CiViTAS
Cleaner and better transport in cities

MOBILIS
TOULOUSE • VENEZIA • LJUBLJANA • DEBRECEN • ODENSE

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Glossary of Terms

ABS	Anti-lock Braking System
AIS	Agricultural Institute of Slovenia
ADAS	Advanced Driver Assistance systems
AFNOR	Association française de normalisation (French national standardisation authority)
AKS	Automatic Kick-down system
ARS	System
ASC	Automatic Stability Centre
ASM	Azienda Servizi per la Mobilità (Mobility service Agency)
ASR	Anti-slip Regulation
AVL	Automatic Vehicle Detection
BAU	Business as usual
BRT	Bus Rapid Transit
CAC	CIVITAS Advisory Committee
CIVITAS	**CI**ty–**VITA**lity–**S**ustainability
CO	Carbon monoxide
CNG	Compressed natural gas
CR	Coordinator responsible
DKV	Debrecen Transport Company
DM	Dissemination manager
RDT	Demand Responsive Transport
EGNOS	**E**uropean **G**eostationary **N**avigation **O**verlay **S**ervice
ELG	Evaluation liaison group
EM	Evaluation manager
GNSS	Global Navigation Satellite System, also called NAVSTAR system
GPS	Global Positioning System

HQB	High Quality bus corridor
IAR	Interim activity report
ID	Partner identification Digit
IP	Implementation plan
IPR	Internal progress report
IPT	Internal transferability potential
ITS	Intelligent transport systems
LDM	Local dissemination manager
LEM	Local evaluation manager
LPG	Liquid petroleum gas
LTZ	Limited transport zone
MOBILIS	Mobility initiatives for local integration and sustainability
MoU	Memorandum of understanding
NGV	Natural gas vehicle
OBD	On-board diagnostic
PAC	Civitas policy advisory
PAR	Periodic activity report
PDM	Project dissemination manager
PEM	Project evaluation manager
PM	Project manager
PMB	Project management board
P&R	Park and ride
PT	Public transport
PSG	Project steering group
REC CEE	Regional environmental centre for central and eastern Europe
R+R	Ride and ride
RTD	Research and technical development

SDM	Site dissemination manager
SM	Site manager
SME	Small and medium enterprises
SMS	Sustainable mobility system
TC	Technical coordinator
TCG	Technical coordination group
TERM	Transport & environment reporting mechanism
TM	Technical manager
TO	Technical officer
TVM	Ticket vending machine
UDC	Urban distribution centre
WD	Working document
WP	Work package
W&R	Walk & ride

EXECUTIVE SUMMARY

One of the key objectives of the CIVITAS Initiative is to encourage cities across Europe to adopt measures that will result in cleaner and better transport.

Within CIVITAS II (2005-2009), 17 cities are clustered into four demonstration projects.

In the MOBILIS project, the cities of Toulouse (France), Debrecen (Hungary), Ljubljana (Slovenia), Venice (Italy) and Odense (Denmark), and their main local mobility stakeholders, agreed to create a new culture for clean urban mobility in the wider context of sustainable development, ensuring the involvement of all relevant stakeholders and participation of citizens. A set of common overall objectives was agreed upon, guiding all the project's activities - from initial planning to the final exploitation of results. The MOBILIS project particularly endeavoured to demonstrate the added value of developing and implementing broad integrated packages of policies and measures.

The five cities implemented forty-nine measures addressing each CIVITAS policy field (development of energy efficient clean vehicles and related infrastructure, management strategies to protect the quality of life in the city centre or sensitive zones, development of integrated pricing in favour of multimodal journeys, improvement of public transport quality, promotion of new approaches of car use, experiment of new concepts for good delivery and implementation of telematic tools to improve transport management and related information systems.).

The common project objectives were:

1. **Foster a transition process towards the broad use of alternative fuels and clean energy-efficient vehicles**
2. **Promote modal shift away from the use of the motor car towards sustainable transport modes**
3. **Improve the quality and fair share of public space**
4. **Create transport minimizing urban structures**
5. **Foster safety, security, social inclusion and equity in urban mobility**
6. **Reduce noise and improve air quality in urban areas**
7. **Support economic development and competitiveness**
8. **Advance efficient planning, management and implementation processes and coordination between mobility stakeholders at different administrative levels**
9. **Increase participation of citizens and civil society in environment- and mobility-related decision making**
10. **Raise awareness for sustainable mobility and promote behavioural change**
11. **Improve innovation and creativity capacities of local mobility stakeholders**

Evaluation concepts in MOBILIS were consistent with the GUARD approach. The evaluation methodology and tasks have been detailed in the evaluation plan (D.3.1): it concerned process and impact evaluation, including gender issue aspects.

The evaluation tasks involved site evaluation managers and measure leaders at city level and evaluation project managers at project level.

The project has assessed the introduction of a variety of innovative measures and has also highlighted some of the implementation difficulties and unexpected results obtained for some measures.

The evaluation of the measure implementation process has provided useful insights for the formulation of policy recommendations. In particular, it has helped to identify typical patterns of

barriers and positive features that characterise clean urban policies. Moreover, the correlation between barrier and positive feature patterns at work package level, in regard to local and institutional contexts, provided complementary information.

The most significant findings concern the relevance of particular barriers and positive features for measure implementation processes. The following barrier/positive feature categories appear as particularly important:

- Main barriers: lack of political support, legislation and regulation, technical and economical planning,

These barriers were or should have been identified at local level and described potential risks and contingencies in their measure descriptions.

- Main drivers: political commitment, partnership and user involvement, user needs' assessment, appropriate communication initiatives

The weight of these identified barriers and drivers varies with the city context and the policy field concerned.
The evaluation process has stressed the importance of a full and continuous assessment of the majority of the demonstrations implemented.

The MOBILIS project translated the results of the Process Evaluation into the following outcomes:

- development of learning practices for practitioners ("Glossy magazine" presenting case stories and the main lessons learned by MOBILIS cities);
- development of tools for practitioners (Guide for the implementation of cycling policy or Method to develop commuter mobility plans);
- input in policy recommendations for local and European decision makers;
- input in transferability report.

Finally, all measures have been successfully implemented. Ten measures (4 in Toulouse, 3 in Debrecen, 1 in Odense and 2 in Venice) have developped action plans or technical systems that will be implemented after MOBILIS time.

The evaluation conducted at measure, city and work package level has revealed that almost all horizontal and thematic goals have been reached.

The implementation of the 49 measures has achieved the initial common project objectives:

- Clean energy-efficient vehicles are operating (i.e: 100 CNG buses in Toulouse, 35 in Venice) and all partners have improved their knowledge on the benefits and constraints of alternative fuel use. Further development and increased impacts are already expected.
- An other approach of car owning and car use, promotion of public transport and cycling, improvement of sustainable mode offer and of the quality and efficiency of PT services have contributed to encourage modal shift towards public transport and sustainable transport modes. Ljubljana experimented information provision on the use of clean vehicles, while Odense developed direct marketing and provided interactive and Odense bicycle training for school children. Toulouse has developed area-based commuter plans and increased the number of PT passengers by around 50%,. Car sharing scheme in Venice has exceeded its expected results; at present 1.864 contracts are in force and 4.468 valid member cards delivered.

- Limited access management initiatives require careful consideration, especially in city centres. The innovative measures of the MOBILIS project have responded to these challenges. The decrease of car traffic (-15% in Toulouse city centre and -10% in Venice at rush hours, between 6 and 35% in environmental Zones in Odense) and simultaneous increase of soft mode use, mainly cycling, improves the quality and fair share of public space in Toulouse, Odense and Venice or will do it after MOBILIS time, in Debrecen.
- Access and parking restriction in Toulouse, and Venice, mobility management in Toulouse and Odense and the development of soft modes in the five cities will allow minimising urban structures.
- New infrastructures and equipments for soft modes and public transports, accessibility improvement for disabled people have fostered safety, security, social inclusion and thus, improved equity in urban mobility. Toulouse, Debrecen, Ljubljana, Odense and Venice have extended or improved their cycle lane network. Disabled passengers are able to use 50% of the buses in Toulouse, the new public transport boats or the carsharing system in Venice.
- Restricted access to city centre in Toulouse and Venice, creation of environmental areas in Odense, increase use of environment friendly transport modes in the five cities and new waterbuses in Venice helped to reduce noise and improve air quality in urban areas. Their impacts will be going on after the project.
- The development of biofuel production in Slovenian farms, the management of freight delivery developed in Toulouse and Venice, the development of new car use in Toulouse, Debrecen and Venice and the implementation of Intelligent transport System in Toulouse, Debrecen and Venice support economic development and competitiveness.
- Participative working groups and necessary identification of users or citzens' needs have advanced efficient planning, management and implementation processes and coordination between mobility stakeholders at different administrative levels. The culture acquired will benefit to develop further mobility development or services. The "participatory planning" experiment in Ljubljana showed that a legally enforced participatory planning based on regular stakeholder consultation could strengthen the successful implementation of the sustainable urban mobility plan.
- Involvement of citizens and associations in working groups or demonstrations have increased, in the five cities, the participation of citizens and civil society in environment- and mobility-related decision making
- Marketing and information campaigns in Toulouse, Ljubljana, Odense and Venise have raised awareness for sustainable mobility and promoted behavioural change
- Development of telematic and intermodal systems, multimodal modelling in Odense, and new mode of car use has improved the innovation and creativity capacities of local mobility stakeholders and researchers.

In Toulouse, the implementation of the project has improved the overall quality of life at local level, by reducing the mobility problem and the pollutant emissions of buses (-85%). Toulouse, which has a long tradition of innovation, took the opportunity of the MOBILIS project to act as a pioneer in the field of Satellite Navigation and Intelligent Transport Systems, as interactive transport ticketing (300, 000 Pastel card subscribers since July 2007) and mutimodal information, while confirming its leader role in the field of clean vehicles with, now, a 100% clean bus fleet, among which 128 CNG buses. The 'intelligent' combination of the whole panel of MOBILIS measures and the cooperation between the main measure leaders has stimulated the quality and use of Public Transport (+ 49%) and soft modes and improved the mobility of some dedicated targets groups.

In Debrecen, the MOBILIS project proved and underlined the commitment of decision makers to the sustainable development of the city, with special attention to mobility issues. The smooth cooperation

between local stakeholders is one of the most important local mobility achievements that was facilitated by the MOBILIS project. The politicians and stakeholders understood the importance of involving all the different stakeholders in the process of sustainable development to create a well-organised sustainable mobility framework for all transport modes and of being able to address the future transport challenges in Debrecen. The measures of the MOBILIS project were major contributions to raise the standards of urban mobility in Debrecen and attempt to improve the quality of life of citizens.

In Ljubljana, the MOBILIS project brought considerable changes in the understanding of transportation issues. Use of alternative fuel is increasing, farmers are encouraged to produce oil rape, crude oil and fodder, public transport is more popular and cycling is becoming also more popular. The learning process also revealed that many more integrated measures were necessary to achieve further substantial change in sustainable mobility in Ljubljana and somehow naturally leads to its involvement in the Civitas plus initiative.

In Odense, the experience, gained from participating in Mobilis project, has made a substantial number of direct improvements in the city regarding sustainable urban mobility. It has also given a wide range of technical experiences and lessons learned which would benefit the future work with mobility and urban planning in Odense. As many of the activities have addressed the individual, in offering and marketing better mobility choices, these experiences will be directly adopted and further developed in the coming years as Odense begin the very large task of implementing the new traffic and mobility plan.

