of the car park on the areas of delivery: the absence or the lack of areas of delivery or their occupation by VP implies that certain deliveries are made in full way, where from a limitation of the capacity of roads leading to traffic jams, pollution, times lost etc.



The acceptance of delivery vehicles in the centre is quite good: 42% consider them acceptable and around 50% consider them as necessary but introducing constraints.

Since the survey, the specific delivery spaces have been modified and the private cars access to hyper centre has been seriously restricted.

Clean vehicle use for delivery

Among the global sample, 68% consider that the use of clean delivery vehicles is very important, 23% that it is important, 6% do not mind and only 1% (2 persons) does not care at all. 26% of the questioned people knew the Chronocity, 75% because they met it on the street.

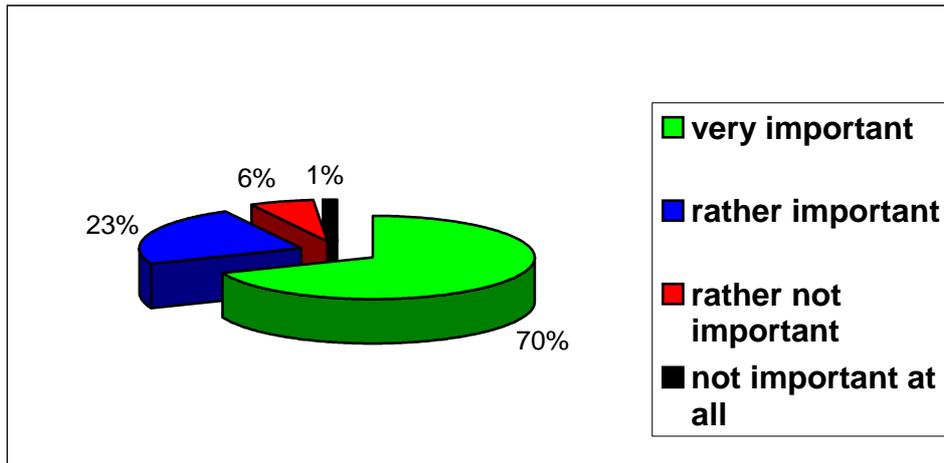


Figure 13: clean vehicle use importance for freight delivery

- In the majority questioned people consider clean vehicles as very useful: 62% for electrical one, 47% for CNG one and 61% of the persons who know the Chronocity. 54% of the shopkeepers are ready to accept more freight delivery constraints to enable the use of only clean vehicles. But as they aren't concerned by the investment cost, the shopkeepers may be motivated by an extended delivery time.

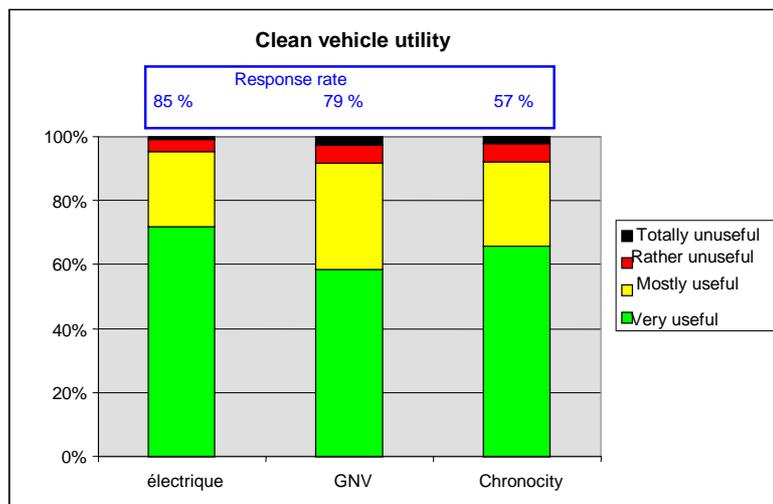


Figure 14: clean delivery vehicle utility

C3 Achievement of quantifiable targets

No.	Target	Rating
1	Structural renew of the freight management regulation in relation with the new transport management policy and especially the city centre access restriction objective.	**
2	Development of the cooperation with the whole stakeholders concerned by the freight delivering	*

3	Purchase of a clean vehicles fleet for the freight delivering in the city centre.	0
4	Optimisation of freight deliveries in the city centre and estimation of its environmental impact	*
0= Not Achieved * = Partly achieved **= Achieved in full ***= Exceeded		

C4 Up-scaling of results

Not applicable, since the UDC project failed and the freight delivery regulation, as the Chronopost project cover the whole area where the freight transport problem had arisen in Toulouse.

C5 Appraisal of evaluation approach

The evaluation method seems quite well adapted to the measure contents and the project deadline. It would be interesting to make another inquiry in one year in order to measure the new delivery regulation and delivery area respect as well as to evaluate the use of the clean delivery vehicles with stickers.

C6 Summary of evaluation results

The key results are as follows:

C6- A. Urban Delivery Centre

Despite, its failure, the project has permitted to initiate:

- for the first time at Toulouse level, a consultation between the carriers and the city counsellors with a global approach of freight delivery in the city centre.
- dissemination towards professionals in favour of clean vehicles

C6- B. New freight Delivery regulation

- **Key result 1** - The new regulation implemented with the agreement of the carriers and shopkeepers has permitted to limit the tonnage for goods delivery lorries and the delivery time during the day in the hyper centre.
- **Key result 2** - The dialog between the city , the carriers' and the shopkeepers' representative has allowed to establish a freight delivery quality chart involving the different partners, to define and implement controlled freight delivery areas.
- **Key result 3** -The shopkeepers have well accepted the slight constraints this new regulation has created. The new parking management regulation (measure 6.1 T) and the public space resign (measure 6.2 T) helped to free delivery parking areas access.

C6-C. Chronopost new organisation for delivery in the hyper centre.

The multicriteria analysis of the implementation of the Chronopost mail delivery platform in the Toulouse city centre is advantageous on all the environmental, economical and social axes.

- **Key result 1** – The very positive environmental assessment results in a decrease of 58% of CO2 emissions that represent a saving of 15 tons/year.
- **Key result 2** – The deliverymen really appreciate the clean vehicles and the work organisation from the new platform in the city centre.
- **Key result 3** – The new delivery organization is relatively transparent for the Chronopost customers who seem to appreciate environmental protection action connected to the use of clean vehicles.
- **Key result 4** – The economical assessment is satisfying as the cost of the new organisation is quite similar to the former one.

D Lessons learned**D1 Barriers and drivers****D1.1 Barriers****D1.2 A Urban Delivery Centre**

It proved impossible to federate all the freight transporters as envisaged, because:–

- **Barrier 1** - Competition is hard in this sector, every carrier is fighting for its market share; there is little confidence between the different actors;
- **Barrier 2** – The present site of the freight carriers is not far from the city centre (less than 10 km) so the expected cost savings proved to be not sufficient to attract them to a new Urban Freight Centre;
- **Barrier 3** - The initially planned incentives did not prove to attract the currently existing carriers. Strong opposition of the stakeholders emerged when a new carrier turned up, willingly to manage the urban freight centre (a new competitor).
- **Barrier 4** -The juridical and financial constructions of the envisaged urban freight centre proved to be too complex. Furthermore the city of Toulouse did not obtain an insight in the cost structure of the different freight operators, as it was considered as sensible market information.

The following risks were identified at the beginning of the measure:

- Opposition of the carriers and tradesmen to change their working process as well as the feeling to be constrained without against part;
- Acceptability by the carriers to participate to the creation of the UDC (financial interest,);
- Financial viability and legal feasibility of the UDC.

The first two risks are considered partly responsible for the failure to realise an urban freight centre.

D1.2 B- New delivery regulation

- **Barrier 1** – no object.

D1.2 C- Chronopost new delivery organisation

- **Barrier 1** – no object

D1.2 Drivers

D1.2 A Urban Delivery Centre

Driver 1 – No object

D1.2 B- New delivery regulation

- **Driver 1** – The consultation and dialogue between the local authorities and the stakeholders (carriers and shopkeepers) has enabled the implementation of this new regulation and the establishment of the delivery quality chart that guarantees the partners dialogue at least in the medium term.

D1.2 C- Chronopost new delivery organisation

Driver 1 – The will of the Chronopost society to engage action in favour of the environment preservation has permitted to initiate a change in the organisation.

Driver 2 – The city of Toulouse has supported the creation of the Chronopost platform in the city centre where the commercial property is quite seldom.

D2 Participation of stakeholders

D.2 A Urban Delivery Centre

- **Stakeholder 1** – The carriers submitted to hard competition have not been favourable to an organisational change that could have penalised the small companies.
- **Stakeholder 2** – the shopkeepers are mainly motivated by an upholding of the quality of service at the same price.