In Venice, caracterised by a unique traffic system composed of mainland city traffic and waterborne traffic the MOBILIS project has contributed to make public transport fleets cleaner (+ 35 CNG buses and 10 LPG boats), to increase accessibility to transport, to better manage traffic flows (-10% of car traffic at rush hours) and parking on the mainland and in the lagoon and to promote alternative modes of mobility, like bicycle and the successfully implmented car sharing scheme.

The main impacts of the measures by field policy in term of transport-mobility, energy, environment, economy and society are summarised, in relation with the policy recommendation, in the tables below:

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Clean vehicles and alternative fuels	Bio diesel production*			-	-			
	Bio diesel use*			-	-			
	CNG infrastructure*	-	-	-	-			
	CNG vehicles*			-	-			
	Biogas production		-	-	-			
	Biogas use*			-	-			
	LPG boats*			-	-			
	Soot filters		-	-	-			

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Access and Parking Management	Restrictive parking *				-			
	Restrictive access*				-			
	Environmental zones*				-			
	Pedestrian zones*				-			
	Bus lanes				-			
	High quality infrastructure for bus				-			

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Integrated pricing and ticketing strategies	Integrated pricing							
	Ticketing systems and smart cards	-	-					

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Stimulation of public transport modes	Quality measurement systems				-			
	Proximity services	-	-					
	Accessibility measures	-	-					
	Demand responsive services**							
	Safety and security training	-	-					
	Integrated public transport services	-	-		-			

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
New form of vehicle use and ownership	Car sharing							
	Car pooling							
	Alternative mobility							

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
New concepts of goods distribution	New freight regulation and charters				-			
	Micro platform and clean vehicles				-			
	Web-based delivery management				-			

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Innovative soft measures	Awareness campaigns for sustainable mobility							
	Individual marketing for sustainable mobility							
	Mobility agency and personalised information							
	Commuter plans assistance							
	Bicycle use promotion and development strategy							
	Bicycle infrastructure	-	-		-			

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Telematic application for Mobility management	Use of GNSS in transport management	-	-		-			
	Bus and tram priority				-			
	Multi modal information systems	-	-					
	Automatic observation systems	-	-		-			
	Global Mobility Management concept	-	-		-			

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

The evaluation of the MOBILIS project has provided information on the results that can be achieved when implementing integrated packages of sustainable urban transport measures and recommendations to implement similar measures. The transferability report (D.3.4.2) provides more detailed recommendations for the ten measures considered as easy to implement in other cities.

Due to the short time of the project and, sometimes, to modifications to the city context, precise results of the impacts on transport, energy, environment and society have been difficult to quantify. The evaluation indicates some of the expected results, while the impacts of others will only appear over the next few years.

One of the main feedbacks from cities is that measure lifetime will go on beyond MOBILIS and it will therefore be interesting to have further evaluation in a few years' time. It is recommended that data

collection and analysis is continued over the lifetime of many of the measures to identify the sustained effects of the measure and to identify whether the measure is continuing to meet its objectives and/or identify areas/opportunities for improvement in the future.

1 INTRODUCTION

1.1 Background

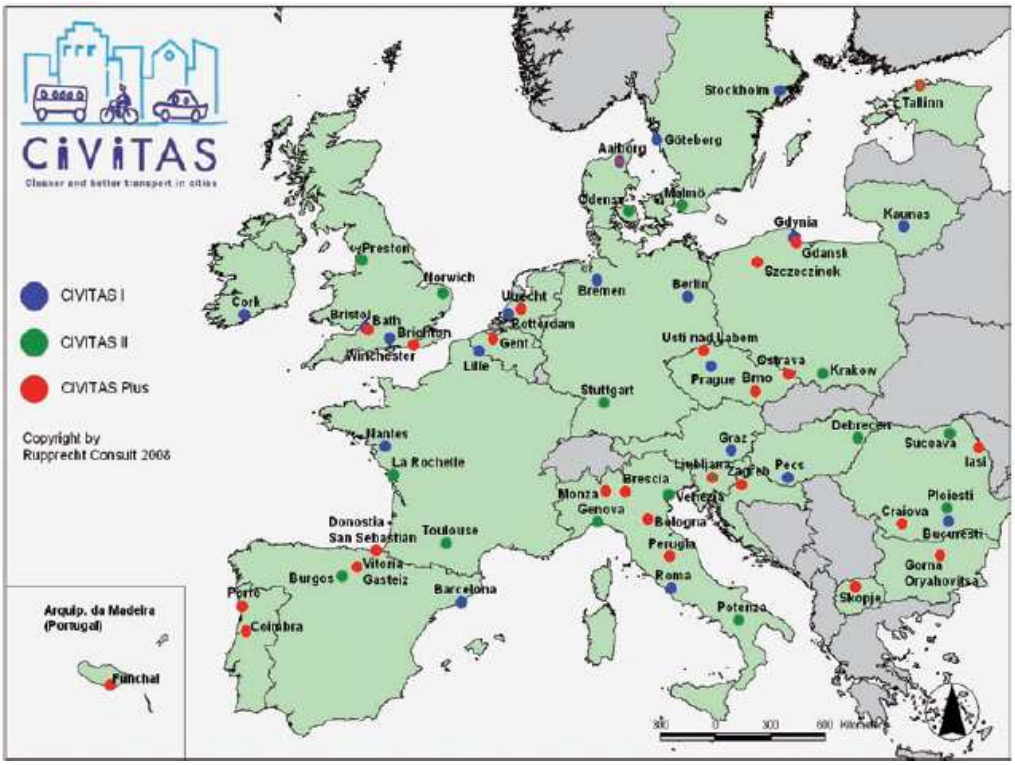
This chapter describes the project context.

With the CIVITAS Programmes, the EC aims to make a decisive breakthrough by supporting and evaluating some ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of European citizens.

CIVITAS II, which is the second step of CIVITAS, includes four demonstration projects, in which 17 cities are involved. They are:

Demonstration project	City leader	City partners[1]
CARAVEL	Genova (Italy)	Burgos (Spain), Krakow (Poland), Stuttgart (Germany)
MOBILIS	Toulouse (France)	Debrecen (Hungary), Ljubljana (Slovenia), Odense (Denmark), Venice (Italy).
SMILE	Malmö (Sweden)	Norwich (UK), Tallinn (Estonia), Potenza (Italy), Suceava (Romania)
SUCCESS	La Rochelle (France)	Preston (UK), Ploiesti (Romania)

[1] In many cases the city leader or the city partners are part of agglomerations. For instance, in MOBILIS, some of the measures concern Blagnac, a neighbouring town, or other cities of the SICOVAL or CAGT city groups.



One of the key objectives of the CIVITAS Initiative is to encourage cities across Europe to adopt measures, which will result in cleaner and better transport. So, transferability evaluation contributes to the transfer decision because it allows a preliminary identification of the prospective difficulties, and improves European knowledge of common features and differences.

In CIVITAS II, the cities, projects and CIVITAS-GUARD were all involved in the transferability assessment.

MOBILIS

In 2004, the cities of Toulouse (France), Debrecen (Hungary), Ljubljana (Slovenia), Venice (Italy) and Odense (Denmark), and their main local mobility stakeholders agreed to create a new culture for clean urban mobility in the wider context of sustainable development, ensuring involvement of all relevant stakeholders and participation of citizens. They have forged a European partnership for implementing '**Mobility Initiatives for Local Sustainability**' **–** the **MOBILIS** project.

MOBILIS aimed to implement radical strategies for clean urban transport in all five cities, building on a broad range of policies and instruments. The project contained a total of 49 measures integrated into a detailed four-year (2005–2009) work programme. This addressed all eight CIVITAS policy fields.

The most outstanding planned activities have focused on:

- Demonstrating the large-scale application of alternative fuels as bio diesel, biogas, compressed natural gas (CNG) and liquid petroleum gas (LPG) in bus or boat fleets, optimising bio-fuel production and operation and developing effective framework conditions for a broad deployment of alternative fuel supply and usage;
- Widening experiences with EGNOS/GALILEO services and implement ITS applications for improving traffic conditions and public transport services;

- Managing the accessibility of sensitive areas through innovative zoning approaches: access control areas, environmental zones, new parking schemes, high-quality corridors, as well as traffic control, enforcement and public space redesign;
- Demonstrating two new approaches to clean urban logistics, implement one new freight distribution centre operated with clean vehicles;
- Ensuring social inclusion by enhancing the accessibility (physical, psychological, economic, informational) of mobility services;
- Substantially enhancing public transport quality and integration with other transport modes (private car, bicycle) through innovative planning and service development;
- Providing new targeted mobility services that change dominant concepts of vehicle ownership and use (car-pooling services, car-sharing services, mobility card schemes);
- Promoting sustainable mobility, modal shift to walking, cycling and public transport and behavioural change through targeted and personal marketing, service development, information dissemination, education and training; and finally
- Contributing to Europe-wide evaluation and dissemination of the results to be put forward through the CIVITAS initiative.

The MOBILIS project particularly endeavoured to demonstrate the added value of developing and implementing broad integrated packages of policies and measures. The exchange of experiences and good practices between the partners therefore played a crucial role. Moreover, specific coordination activities have been focusing on the promotion and integration of the following five key topics across all sites and measures:

- Social inclusion and equity in mobility;
- Transition strategies towards alternative fuel production and use;
- Planning and organising mobility at urban area level;
- Understanding and changing mobility behaviour;
- Costs and benefits of using new technologies in transport.

MOBILIS aimed to bring about positive change in the planning culture and mobility patterns of all the five partner cities, but also to provide conclusions about the transferability of practices to other urban communities across Europe.

1.2 The Project Consortium Cities

The cities of Toulouse (France), Debrecen (Hungary), Ljubljana (Slovenia), Venice (Italy) and Odense (Denmark) have formed a strong partnership with high-level political commitment to respond to the future challenges in urban transport and mobility. Toulouse, Debrecen, Odense and Venice have been committed to working together as equal partners, while Ljubljana has been eager to contribute as a 'follower city', especially to innovations in alternative fuel production, supply and use, as well as through innovative soft measures. The partnership has been characterised by an equal and bi-directional mutual exchange of knowledge, know-how, lessons of practical experiences, and particularly the real exchange and transfer of innovations.

Although different in size, history and geographic location, all five cities are well known for spearheading innovative transport and energy policies in their countries with their common commitment to sustainable urban development. As typical examples of medium-sized cities, they represent regional centres playing an important role in the development of their hinterlands.

The MOBILIS cities are well represented in national and European networks promoting sustainable mobility solutions. The co-ordinating city - Toulouse - is a frontrunner in terms of innovative transport solutions in France. Toulouse has considerable experiences in high-profile national and European RTD projects, especially concerning intelligent transport systems, and the future European geo-positioning system Galileo has been developed there. As a member of the POLIS management committee, Toulouse actively promotes its experience widely at the European level. Debrecen and Ljubljana have sound experience with European-transport related projects and are also part of transport-related networks in their regions. In June 2004, Ljubljana has even received the annual European Mobility Award. Venice has been actively developing innovative mobility policies, challenged by its particular urban form. The city is also involved in a broad range of European RTD projects and promotes sustainable urban development in several international city networks. Odense has a long tradition in planning for cyclists and innovative approaches to stakeholder involvement and citizen participation. It also plays an active part in several European RTD projects and city networks at national and European level.

Most of all, the five cities have relevant experience in developing clean vehicle fleets, together covering the main fuel alternatives of compressed natural gas (CNG), bio-diesel, bio-gas and liquid petroleum gas (LPG) for boats. They also share a common interest in agricultural waste products as an important local energy source. Debrecen, especially, is a pioneer in biogas production from organic

waste. This broad coverage and specific expertise has formed the basis for focusing on transition scenarios towards the sustainable production, supply and use of alternative fuels.