D.2 B- New delivery regulation

- **Stakeholder 1** – The carriers accepted the new regulation as they had been consulted and listened to.
- **Stakeholder 2** – the shopkeepers accepted the new regulation as they had been consulted and listened to.

D 2 C- Chronopost new delivery organisation

- **Stakeholder 1:** Chronopost implemented the new delivery organisation without consultation of its clients but their acceptance level is good because the impacts are weak for them.

D3 Recommendations

D3 A Urban Delivery Centre

- **Recommendation 1** – The freight delivery sector knows a high competition level and small margins. The context makes difficult to build up a relation of trust and realise a common project with carriers. The development of an urban freight centre can only be the result of a long process of assessment of the problems, recognition by the stakeholders, public awareness and wiliness to cooperate and improve the situation.
- Before the implementation of an urban freight centre, a city should:
 - implement a public and stakeholder information campaign, environmental charts and a more restrictive regulation; highlight the expected effects and change of mind set. This might take a certain time before the effects are visible.
 - develop a cooperation with the final receivers (shop owners) or the producers of the goods to create a demand for grouped freight deliveries, which will force the competing transporters to cooperate.

D1.2 B- New delivery regulation

- **Recommendation 1-** The preliminary discussions between the local authorities and the concerned stakeholders is deeply necessary to the adapt it as much as possible to the needs and constraints of the carriers and shopkeepers and to ensure their acceptance and respect of it.

D1.2 C- Chronopost new delivery organisation

- **Recommendation 1-** the support of the city to private society motivated by experiments in favour of environment respect allows creating an example that may encourage others societies to get involved in similar changes.

D4 Future activities relating to the measure

The city of Toulouse will maintain its policy in favour of the clean vehicles for delivery.

Annex N°1: The economic balance assessment of Chronopost

The objective of this annex is to estimate the financial impacts of the motorization and organisational change of the deliveries to the city centre of Toulouse.

The costs are in the current euro exclusive of tax of year 2006.

Indicators used for the change of motorization of vehicles

The former organisation used 6 diesel Master of 10 m³

The new organisation uses:

- 1 Chronocity of 1 m³,
- 3 electric-driven vehicles of 2,8 m³
- 11 Citroën Jumper GNV of 12 m³
- 1 Fiat Doblo GNV of 3,8 m³

The maximal useful volume of the new organisation is 25 m³ by tour, against 60 m³ in the former one. We shall see afterward that the new organisation allows delivering all the parcels in spite of an increase of the activity. The new organisation optimises the use of smaller vehicles, thus cheaper in equivalent vehicles with a more respectful motorization of the environment.

The indicators allowing determining the financial cost of a motorization change from diesel towards a electric motorization or to the GNV are the costs:

- of maintenance except tires (€ a month)
- of rent and insurance(assurance) of vehicles (€ a month)
- of the vehicles consumption (m³/100 km for the GNV, L / 100 km for the diesel)
- fuels ((/m³, €/L and € / km for electric vehicle)
- and the distance travelled by vehicles (km / month).

The total distance travelled monthly by a vehicle a month is composed of:

- the distance by tour (14 km / tours)
- the number of tours a day (2 tours / day)
- the average number of workdays a month (21 days / month)
- the distance between the platform of Blagnac and the average of the places of deliveries (9,3 km).

1. Cost of the change of vehicles in the former organisation

By setting as base 100, the value of the rent and fuel cost of diesel vehicles used in the former organisation, we can compare between them the various types of motorization.

The expenses division of fuel by type of vehicle on the global cost allows accentuating the importance of the fuel cost according to the type of vehicle.

The average weekly day vehicle consumption is the following:

5 Jumper is used only for the voluminous transportation of goods and it has a specific tour.

Average weekly day assessment

			diesel (g)
WITHOUT PLATFORM			
Morning	Blagnac-centre area		8528,3
	Rounds		10132,5
	Total		18660,8
Afternoon	Blagnac-centre area		5685,5
	Rounds		6755,0
	Total		12440,5
WITH PLATFORM			
Morning	Blagnac-City - PL		4225,0
	Blagnac-City – GNV commercial vehicle		0,0
	City-centre area GNV		0,0
	cold motors	4	0
	warm motors (46)		0
	Total		4225,0
Afternoon	Blagnac-City - VU Diesel		1532,5
	Blagnac-City - GNV		0,0
	City-centre zone6 GNV		0,0
	cold motors	3	0
	warm motors (37)		0
	Total		1532,53875
TOTAL WITHOUT PLATFORM			31101,3
TOTAL WITH PLATFORM			5757,5
EVOLUTION WITH/WITHOUT (%)			-81,5

		base 100	Renting cost	Gas oil cost du carburant
Baseline vehicles	Diesel (Master)	100	72%	28%
	Diesel (Boxer)	98	61%	39%
	Diesel (Partner)	72	58%	42%
Experiment Vehicles	GNV (JUMPER)	132	80%	20%
	GNV (DOBLO)	90	72%	28%
	Electrique	101	96%	4%

Table 1: Base 100 of the vehicle costs per vehicles and per month

If Chronopost had used in the former organisation, GNV Jumper vehicles instead of diesel Master vehicles, we would have had a 32 % additional cost. Similarly, the use of GNV Doblo vehicles of a lower capacity (3,8 m3) instead of diesels Master vehicles (10 m3), would have saved around 10 % of fuel cost. The cost of electric Berlingo vehicle is similar to the master Diesel one. Electric Berlingo might have been used in the former organisation because the number of km travelled daily is lower than the autonomy of the Berlingo batteries.

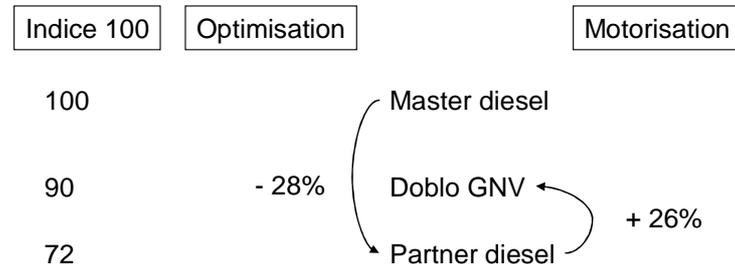
The share of the fuel costs is very weak (4 %) in comparison to the renting cost of these vehicles.

The difference in the division of the costs between the GNV DOBLO and the GNV Jumper results from the fact that the renting cost of the second one is much more important than for the first one (in consumption and in distance constants)

The fact of comparing GNV Jumper with diesel boxer and GNV Doblo with Partner allows to observe the share of the costs connected to the change of motorization and the share connected to the optimisation of the capacities of vehicles.



The Boxer use instead of a Master vehicle introduces a reduction of 2 % with 11 % cost variance in the division between the rent and fuel costs. The GNV vehicle Jumper monthly costs are 35 % higher than the diesel Boxer vehicle one with similar volume.



The vehicle Partner is 28 % cheaper than a Master vehicle. The GNV vehicle Doblo costs monthly 26 % more than a Partner diesel vehicle of similar volume.

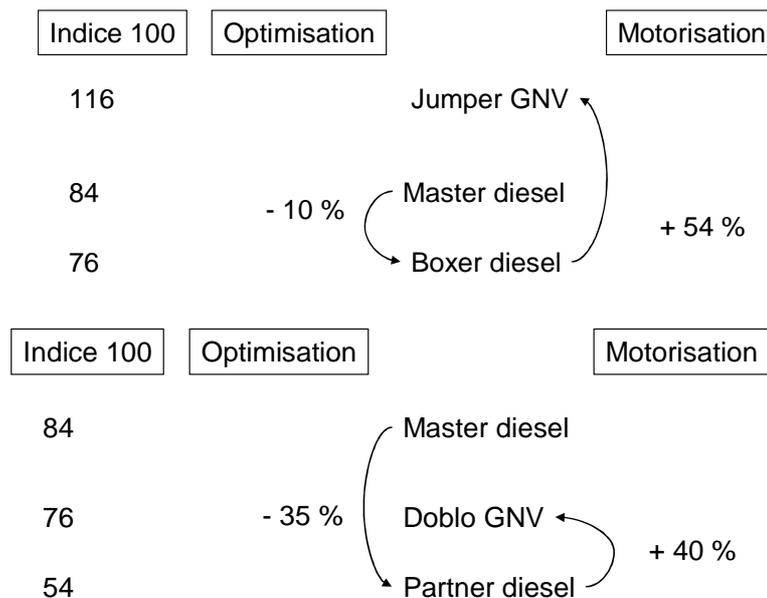
Cost of the change of vehicles in the new organisation

		base 100	part du coût de location	part du coût du carburant
Véhicules de référence	Diesel	84	86%	14%
	Diesel (Boxer)	76	78%	22%
	Diesel (Partner)	54	76%	24%
Véhicules utilisés	GNV (DOBLO)	76	85%	15%
	GNV (JUMPER)	116	90%	10%
	Electrique	99	98%	2%
	Chronocity	27	100%	0%