A common tradition of the cities is the commitment of their mayors to not only fully back the implementation of innovative projects but also to use their national popularity to put results on a wider agenda. This high-level political commitment in all cities has been expressed through the active participation of key politicians in the MOBILIS Project Steering Group (PSG).

The MOBILIS project consortium has consisted of a total of 33 contractual partners. Tisséo-SMTC – the transport authority of the Toulouse urban area- led the consortium, which included public and private organisations from the five partner cities (Toulouse, Debrecen, Ljubljana, Venice and Odense), as well as one private partner from Belgium and one from Germany.

The local consortia have been local government departments with clear competence in public and private transport, as well as other sectoral policies. Together with the help of the MOBILIS project office; they were able to implement the ambitiously designed packages of measures.

The main changes in consortium structure during the MOBILIS Project were the following:

Toulouse

During the contract signature phase, the Public Transport Authority management structure (Tisséo-SMTC, coordinator) went through many changes, which introduced, then withdrew, one partner (CONNEX). Moreover, the SME group (CECILE), specialising in satellite navigation applications, became a new partner with the CIVITAS MOBILIS consortium and has taken over substantial parts of the activities carried out in measure 12.1 (amendment validated in December 2006). In March 2008, less than one year before the end of MOBILIS, a new city council has been elected. This change also affected Greater Toulouse Authority and the public transport authority Tisséo-SMTC.

Venice

In April 2005, shortly after the start of MOBILIS, a new city council was elected. The newly elected Lord Mayor started a re-organisation process, which has affected the city council and various organisations and agencies of semi-public or public character. These changes have been limited but, since they concerned some of the Venice MOBILIS consortium partners, they affected a lot of measures, sometimes slightly delaying the scale of implementation. The political decision to transfer main operative activities from VESTA Spa to ASM Spa was linked to the recognised capacity of ASM Spa to efficiently implement them. In most cases, the staff in charge of the measure was kept on with the new organisation, so continuity has been ensured.

Finally, on the 31st of January 2007, the function of CDG TALV, the Government Commissioner responsible for waterborne traffic in the Venice Lagoon, formally phased out and all its contracts and commitments have been transferred to the City of Venice.

All administrative changes were finalised around the midway point, so Venice has been able to start the 2nd half of MOBILIS with quite a stable partnership.

Ljubljana

In 2005, the new owner of Teol d.d. (SAVA d.d.) decided to carry out some of the tasks initially in charge of Teol d.d for the implementation and large-scale deployment of bio-diesel and CNG fleets. SAVA therefore joined the MOBILIS consortium (amendment validated in December 2006). Finally, SAVA and TEOL have withdrawn from the MOBILIS project and been replaced by PINUS TKI.

Debrecen and Odense

In both cities, no specific partners changes have intervened.

The final consortium has been composed of the partners quoted in the table 1 below.

Table 1: MOBILIS participants

Participant Role*	Participan Number	Participant name	Participant short name	Country
CO	1	Syndicat Mixte des Transports en Commun de l'agglomération toulousaine / Public transport authority of Toulouse conurbation	Tisséo-SMTC	France
CR	2	Communauté d'Agglomération du Grand Toulouse / Great Toulouse community	CAGT	France
CR	3	Communauté d'Agglomération de Toulouse Sud-Est	SICOVAL	France
CR	4	Ville de Toulouse,/city of Toulouse	Toulouse	France
CR	5	Ville de Blagnac : City of Blagnac	Blagnac	France
~~CR*~~	~~6~~	~~Connex Toulouse~~	~~Connex~~	~~France~~
CR	7	Gaz de France	GDF	France
CR	8	Centre d'Études Techniques de l'Équipement du Sud-Ouest	CETE/ZELT	France
CR	9	Agence d'Urbanisme et d'Aménagement du Territoire Toulouse Aire Urbaine	AUAT	France
CR	10	Municipality of Debrecen, City of County Rank, Mayor's Office	Debrecen	Hungary
CR	11	DKV Debrecen Transport Company – urban trolley buses, tramway and parking system operation	DKV	Hungary
CR	12	Hajdú Volán Transportation Inc. – regional and urban buses services, CNG operation	Hajdú Volán	Hungary
CR	13	Magyar Közút Kht. Hajdú-Bihar Megyei Területi Igazgatósága: Hajdú-Bihar County State Road Maintenance Company – road traffic management and control	MK KHT	Hungary
CR	14	University of Debrecen, Centre of Agricultural Sciences, Faculty of Agricultural Economics and Rural Development	UoD	Hungary
CR	15	MESTNA OBČINA LJUBLJANA – City of Ljubljana	Ljubljana	Slovenia
CR	16	Janvo podjetje Ljubljanski potniški promet d.o.o. – Urban bus network operator	LPP	Slovenia
~~CR*~~	~~17~~	~~TEOL, Kemična industrija, d.d. – bio-diesel production~~	~~Teol~~	~~Slovenia~~
CR	18	University of Maribor, Faculty of Mechanical Engineering, Institute of energy, process and environmental engineering – bio-diesel production	FME	Slovenia
CR	19	Agricultural Institute of Slovenia	AIS	Slovenia
CR	20	Regional Environmental Centre for Central and Eastern Europe	REC CEE	Slovenia
CR	21	Comune di Venezia - City of Venice	Venice	Italy
CR	22	ACTV S.p.A.	ACTV	Italy

Participant Role*	Participan Number	Participant name	Participant short name	Country
CR	23	Azienda Servizi Mobilita S.P.A.	ASM	Italy
~~CR*~~	~~24~~	~~VESTA S.p.A. Venezia Servizi Territoriali Ambientali~~	~~VESTA~~	~~Italy~~
CR	25	Agire – Agenzia Veneziana per l'Energia	Agire	Italy
~~CR*~~	~~26~~	~~Commissario Delegato dal Governo per il Traffico Acqueo nella Laguna di Venezia~~	~~CDG TALV~~	~~Italy~~
CR	27	Forma Urbis S.a. S	Forma Urbis	Italy
CR	28	City of Odense	Odense	Denmark
CR	29	MOBIEL21	MOBIEL21	Belgium
CR	30	Rupprecht Consult – Forschung & Beratung GmbH	RC	Germany
~~CR*~~	~~31~~	~~SAVA~~	~~SAVA~~	~~Slovenia~~
CR	32	CECILE	CECILE	France
CR	33	PINUS	PINUS	Slovenia

1.3 The Project Objectives

This chapter describes the objectives of MOBILIS in a measurable and verifiable form.

The Project objectives represent the aspirations of MOBILIS at the strategic and common level, i.e. the project level. A set of common overall objectives has been agreed upon that has guided all activities throughout the project implementation - from initial planning to the final exploitation of results.

The major operational project goals represent the aspirations of MOBILIS at the level of the project's work packages and measures;

The Key Project Targets represent the tangible and verifiable outcomes that a measure aimed to achieve.

General objectives

The following objectives were agreed upon by MOBILIS consortium for guiding activities throughout the project duration:

- **Foster a transition process towards the broad use of alternative fuels and clean energy-efficient vehicles**
- **Promote modal shift away from the use of the motor car towards sustainable transport modes**
- **Improve the quality and fair share of public space**
- **Create transport minimising urban structures**
- **Foster safety, security, social inclusion and equity in urban mobility**
- **Reduce noise and improve air quality in urban areas**
- **Support economic development and competitiveness**
- **Advance efficient planning, management and implementation processes and coordination between mobility stakeholders at different administrative levels**
- **Increase participation of citizens and civil society in environment- and mobility-related decision making**
- **Raise awareness for sustainable mobility and promote behavioural change**
- **Improve the innovation and creativity capacities of local mobility stakeholders**

The eight technical work packages (WP5-12) provided a common framework for MOBILIS measures based on the use of similar policy approaches and instruments and a basis for cross-project cooperation on the CIVITAS level. Their relation to the project objectives is illustrated in the following table:

Table 2: Overview of MOBILIS objectives and relation to Work Packages

MOBILIS Objectives	Work Package Related to MOBILIS Objectives	
Foster a transition process towards the broad use of alternative fuels and clean energy-efficient vehicles	WP 5	Clean vehicles and alternative fuels
	WP 6	Access management
	WP 8	Stimulation of public transport modes
	WP 10	New concepts for goods distribution
	WP 11	Innovative soft measures
Promote modal shift away from the use of the motor car towards sustainable transport modes	WP 6	Access management
	WP 7	Integrated pricing strategies
	WP 8	Stimulation of public transport modes
	WP9	New forms of vehicle use and ownership
	WP 11	Innovative soft measures
	WP 12	Telematics
Improve the quality and fair share of public space	WP 6	Access management
	WP 7	Integrated pricing strategies
	WP 8	Stimulation of public transport modes
	WP 11	Innovative soft measures
Create transport minimising urban structures	WP 6	Access management
	WP 11	Innovative soft measures
Foster safety, security, social inclusion and equity in urban mobility	WP 7	Integrated pricing strategies
	WP 8	Stimulation of public transport modes
	WP 11	Innovative soft measures
	WP 12	Telematics
Reduce noise and improve air quality in urban areas	WP 6	Access management
	WP 8	Stimulation of public transport modes
	WP9	New forms of vehicle use and ownership
	WP 10	New concepts for goods distribution
	WP 11	Innovative soft measures
Support economic development and competitiveness	WP9	New forms of vehicle use and ownership
	WP 10	New concepts for goods distribution
	WP 12	Telematics
Advance efficient planning, management and implementation processes and coordination between mobility stakeholders at different administrative levels	All work packages	
Increase participation of citizens and civil society in environment- and mobility-related decision making		
Raise awareness for sustainable mobility and promote behavioural change		
Improve the innovation and creativity capacities of local mobility stakeholders		

Major operational goals

Horizontal goals

The following table provides an overview of the project-specific **goals** identified for each horizontal work package.

Table 3: Major operational goals by horizontal Work Package

Major operational project goals by horizontal work package
WP1: Project Management
Ensure smooth high-quality project delivery within the stipulated timeframe; Manage resources in a professional and transparent way; Support partners in the day-to-day technical as well as financial and administrative management; Foster a cooperative working relationship among partners; Create and maintain partnerships with and between all relevant actors at the local, national and European levels; Enable and facilitate information exchange between all (internal and external) project stakeholders as well as with GUARD and other CIVITAS projects; Regularly report project progress to the European Commission; Follow strict internal monitoring arrangements for technical as well as "horizontal" aspects, i.e. management-, integration-, evaluation-, and dissemination-related project reports; Ensure professional evaluation, dissemination, training, exploitation and integration; Contribute to increasing the European Added Value of the project; Integrate political decision-makers of the five MOBILIS cities to evaluate the progress of the project and to provide strategic guidance to the consortium; and Facilitate a spirit of integrity, equity and fairness at project level.
WP2: Integration and technical coordination
Accomplish technical coordination between sites and ensure well-informed decision making; Increase the overall level of integration, fostering synergies and avoiding conflicts between policies measures – at site-level also beyond MOBILIS; Ensure an efficient and effective implementation process focused on target achievement; Secure the integration of gender equity issues across all policies and measures; Prepare sound contingencies for managing potential and actual risks; and Develop policy recommendations for all public authority levels to enhance the implementation of integrated clean urban transport strategies.
WP3: Evaluation
Evaluate the impacts of measures and complementary sets of measures by use of common indicators, methods and tools Cooperate actively on CIVITAS level evaluation activities (GUARD and other CIVITAS Projects) Identify potentials for transfer of measures.
WP4: Dissemination, training and exploitation
Ensure effective dissemination of MOBILIS outcomes and raise awareness about sustainable mobility and alternative energy use on the local, national and European level Establish an intense process of experience exchange on the MOBILIS and European level Coordinate MOBILIS-level training activities among project cities and provide in-depth, hands-on training for transport professionals Promote exploitation of innovative technologies, systems, services and policies, as developed in the project on the MOBILIS and European level in coordination with GUARD

Thematic goals

The following table provides an overview of the project-specific **goals** identified for each technical work package.