Table 2: Base 100 of the costs by vehicle and month in the new organisation

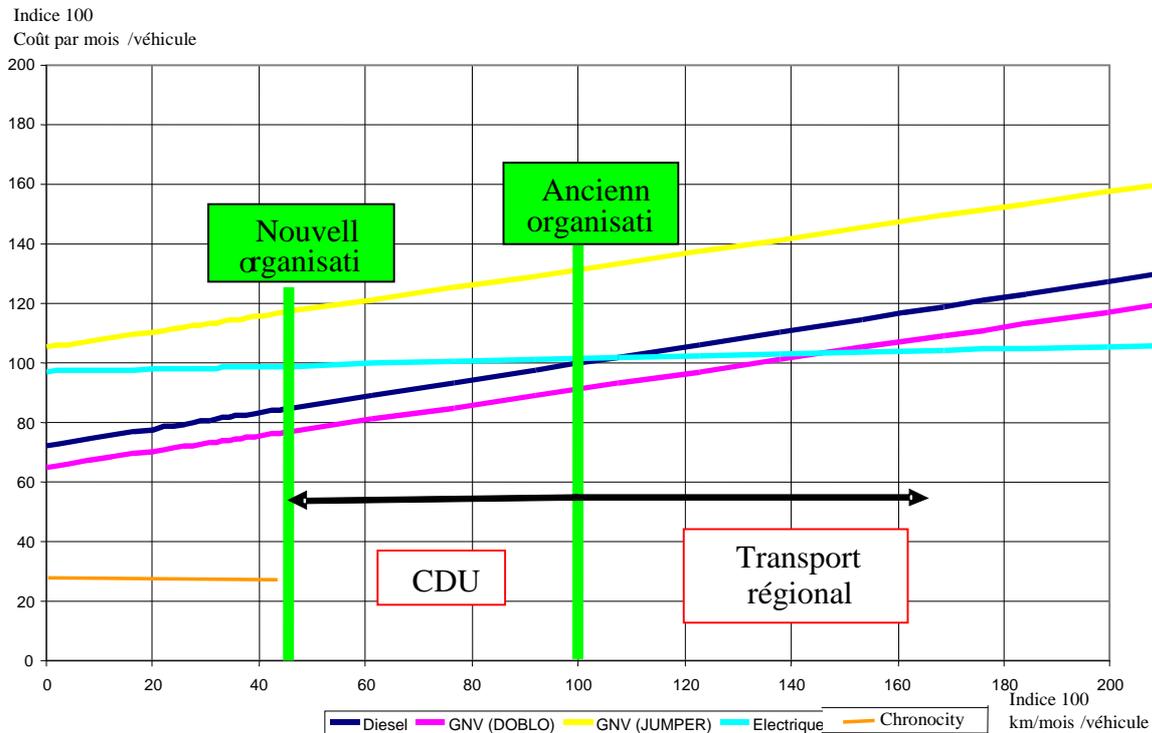
The more the distances travelled monthly by vehicle are weak, the more the share of the fuel in the global cost is weak (in constant rent), from 28 % to 14 % for diesel vehicles between the former and the new organisation.

- Only the GNV Jumper vehicles are more expensive in this new organisation.
- The monthly cost of the electric vehicle varies only very weakly with the distance. In the new organisation, the monthly cost by vehicle is similar between electric vehicles and diesels.
- The GNV DOBLO vehicle is cheaper in the new organisation than the vehicle diesel or GNV JUMPER or electric Berlingo.
- Chronocity is the less expensive solution but it can only be used in the delivery areas and it has only a useful volume of 1 m3.



Division of the costs of optimisation and change of motorization

Graph of comparison between vehicles according to the distance



Graphique : Evolution du coût/mois en fonction de la

The graph above shows curves by types of vehicles of the global monthly vehicle cost according to the number of km covered monthly by vehicle. Bases 100 of the graph are the values of the former organisation (distance and conveyes).

The new organisation allows to realize a 54 % decrease of the distances covered monthly by vehicle.

The more the number of km / month is weak, the more we are close to a Urban Logistics centre transport type of. The new organisation of Chronopost intergrates this logic of optimization of the distances of access to the delivery areas and rationalization of its tours.

We observe that the GNV vehicle DOBLO is cheaper than electric ones until a distance approximately 45 % wider than the reference one. Electric vehicles could not have reached this distance because of the autonomy limit of these (90 km).

Indicators for the organisation

The indicators are:

- the yearly cost by m² premises,

- the cost of the division in the former organisation in comparison to the cost of the division from Blagnac with the city platform and the shuttles,
- the cost of the new organisation with clean vehicles,
- the evolution of the productivity,
- the evolution of the activity,
- the rate of groupage,
- the time of delivery.

The cost / year / m² of the premises and the agency of Blagnac

		base 100 of Cost/year/m ²
Blagnac agency		100
:	Renting annual cost	70
	Annual depreciation	30
-----		-----
City Platform		151
which:	Renting annual cost	87
	Annual depreciation	64

Table 3: Location investment costs

The total yearly cost by m² of the new premises 51 % higher than the total yearly cost in m² of the Blagnac platform. This results from the importance of the investment of renovation of the premises in comparison to the surface of the premises. The cost of depreciation of the premises of the city centre is more than the double of the cost of depreciation of the Blagnac platform The depreciation of the premise investment is linear and for 8 years. The rent cost of the city centre premises is 24 % higher than the cost of the rent of Blagnac ones.

The cost of the new organisation from the Blagnac platform

The collecting tours are not taken in account, as they haven't been modified.

The total daily cost was calculated with the following indicators:

cost of a driver(chauffeur) by tour (€ / travl)	hourly cost of the drivers(chauffeurs) (€ / hour)
	duration of the travel by vehicle (hour)

cost of the fuel by travel for one tour	distance of the travelA/R (km)
	consumption extra urban (l / 100km)
	cost of the fuel (€/L)

To estimate this new organisation, it is necessary to define the platform and connection costs between them.

	previous organisation	new organisation
Blagnac City travel cost	64%	45%
Location cost.	36%	55%
total (base 100)	100	109
difference		9

Table 4 : economical assessment

The connection and platform cost of the new organisation is 9 % higher than in the former organisation. In the former organisation, the cost of the connection is higher than the cost of the platform; in the new organisation, the platform cost is significantly superior to the connection cost.

The cost of the new organisation with clean vehicles

In the new organisation, there is:

- 1 Chronocity
- 3 electric vehicles Berlingo
- 1 GNV Citroën Jumper
- 1 GNV Doblo cargo boat in the

We thus save to constant number of driver on:

- the use of Chronocity
- the use of the GNV Doblo vehicle
- the use of 3 electric vehicles

We have an additional cost on:

- the travel from Blagnac with the city centre platform in the new organisation
- the use of the vehicle GNV Jumper

	Pondération
Chronocity	34,1%
GNV Doblo	11,0%
Berlingo électrique	1,7%
Organisation	45,6%
GNV Jumper	7,6%
Total	100%

The use of Chronocity and vehicle Doblo allows to compensate the additional costs of the new organisation (connections and platform) and of the use of electric vehicles and GNV JUMPER. It is necessary to remind that the absolute values are weak. The new organisation with the use of the clean vehicles has a cost almost similar to the former organisation with diesel vehicles.

Evolution of the activity

We focus first on the evolution of the number of delivered objects and the number of realized points.

The available data are:

- the monthly division of the number of mails and parcels and delivery points before project (from October, 2004 till December, 2004) by only 4 tours on 6.
- the monthly division of the number of mails and parcels and delivery points after project (from August, 2005 till July, 2006)

The hypotheses are:

- the morning tours areal similar.
- the monthly division and the morning and afternoon activity shares are constant: 74 % in the morning and 26 % in the after noon.

This allows to reconstitute the average situation before project and so to compare the evolution.

	Evolution	
	parcels	points
morning extrapolation	16%	10%
afternoon extrapolation	15%	12%
Total	16%	10%

Table 5: Synthesis of the evolution of the activity

The number of delivered objects and delivery points has increased by 16 % for the first one and by 10 % for the second one. This new organisation was able to absorb this activity increase and also allows freeing surface in the Blagnac platform by the transfer of goods in the city centre premises.

Rate of groupage

We observe a groupage increase by 6,3 % in the morning and 2,2 % in the after noon. It can be in relation with the activity increase and/or to the new customer directed policy and/or to a better organisation in spite of the decrease of the total volume of the delivery vehicles.

Productivity and time of deliveries

The productivity is similar in both organisations.

According to the data of Mai 2004, the former organisation needed 77 monthly workinghours. The new organisation saves 23 working hours to constant staff.