Table 4: Major operational project goals by WP / Policy Field

Major operational project goals by WP/Policy Field
WP5: Clean vehicles and alternative fuels
Develop transition strategies towards the sustainable production, supply and use of alternative fuels and clean vehicles, tailored to local conditions Substantially increase the current use of clean vehicles, alternative fuels and emission reduction technologies in municipal fleets Stimulate the demand for clean vehicles and alternative fuels among mobility service operators and private car owners Build up local capacities by working with alternative fuel technologies
WP6: Access management
Create and enlarge access-controlled and "clean zone" areas Reduce car and boat traffic in inner urban areas by managing parking space availability and costs Provide incentives for the use of clean vehicles and alternative fuels Improve the acceptance of access restriction policies for sensitive areas
WP7: Integrated pricing strategies
Achieve full integration of tariff and ticketing systems between PT services, but also for car parks and motorway use Make PT services more attractive and enhance modal shift by integrating other services and using electronic tools (e-purse, service cards) Use transport service contracts as a tool for quality improvements and targeted service development for specific user groups Promote P&R infrastructures and intermodal travelling and reduce car traffic in the city centre
WP8: Stimulation of collective transport modes
Improve the overall availability, quality, accessibility and attractiveness of PT services Remove barriers for using PT through comprehensive accessibility strategies and targeted service improvements Enhance the intermodal connectivity of PT services Improve security in PT for all user groups Increase the PT services integration through enhanced cooperation, coordination and participation in planning
WP9: New forms of vehicle use and ownership
Reduce the number of car trips and increase the average vehicle occupancy Enlarge service offers for car sharing based on sustainable marketing strategies Improve the integration between carpooling and PT services Provide new car-pooling services for specific target groups Limit the circulation of high-polluting cars by providing tailored mobility service alternatives
WP10: New concepts for the distribution of goods
Rationalise urban logistics and goods distribution, reducing empty carriages and vehicle emissions, especially in sensitive areas Promote clean vehicles for urban logistics and goods delivery services Reduce congestion, traffic disruption and incidents caused by goods distribution Enhance participation and cooperation of all stakeholders in urban goods distribution
WP11: Innovative soft measures

Major operational project goals by WP/Policy Field
Raise overall awareness and create commitment among citizens and local stakeholders for sustainable mobility, including alternative fuel use and clean vehicles
Establish a new "mobility culture" in all partner cities based on policy integration, stakeholder consultation and participatory planning
Achieve behavioural change through targeted service marketing, information dissemination and cooperative mobility planning
Introduce innovative planning approaches for addressing mobility and urban development in an integrated way
Enhance the use of alternative modes to the private car and improve the safety of and integration between walking, cycling and PT
Build sustainable mobility into school education
WP12: Telematics
Validate the feasibility of the use of GNSS systems (EGNOS & Galileo) in support of the exploitation of surface public transport
Use ITS for PT quality improvements (fleet management, priority scheme) and traffic control
Provide real-time and reliable traveller information services for PT and road traffic
Support decision making and policy integration

Key project targets

The MOBILIS project has demonstrated a number of innovative measures pursuing each of the major operational project goals and evaluated their impact. The verifiable results and outcomes are described in detail in each of the measure evaluation result sheets in Annex A. These targets are three-fold and can be categorised as:

- physical implementations (for example number of CNG buses);
- impacts on environment, mobility, energy etc. (hard facts following the CIVITAS core indicators)
- impacts on MOBILIS policy themes (such as social inclusion, mobility behaviour, urban planning etc.)

The following table summarises the MOBILIS key project targets (not exhaustive).

Table 5: Key project targets by WP / Policy field

Key project targets by WP/Policy Field
WP5: Clean vehicles and alternative fuels
100% clean PT bus fleet (Toulouse)
Develop the CNG offer for private use (Toulouse)
10 LPG demonstration pilot boats circulating in the lagoon (Venice)
Clear steps forward following MOBILIS; the market study and the Local Action Plan will permit future development of the use of LPG beyond the MOBILIS project in a very effective and practical way: political commitment together with technical and economic feasibility (Venice)

Key project targets by WP/Policy Field

and economic feasibility (Venice)

A reduction in emissions from the ACTV bus fleet in line with the following data (Venice)

	CO (g/km)	HC (g/km)	Nox (g/km)	PM10 (g/km
Bus Euro I (1193 – 1996)	6.82	0.84	17.6	0.79
CNG bus	3.3	0.73	1.32	0.022
Reduction in pollutant emissions (%)	51.6	13	7.5	97.2

WP6: Access management

Reduce by around 2,000 the number of parking spaces in the extended city centre (Toulouse)

Increase by around 10 km/h the average commercial bus speed (from 13 to 23 km/h) (Toulouse)

Increase in patronage of High Quality Corridor Bus lines by 50 – 70% (Toulouse)

Decrease the transit traffic in the city centre by 30% using access limitation and P+R promotion (Debrecen)

Increase the number of cars using the interchange car-parks and decrease the number of cars searching for parking in the central area of the city (Venice)

Increase the proportion of coaches with class Euro IV exhaust emission standards accessing Venice (Venice)

Reduce by 10% the number of cars entering the city by 2008 (Venice)

Increase by 10% cyclists and pedestrians on selected routes (Odense)

Reduce car speed by 25% (Odense)

Reduce transit traffic through housing areas by 20% (Odense)

Increase number of walking residents on selected street stretches by 25% (Odense)

WP7: Integrated pricing strategies

Develop integrated PT fares (Toulouse)

WP8: Stimulation of collective transport modes

Reduce bus route times – target average minus 5% per bus route (Odense)

Increase number of combined bus/cycle trips – target + 25% (Odense)

Extent of use of new mobility card - target 100% growth in car club memberships (Odense)

Extent of use of new SMS service for public transport users – target 10,000 users per year (Odense)

WP9: New forms of vehicle use and ownership

Reduce individual trips in the conurbation by more than 1,000 by developing carpooling (Toulouse)

50% rate of alternative fuel among car sharing vehicles (Venice)

Eliminate at least 200,000 person kilometres with old cars (Odense)

Number of bus trips – target 25% of trips previously made by car by target group (Odense)

Number of cycle trips carried out – target 40% of total trips made by target group (Odense)

WP10: New concepts for the distribution of goods

Define a new organisation for freight delivery (and the associated exploitation scheme) and the use of clean vehicles

WP11: Innovative soft measures

Key project targets by WP/Policy Field
Increase the number of total trips in the mainland made by bicycle by about 10% by the end of 2006 and by 18% by the end of 2008 compared with the original 7% (Venice) Reduce use of motor cars – target minus 10% (Odense) Increase shared car trips - + 5% (Odense) Increase number of bicycle trips - + 20% (Odense) Increase number of bus trips - +10% (Odense) Increase number of bicycle trips on new connection(s) - target + 15% (Odense) Increase number of pedestrian trips on new connection(s) – target + 10% (Odense) Increase number of bus trips to Odense Harbour – target + 10% (Odense)
WP12: Telematics
MOBILIS to become the leading European project promoting EGNOS/GALILEO (Toulouse)

1.4 Overview of the Measures

The general activities that the partners have undertaken in each of the eight CIVITAS policy fields are listed in the table n° 6 below. The detailed descriptions of the measures can be found in the result evaluation sheet of each measure (Annex A)

Table 6: list of the MOBILS measures

WP	**5**	**Clean vehicles and alternative fuels**	**Tisséo-SMTC**
Measure	**5.1.T**	**Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures and solutions for alternative fuels**	Tisséo-SMTC
Measure	**5.2.T**	**Solutions for alternative fuels in Toulouse and complementary measures to achieve a 100% clean fleet**	Tisséo-SMTC
Measure	**5.3.D**	**Operation of bio-fuel and CNG vehicles and framework conditions for alternative fuel use in Debrecen**	UoD
Measure	**5.4.L**	**Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana**	LPP
Measure	**5.5.V**	**Deployment of CNG buses and LPG boats in Venice**	ACTV / AGIRE
WP	**6**	**Access management**	**Debrecen**
Measure	**6.1.T**	**Definition and implementation of a new parking management policy in Toulouse**	Toulouse
Measure	**6.2.T**	**Public space redesign in Toulouse**	Toulouse
Measure	**6.3.T**	**Implementation of the Urban Mobility Plan in the Blagnac Area**	Blagnac
Measure	**6.4.T**	**High-quality bus corridors in Toulouse and development of PT segregated and secured lanes in the city centre**	Tisséo-SMTC
Measure	**6.5.D**	**Access and parking management for the Debrecen city centre**	Debrecen
Measure	**6.6.D**	**Accessibility scheme for the conference center and pedestrian zone in Debrecen**	Debrecen
Measure	**6.7.V**	**Parking management strategies for Mestre (Venice mainland)**	Venice
Measure	**6.8.V**	**Access management for the city centre in Venice**	ASM
Measure	**6.9.V**	**Electronic control of the Mestre restricted access Zone (Venice mainland)**	Venice
Measure	**6.10.O**	**Implementation of environmental zones in Odense**	Odense
Measure	6.11.V	Access and traffic management in the Grand Canal through ARGOS	Venice
WP	**7**	**Integrated pricing strategies**	**Tisséo-SMTC**
Measure	**7.1.T**	**Innovative multimodal PT contracts, services and electronic ticketing in Toulouse**	Tisséo-SMTC
WP	**8**	**Stimulation of collective transport modes**	**Tisséo-SMTC**
Measure	**8.1.T**	**Establishing quality and structure of PT services in Toulouse**	Tisséo-SMTC
Measure	**8.2.T**	**Development of proximity services at important passenger transport hubs**	Tisséo-SMTC
Measure	**8.3.T**	**Improving the accessibility of PT services in Toulouse**	Tisséo-SMTC
Measure	**8.4.T**	**Integration of the demand responsive transport as a complementary service to PT in Toulouse**	Tisséo-SMTC
Measure	**8.5.D**	**Safety and security training for public transport drivers in Debrecen**	Hajdú Volán
Measure	**8.6.V**	**Introduction of low impact, access-for-all waterbuses in Venice**	ACTV
Measure	**8.7.O**	**Integration and quality improvements of sustainable modes in Odense**	Odense
WP	**9**	**New forms of vehicle use and ownership**	**Tisséo-SMTC**
Measure	**9.1.T**	**Promotion of car-pooling and integration with PT services in Toulouse**	SIVOVAL
Measure	**9.2.T**	**Implementation of a new car-sharing service linked to PT services in Toulouse**	Tisséo-SMTC
Measure	**9.3.D**	**Car-pooling service for students in Debrecen**	Debrecen
Measure	**9.4.V**	**Expansion and diversification of the car-sharing scheme in Venice**	ASM
Measure	**9.5.O**	**Creating alternative mobility options for owners of old cars in Odense**	Odense
WP	**10**	**New concepts for the distribution of goods**	**Venice**
Measure	**10.1.T**	**Clean urban logistics and goods distribution platform in Toulouse**	Toulouse
Measure	**10.2.V**	**Clean urban logistics in Venice**	Venice / Forma Urbis
WP	**11**	**Innovative soft measures**	**Odense**
Measure	**11.1.T**	**Awareness raising campaign for changing mobility behaviour in Toulouse**	Tisséo-SMTC
Measure	**11.2.T**	**Promotion of bicycle use and integration with PT services in Toulouse**	CAGT
Measure	**11.3.T**	**Set-up of a mobility agency and customised services in Toulouse**	Tisséo-SMTC
Measure	**11.4.T**	**Commuter and school mobility plans in Toulouse**	Tisséo-SMTC
Measure	**11.5.D**	**Sustainable city-traffic development plan in Debrecen**	Debrecen
Measure	**11.6.D**	**Integrated and extended cycling network in Debrecen**	Debrecen
Measure	**11.7.L**	**Participatory planning and promotion of sustainable mobility in Ljubljana with emphasis on safe and increased bicycle use**	Ljubljana
Measure	**11.8.L**	**Set-up of information points on clean vehicles and alternative fuels in Ljubljana**	Ljubljana
Measure	**11.9.V**	**Promoting safe and increased bicycle use in Venice**	Venice
Measure	**11.10.O**	**Interactive traffic training for children in Odense**	Odense
Measure	**11.11.O**	**Personal transport choice marketing in Odense**	Odense
Measure	**11.12.O**	**Mobility management service for Odense Harbour**	Odense
WP	**12**	**Telematics**	**CAGT**
Measure	**12.1.T**	**Demonstration of EGNOS/Galileo services use for the PT control and information system in Toulouse**	CAGT
Measure	**12.2.T**	**Implementation of bus priority scheme in Toulouse**	Toulouse
Measure	**12.3.T**	**Development of an integrated multimodal traveller information system in Toulouse**	Tisséo-SMTC
Measure	**12.4.D**	**Tramway priority scheme and real-time passenger information system in Debrecen**	DKV
Measure	**12.5.V**	**Satellite Control (GPS-GPRS) for water PT services in Venice**	ACTV / City of Venice
Measure	**12.6.V**	**Management decision support system for water borne traffic in Venice**	City of Venice / Forma Urbis

1.5 Structure of this report

This document is divided into four main chapters:

- **Chapter 2** provides the concepts used in MOBILIS for the evaluation and transferability tasks at the level of a measure or a set of measures. This chapter is general; it explains how the MOBILIS partners have committed themselves to building the WP Evaluation (WP3). General willingness was to be very close to GUARD recommendations; the slightly different approaches are explicitly designed. This chapter includes three main items: a/Impact Evaluation, including functionality evaluation and acceptability, b/Socio-Economic Evaluation (CBA), c/ gender issue, d/ process evaluation and e/transferability approach.
- **Chapter 3** provides a summary of the evaluation performed in MOBILIS, for each city, each Work package and each measure. The evaluation results are presented measure by measure in annex A.
- **Chapter 4** provides at city level an overview of the impact results obtained by the combined implementation of the different measures in relation to the initial objectives and targets, the lessons learned and recommendations that can be done.
- **Chapter 5** provides a cross-site evaluation overview of the impact results obtained by Work Packages in relation to the initial objectives and targets and the lessons learned.
- **Chapter 6** provides the transferability analysis of successful measures or combined measures.

2 APPROACH TO EVALUATION IN MOBILIS

The site evaluation managers have performed the evaluation at measure and city level according to the MOBILIS evaluation plan (deliverable D3.1)

2.1 Evaluation Framework

Evaluation concepts in MOBILIS were consistent with the GUARD approach, as described in document D.2.1 *Framework for Evaluation*, 8th February 2006. They have been developed in the evaluation plan D.3.1 V7-3, validated by EC in May 2007 and updated after the mid-term report (D3.1 V8-August 2008).

In MOBILIS, for each measure, the evaluation tasks have depended on the nature of the measure. They are as follow:

- Evaluation of the functionalities.
- Evaluation of the technical impacts (also called Impact Evaluation in the text).
- Evaluation of the acceptability.
- Cost-Benefits evaluation data.
- Process Evaluation[2].
- Gender issue

2.2 Evaluation of the functionalities

This topic had been distinguished from the Impact Evaluation. Its aim was not to assess whether the measure provides benefits in terms of travel conditions, information, etc. but only to know to what extent the material or the system used is consistent with the specifications of its development.

Evaluation of the functionalities should only be performed for materials or systems that are innovative, or used for the first time in the city concerned

Its methodology consists in checking a list of technical functionalities that are generally well defined.

[2] The measures, which have not given positive result, but whose lessons learned through their introduction need to be noted have been the object of an in-depth process evaluation.
On the opposite, the measures considered as “successful” by the cities where they have been implemented with a clear evidence of positive change and possible to be transferred in a quite similar context, regarding the relative weight of the different initial context elements have been the object of a transferability study

2.3 Impact Evaluation

Impact Evaluation objective

Impact Evaluation has been one of the main tasks of MOBILIS. The aim has been to evaluate the benefits (or losses) generated by the measure. As indicated above, the Impact Evaluation had to be conducted with systems[3] or materials whose functionalities are correctly designed.

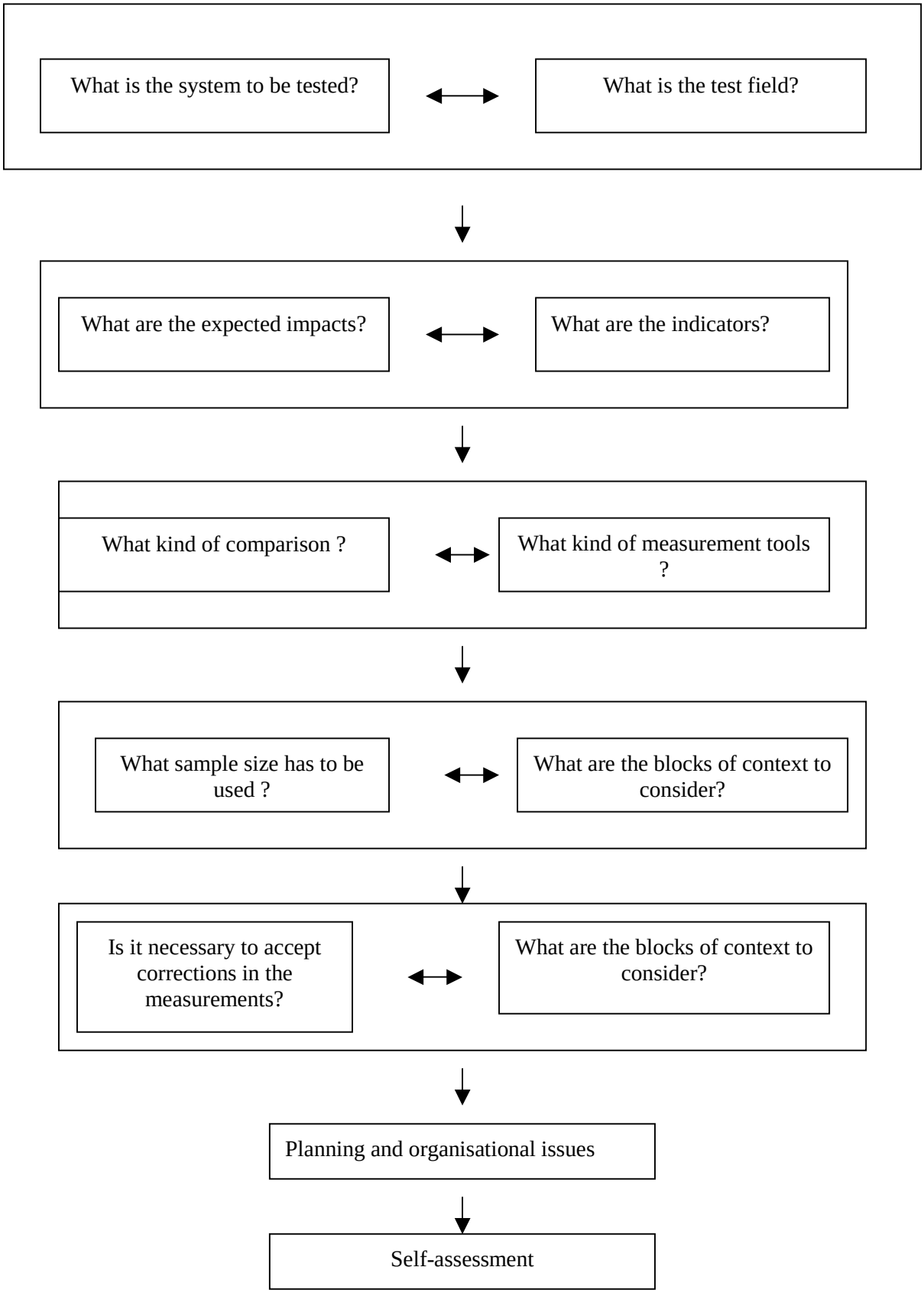
Methodology and Scenarios

The method proposed to the MOBILIS partners was based upon **twelve questions** that the evaluator should ask in order to draw up the Evaluation Plan and then evaluate the measure.

These questions were the basis for preparing the Evaluation Plan. They all should have been taken into account. Feedback might be needed between the different questions as indicated in the figure below.

[3] In this chapter the word "System" is used for all kinds of material, sets of materials or procedures used in a MOBILIS measure.

Figure 1: impact evaluation methodology sheme



The purpose of these questions was to define:

- **the system to be tested:** In some cases it was important to know exactly what the area of evaluation was, for instance when a system included several sub-systems.
- **the test field: i**n MOBILIS, the tests were generally field trials, in real traffic conditions. Consequently, the test field was part of the city (a street, a set of streets or roads, a corridor, a district, etc.)
- **the tested impacts:** MOBILIS has used the classification of impacts proposed by GUARD[4]. However, some GUARD impacts were not relevant for MOBILIS measures, and others had to be added because of particular problems that are of interest to MOBILIS partners.

  The list of MOBILIS impacts based upon the GUARD classification is given in § 2.3.3:
- **the relevant indicators:** The set of indicators is based on the indicators proposed by GUARD. Indicators are precised in § 2.3.3 below.
- **The kind of comparison:** Many results are based upon a comparison. In general, the comparison includes **three** steps:

  1/ A "before" situation, called "**Baseline Situation**" in the GUARD evaluation results template. For the indicator concerned, this is the value at a particular date before the implementation of the MOBILIS measure

  2/ An "**After Situation**" obtained, for the same indicator, after the implementation of the MOBILIS measure. However, in many cases, the value of this indicator, , does not depend solely on the MOBILIS measure, but also on other circumstances beyond MOBILIS control. This is why the following third step is needed.

  3/ A virtual situation that would have been the situation of the indicator at the same date as the "After Situation", but with the hypothesis of non-implementation of the MOBILIS measure. This situation, called "**Business-as-Usual Scenario**" in the measure evaluation results sheets (Annex A), describes the situation evolution without implementation of the MOBILIS measure, but with implementation of all the other measures that are not included in MOBILIS.

  This virtual situation could not be directly measured, but had to be approximated.

  The real MOBILIS benefit is the difference, for the indicator concerned, between the After Situation and the Business-as-Usual Scenario, as illustrated in the figure n°2 below.

[4] See GUARD Report *D2.1 Framework for Evaluation* (the version used is version 3: 8th February 2006).

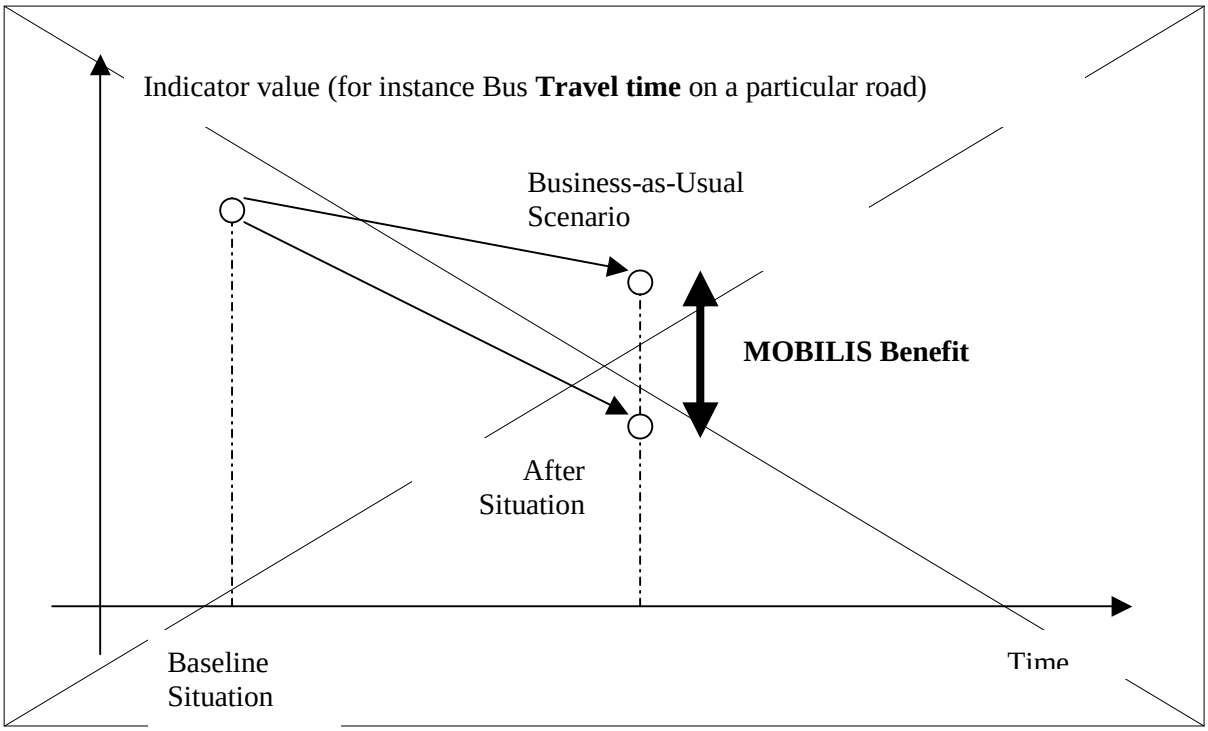


Figure 2: definition of the measure implementation result

- **the measurement tools:** this question depended on the indicator concerned and on the local tools available. It had been clarified at the local level.
- **Sample Size to use:** The MOBILIS partners adopted the method clearly described in the GUARD document already quoted[5].
- **the blocks of context[6] to consider:** They depends on the kind of analysis to do, but the evaluator had to examine this question because the answer might have a great influence on the result.
- **If it was necessary to accept corrections in the measurements:** For several reasons, some measurements may appear as not realistic and it might be necessary to apply some rules in order to treat these aberrant values.
- **the Evaluation planning:** The planning schedule was detailed in the Evaluation Plan.
- **The practical and organizational points:** This step includes all the contacts to be taken, training and/or information of the people involved in the evaluation tasks; preparation of the material needed for the measurements, permissions needed, etc.
- **The evaluation self-Assessment aimed** to have a look at the probable reliability of the measurement

[5] See GUARD Report *D2.1 Framework for Evaluation*, chapter 3.6.2 Surveys and Data Collection, page 28.

[6] A **Block of Context** is the variables or set of variables of the context for which we assume that the mean value can be calculated.

Impacts, Indicators and Data collection

GUARD had proposed twenty-nine core indicators, however, the following statement[7] had been agreed:

"*The common indicators should reflect the consensus achieved within all the cities, and should therefore ideally be collected by all CIVITAS cities. However, this does not mean that all cities will use all the common indicators for their evaluation. The indicators that need to be used will depend on the set of measures being implemented. The wide ranging nature of the measures will make some indicators irrelevant for certain cities, whereas in other cases some indicators may be hard to measure*", and "*it must be noted that further changes may be necessary in the light of on-going discussion with the projects and cities, so the list of indicators will be updated as necessary*".

MOBILIS adopted slightly different indicators given in annex A-0.

2.4 CBA Evaluation

In CIVITAS II, the analysis theory had been described in D 2.1: Framework for evaluation. CBA had to focus on a sub-set of the main quantitative indicators and impacts identified in D 2.1

The key indicators include measures of changes in:

- capital costs,
- operating and maintenance costs,
- transport demand (measured in terms of final outputs (passenger kms, freight tonne kms) or intermediate outputs (vehicle km),
- transport costs (fares for public transport, operating costs and parking costs for private transport),
- transport journey times (including out of vehicle time, in-vehicle time and delay time),
- vehicle emissions,
- transport related accidents.

It was suggested that five agent groups be considered (transport operators, authorities, users of the measure, other transport users and households) and that the required impact data be shift between these groups.

It was agreed that the experts from the University of Southampton (TRB) would carry out the CBA, on the basis of the impacts provided by the cities. The additional efforts required on the part of the projects/cities have been minimal.

At the beginning of 2008, the projects/cities were responsible for determining the measures or set of measures that could be examined in a CBA analysis, and for providing the data[8] on the expected benefits in terms of physical impacts (time saved, reduction of pollutants, energy saved, etc.).

[7] See GUARD Report *D2.1 Framework for Evaluation*, page 23.

[8] Instead of applying their national rules and methods concerning the benefits (in terms of money), the cities should apply the common rules which had been defined by GUARD/TRG.

CBA in MOBILIS

Choosing the measures

During a technical meeting at the end of February 2008, the MOBILIS evaluation team determined the list of measures proposed to GUARD to be examined in the scope of the CBA exercise, together with the city managers and evaluation leaders. The implementation level of the measure, and therefore the expected available data, determined this choice. Six measures were selected, five WP 5 measures and one in WP 9.

Data production

The cities provided the available data, on the indicators adopted by MOBILIS as explained above for each selected measure and limited interactions to allow TRG to understand/interpret the outputs as appropriate.

Data reporting

The MOBILIS technical group agreed to report the CBA data, accompanied by some explanation in order to ensure and simplify the analysis by GUARD, in the evaluation results sheets, or in an annex of it. So the management of the data collection has been the same that this of the result evaluation sheets, as described in § 2.7: result templates.

2.5 Gender issue approach

It is recognised that the implementation of innovative measures can only be successful if the needs and expectations of both men and women are equally reflected in the planning, decision making and realisation of interventions. Particularly in the transport sector, either women's needs and requirements have been neglected or planning was done in a gender blind way. Failing to take gender concerns into consideration often resulted in the transport projects having less of an impact.

For the MOBILIS project, the partners looked into the gender aspect from two angles:

- as part of the wider dimension of social inclusion, which also takes the need of disadvantaged groups into consideration; this has been addressed by the MOBILIS policy theme on social inclusion;
- by looking at gender equity aspects when implementing mobility projects;

The methodology is detailed in the gender issue report. Only the main principles are summarised here.

To conduct the gender issue evaluation, all CIVITAS MOBILIS measures have been screened using the 'Gender Impact Assessment' -tool. This 'Gender Impact Assessment' is a tool that involves an assessment of policies and practices to see whether they will affect women and men differently, with a view to adapting these policies/practices to make sure that any discriminatory effects are eliminated (Crawley & O'Meara, 2004). Crawley and O'Meara developed a four-step Gender Impact Assessment tool, which is a set of four questions regarding gender differences that should be answered in relation to any action/measure implemented

STEP 1: What do we know to be the different experiences, situations and roles of men and women, which might impact on how they get involved in/are affected by this action? Use statistics and data when available.

STEP 2: What are the implications of these for the action being assessed?

STEP 3: a) Given these implications, what do we need to do when pursuing this action to promote equality of opportunity for men and women?

b) If any of the implications identified above are 'macro issues' what can you do within the scope of your job to progress action in this area?

STEP 4: a) What indicators will you use to measure success (i.e. what will you measure?)

b) What are your targets (i.e. how much do you want) in relation to each of these indicators?

Gender screening of the measures in CIVITAS MOBILIS cities

The gender screening of the measures took into account steps 1 and 2 of the Gender Impact Assessment (Crawley & O'Meara, 2004).

Steps 3 and 4 of the Gender Impact Assessment have been considered in the next phases of development and implementation of the gender audits.

2.6 Process Evaluation

Introduction

In general, two levels of risks were differentiated and addressed within MOBILIS:

- Risks to measure implementation and success;
- Project management-related risks.

For the first level, all local project partners had identified and described potential risks and contingencies in their measure descriptions using the following risk types for categorisation:

- Technical risk (T) – e.g. due to failure or low performance of (immature) technologies, technical systems or methodologies, incompatibilities between systems, safety hazards of particular technologies;
- Financial risk (F) – e.g. related to delayed payments from third parties (cash flow), substantial cost increases for major components, parallel investments and budget modifications;
- Organisational risk (O) - e.g. dependency on a single supplier, dependency between implementation steps and stages, coordination between project and other measures, availability of management skills and capacity;
- Political risk (P) – e.g. cooperating agencies are governed by opposite political parties, politicization of measure topics, existing resistance or lobbying against measures;
- Institutional risk (I) – e.g. related to the restructuring or privatisation of organisations, project tasks beyond usual practices or competencies, changing composition of boards or committees;
- Legal Risks (L) – e.g. due to conflicts of interest between actors, legal gaps or uncertainties;
- Spatial Risks (S) – e.g. related to the physical interference between measures and urban structures (infrastructures, operation area).

The objectives of the Process Evaluation in CIVITAS were: "to obtain new findings about success factors and strategies for overcoming possible barriers during the implementation phase of CIVITAS II measures by a cross-site analysis" and "recommendations for other European cities".

The European Commission stated[9] that there are two levels of process evaluation in the CIVITAS initiative: at the level of GUARD and at the level of the city consortiums, e.g. the MOBILIS consortium.

The MOBILIS project translated the objectives of the Process Evaluation into the following outcomes:

- development of learning practices for practitioners (Glossy magazine);
- development of tools for practitioners (Guide for the implementation of cycling policy or Method to develop commuter mobility plans);
- input in policy recommendations for local and European decision makers;
- input in any exercise of transferability, training and/or policy integration.

In terms of theory, the MOBILIS consortium has closely followed the hypotheses presented by the GUARD consortium. In addition, by taking into account its local needs and the objectives of CIVITAS GUARD, "the MOBILIS consortium intended to increase the focus of the process evaluation on the so-called "complex stories of constraints and success factors" and "soft information". Besides identifying successful strategies, constraints and critical success factors, the MOBILIS consortium has also tried, where possible, to identify and measure the impact of a certain implementation approach on the outcome of the measure. In its attempts to understand the "full story" of the measure implementation processes, the consortium freed up a considerable amount of its resources for technical workshops, site visits and in-depth interviews.

Methodology: Objectives of the Process Evaluation and theoretical frame

The nature of the CIVITAS programme imposed a number of constraints on the implementation of a thorough process evaluation. The following characteristics of the MOBILIS project complicated the task of process evaluation:

- large difference between context characteristics of the CIVITAS MOBILIS Cities
- large number of measures;
- large difference between measures;
- large difference in terms of ambitions of the measures;
- large differences between direct objectives of the measures, even if the measures of the different MOBILIS cities seemed equal;

To assess the effectiveness of the implementation processes, the MOBILIS evaluation manager considered it essential, firstly, to measure the level of success of the measure in terms of technical performance, impact and acceptability, in comparison with a so-called "business-as-usual" scenario. Then, secondly, to determine to what extent the different "process evaluation" factors (e.g. constraints, tools, etc.) and their mix had influenced the impact of the measure. The latter was the core work of the process evaluation.

[9] (Meeting EC/GUARD/CIVITAS II projects, Brussels, February 2006)

Afterwards, the MOBILIS process evaluation concentrated on the local needs for process evaluation, while closely cooperating with GUARD to ensure their objectives were met. The link between the GUARD process evaluation, MOBILIS process evaluation, and the MOBILIS technical evaluation is illustrated in the figure below.

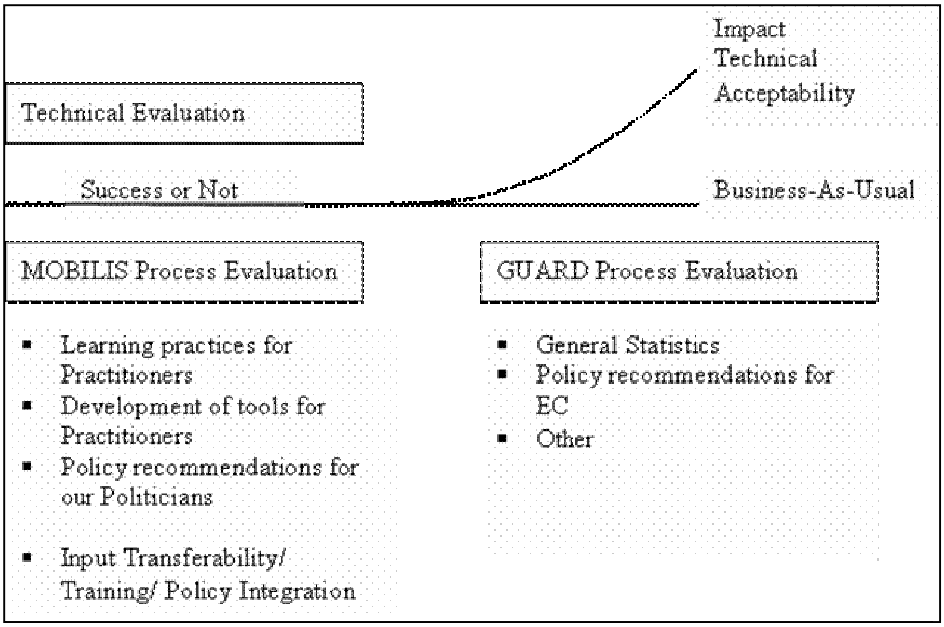


Figure n° 1: Relations between CIVITAS evaluation activities

The final impact of the measure has been compared with its initial objectives. These were firstly to determine the difference between the final outcome and the envisaged outcome and, secondly, to understand the processes during the planning, implementation and realisation phases for each measure[10].

The correlation between the different scenarios, critical success factors, constraints and tools are illustrated in the figure below:

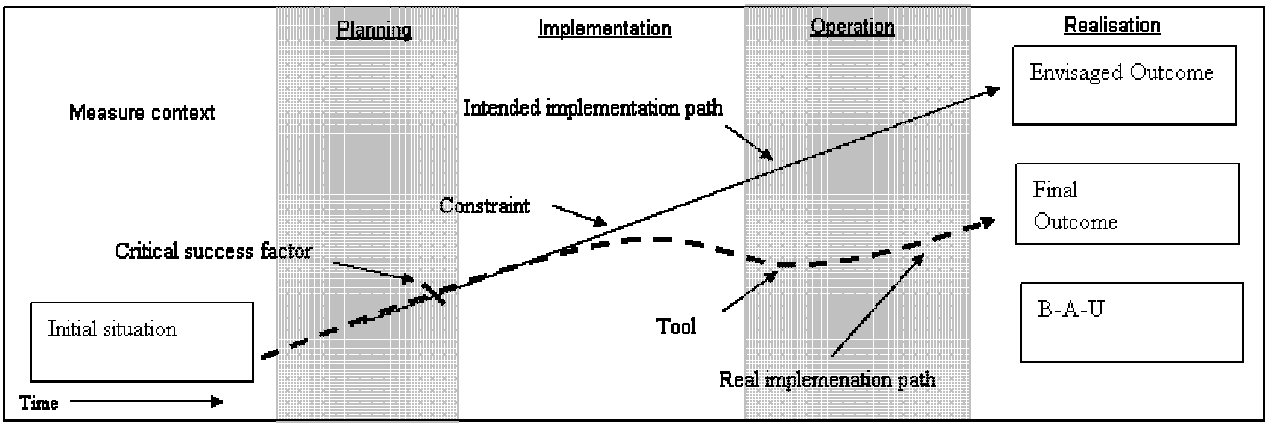


Figure 2: Measure realisation scheme

[10] Every measure has its own unique realisation scheme.

On-line Database

The aim of the online data collection method was to obtain detailed feedback on constraints, solutions and success factors for the planning, implementation and realisation of the CIVITAS project and its measures. This was so as to allow the development of useful management tools and policy recommendations focused on both practitioners and policy makers.

Given the constraints defined by the nature of the CIVITAS projects, which nevertheless required a scientifically robust exercise, an integrative, efficient and innovative approach was needed for collecting the process evaluation data.

Following the MOBILIS process evaluation theory, as described above, it was agreed that the MOBILIS consortium was allowed to apply its own method of data collection to feed the process evaluation of the MOBILIS project and CIVITAS-GUARD.

To feed the database, the MOBILIS project managers sent GUARD/BOKU all relevant project material (activity reports, IPR, State of progress presentations, etc.) and additional information provided by the local evaluation managers on the measure and site characteristics. Once the database was full, MOBILIS and GUARD joined forces to check the collected data together.

MOBILIS data collection and use

The method of data collection in relation to the MOBILIS Process Evaluation consisted of two main parts:

- The collection of information for each MOBILIS measure to assess the measure realisation path
- A more advanced collection of so-called “soft information”

The information at measure level was collected both through a checklist filled in by the measure leaders[11] and through the information given in part D of the evaluation result sheets. These information are resumed measure by measure in chapter 3 (lessons learned and recommendations) and analysed by work package in chapter 4 and at project level in the conclusion of this report and in the Policy Recommendation report. They also have been integrated in the Transferability Report in relation to ten successful selected measures.

For some selected measures, it seemed useful for practitioners to conduct an in-depth process evaluation through so-called mini-reports, appended to this report in Annex C.

Based on these mini-reports, case stories have also been developed and integrated in a “Glossy Magazine”.

DATA collection management

Data collection was managed as follows:

Annual sending of MOBILIS activity reports to GUARD

What	Who to Who	When
DOW, Inception report, Mid-term report	Tisséo to GUARD	Once ready
MOBILIS activity reports (the additional information obtained; completed IPRs without	Tisséo to GUARD	Annually (May, June)

[11] It is acknowledged that the identification of a constraint depends on the expertise and interpretation of the different stakeholders.

information obtained; completed IPRs without financial details (once a year the 4 quarterly editions); the Interim Activity Report; Periodic Activity Report and annual process evaluation update; the Risk Map; the Minutes and synthesis of the thematic Workshops; the Minutes and synthesis of the in-depth interviews)	GUARD	
Other information (mid-term process evaluation analysis; the Minutes and synthesis of the in-depth interviews)	Tisséo to GUARD	Annually (May, June)
MOBILIS final report, MOBILIS evaluation report	Tisséo to GUARD	End of Project

Process evaluation for each MOBILIS measure

What	Who	When
Pre-completion of the light process evaluation checklist	Local Evaluation Managers*	– End May
Finalisation of the light process evaluation checklist	Local Evaluation Managers	Once the measure finalised
Dispatch of the light process evaluation checklist to GUARD	Tisséo to GUARD	Once complete
Completion of part D "lessons learned and recommendations" of the GUARD evaluation result template	**Local Evaluation Managers to CETE/ZELT and GUARD**	**Once the measure finalised**

Preparation of a mini-report for some selected measures

What	Who	When
Selection of the Measures for in-depth process evaluation	Local evaluation managers*	December 2007 (M34)
Production of the mini-reports	Local evaluation managers*	Once the measure finalised
Attachment of the mini-reports to the MOBILIS evaluation report (annex C)t	CETE/Zelt	Month 48

Case stories in a glossy magazine

What	Who	When
Format of the Case stories	**Odense** / Venezia / Tisséo/	March 2008 (M38)

	Ruprecht	
Interviews	Odense	July – October 2008
Production of the Case stories	Odense	May-September 2008
Production of the glossy magazine	Odense	December 2008

Process evaluation complementary information

What	Who	When
Complementary questionnaire for each measure	Local Evaluation Managers to Tisséo, then Tisséo to GUARD	October 2008- February 2009

2.7 Results templates

The results template received from GUARD in April 2007 was read again and observed on behalf of the MOBILIS evaluation manager group. The evaluation results template was intended to be a useful evaluation tool for the CIVITAS cities and projects as well as for GUARD. It served multiple purposes including:

- Ensures reporting of all evaluation-relevant information ("completeness");
- Ensures a common reporting style;
- Facilitates analysis of evaluation results for the CIVITAS projects and GUARD;
- Enables cross-site evaluation at CIVITAS level;
- Helps to provide information for dissemination of evaluation results, in particular measure results, in a clear and concise manner.

After their validation by the evaluation liaison Group (ELG) in July 2007, the validated "Evaluation Results Template" was passed on to the city evaluation leaders and city managers along with the "Guidelines for Completion of the Evaluation Results Template- v3.2" written by GUARD in July 2007 and the evaluation schedule determined by the project, in contact with GUARD.

The evaluation results template is composed of four main blocks:

- A-Introduction: it includes a description of the objectives of the measure as implemented and a non-technical description of the measure as implemented
- B-Measure impleementation: in this part are described the innovative aspects of the measure, the situation before CIVITAS, the implementation of the measure at reporting time, the deviations observed from the original plan. And the inter-relationships wih other measures;
- C-Evaluation- methodolgy and results: the most important section of the results template provides information on the measurement methodology and a textual explanation of the achievements (report and interpretation of the evaluation results, providing facts and explanation),

- D-Lessons learned: The information provided in this section concern the conditions prevailing during the measure implementation, the barriers and drivers met, and therefore highlight thee transferability potential of the measure.

The reporting system adopted has been as follows:

- The city evaluation leaders were responsible at city level. They worked with measure evaluators and leaders.
- The impact evaluation manager was the Guard interlocutor and quality controller. He collected and checked them before transmitting them to GUARD, received the GUARD comments and transmitted them to the site evaluation managers. The evaluators have fulfilled B version in the first quarter of 2008, then the draft version when the results were known.

3 EVALUATION OF MEASURES

This chapter describes the context of the cities in which the measures have been implemented and for each city, the different measures implemented, their achievement, the lessons learned and the recommendations for other cities interested to develop and implement similar measures.

The description of the context of the cities refers to the description of work in the initial contract. Although it has been partly updated in the mid term report, some elements may be slightly outdated.

3.1 City 1: Toulouse

Toulouse Description: MOBILIS in Toulouse

Toulouse is situated between the Mediterranean and the Atlantic, 500 km from Paris. With more than 700,000 inhabitants, the urban district of Toulouse is the fifth largest urban area in France, characterised by a significant annual demographic growth rate (1.6 % - one of the largest in France).

The city of Toulouse is the fourth largest city in France, capital of the largest French region, Midi-Pyrénées (45,000 km²), and among the biggest cities in southern Europe.

The urban structure of the City may be described as a set of concentric circles: the historic part of the City (very centre) is the heart of commercial activities and is surrounded by urban main roads (boulevards); it includes narrow streets and the most typical historical buildings. The urban part of the city, on the two sides of the river Garonne, is encircled by the ring road. Outside of this ring, the conurbation is in constant growth. Toulouse Airport, located 20 minutes from the City centre, is the 4th largest airport in France, with 5 million passengers a year (48% increase in 5 years).

Figure 3: Toulouse conburbation

Due to the high growth of the conurbation of Toulouse, transport and traffic management needed to be re-organised to prevent complete congestion of the city centre. Significant progress has been made over the last decade in terms of town planning and infrastructure investments to provide new, competitive and attractive Public Transport infrastructures.

In 2005, the Public Transport services mainly included the 1st underground line (automatic vehicles - VAL), installed in 1993 and extended at the end of 2003 (15 km and 18 stations), and urban railway lines to the 2 cities in the urban area: Colomiers and Muret. 56 urban bus lanes were added to the urban public transport network at the end of 2003.

Whereas the problems tied in with urban sprawl and sustainable development were commonly taken into consideration, there was great willingness among the different local authorities to promote changes in public behaviour.

The MOBILIS project has been an opportunity to develop the modes of sustainable transport and the use of soft modes. The overall aim was to improve the attractiveness of Public Transport (PT) and develop its modal share, currently at a medium level (12%), and to implement new urban transport concepts through the initiatives accompanying the construction and opening up of a second underground line.

Main demonstration sites in Toulouse

Most MOBILIS developments have been carried out with a view to being used at the whole conurbation level. However, there were a few specific demonstration sites where innovative measures have been undertaken, with the possibility of transfer to other similar areas.

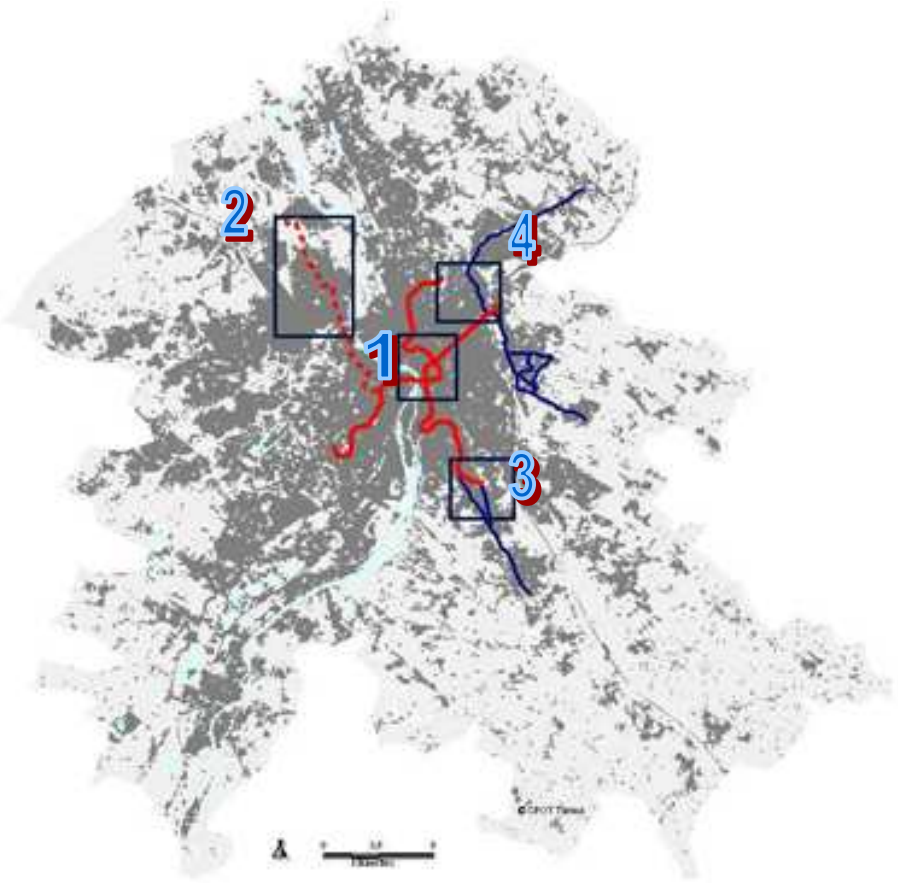
Three types of demonstration site with specific mobility problems had been defined:

- **The City centre** with a particular mixed urban structure (commercial – residential – industrial/services – touristic). It represents a large problematic area in Toulouse with narrow streets, and typical quality of life to preserve;
- **The peripheral 'residential' areas** (suburbs) with low density, reducing the cost-effectiveness of any Public Transport service and generating many commuters;
- **Peripheral 'working' areas** (industrial/commercial/University) of great importance for Toulouse. These are especially the aeronautic industry area in the North-West and in the South-East, the research area with one of the main Universities in France (with around 110,000 students; Toulouse is the 2nd largest student city after Paris).

Four demonstration areas were defined for MOBILIS in the Toulouse conurbation:

- The **Toulouse city centre** (corresponding to the 1st type of demonstration site), with typical problems of congestion and freight delivery. It has been physically redesigned in connection with the building of the 2nd underground line;
- The **Blagnac area** (location of Airport and Airbus factories – A380) corresponding to a complex mix of the three demonstration site types, taking into account the policy of the City of Blagnac that aimed to develop a sustainable traffic and transport management policy for its sizeable town centre;
- The **South-East connection axis** in the SICOVAL area, including the location of the Labège Inopole commercial and service area and the University of Sciences (corresponding to a mix of the 2nd and the 3rd demonstration site types). The RN113 High Quality Bus Corridor in connection to the 2nd underground line and commuter plans have been developed on this axis.
- The **North-East connection axis** where the RN88 (abandoned since 2006 due to environmental matters) and the RN126 High Quality Bus Corridors have been developed to connect to the underground network (can be considered as a residential area, but also a commercial area – in the Eastern part);

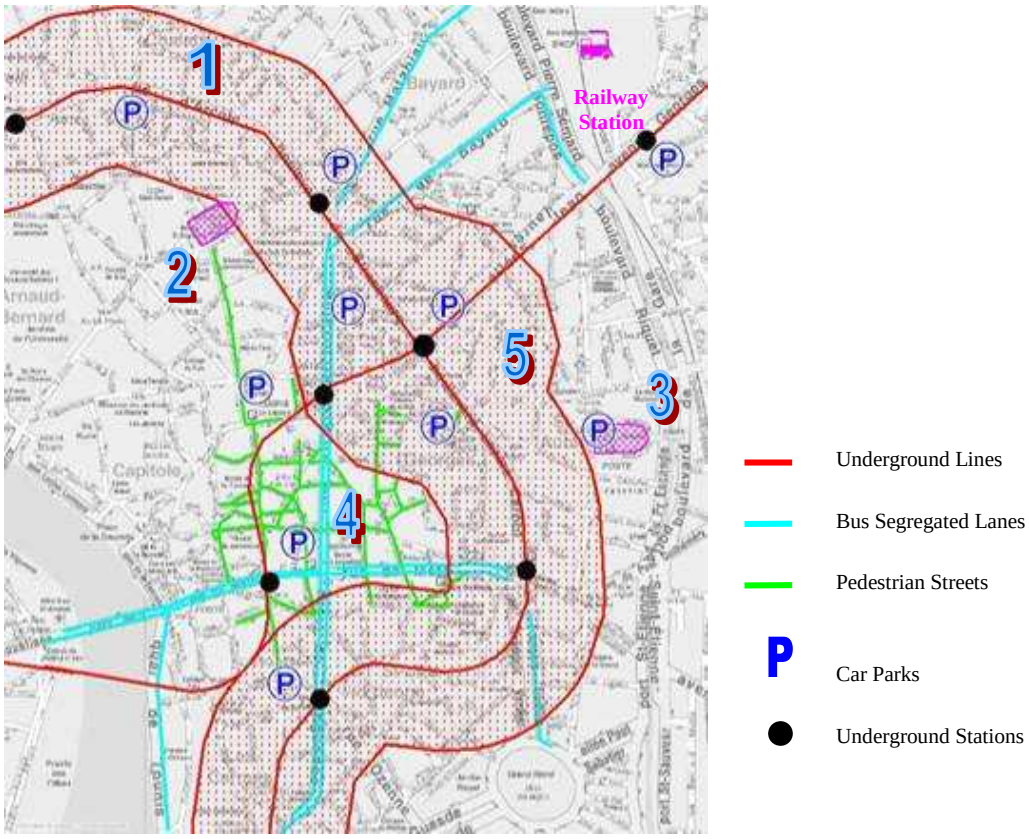
Figure 4: Toulouse Map with the 4 demonstration sites



Toulouse city centre has hosted the following experiments as part of the MOBILIS project:

- Car Park Management, especially areas 2 & 3 but also along area 1 (second underground line B that opened in June 2007),
- Public Space Redesign & New Layout of Road Infrastructures, along area 1 and level with area 4,
- Implementation of a new delivery goods system and regulation of area 5 and implementation of multiservices to boost the area's attractiveness,
- Development of integrated fare products (Car Park & Public Transport) with a demonstration at the level of city centre Car Parks that still need to be selected,
- New Freight Delivery Management and Development of an Urban Logistics & Goods Distribution Centre (abandoned since April 2007)
- Development of Segregated Lanes in the City Centre.

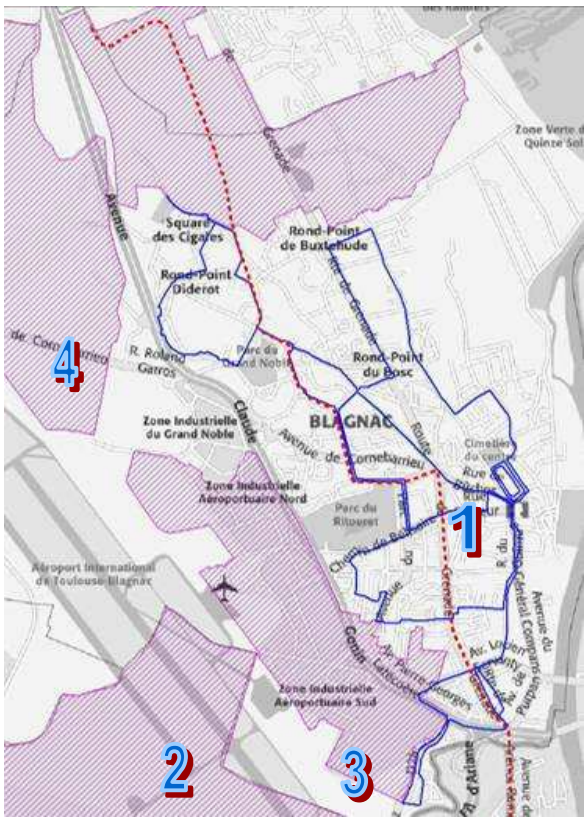
Figure 5: Map of the 1st demonstration site - Toulouse City Centre



The **Blagnac area** has hosted the following experiments as part of the MOBILIS project:

- Implementation of the Local Urban Mobility Plan especially in the town centre (area 1), including car park management, redesign of public space and of the public transport network, notably by taking into account the building of the new tramway line (planned for 2009),
- Reorganisation of transport, especially in the Airport area (area 2) and in the town centre (area 1),
- Implementation and Evaluation of the Airbus Commuters Plan (area 3 & 4) and of the Airport Commuters Plan (area 2),
- Development of an Administration Mobility Plan.

Figure 6: Map of the 2nd demonstration site - Blagnac Area



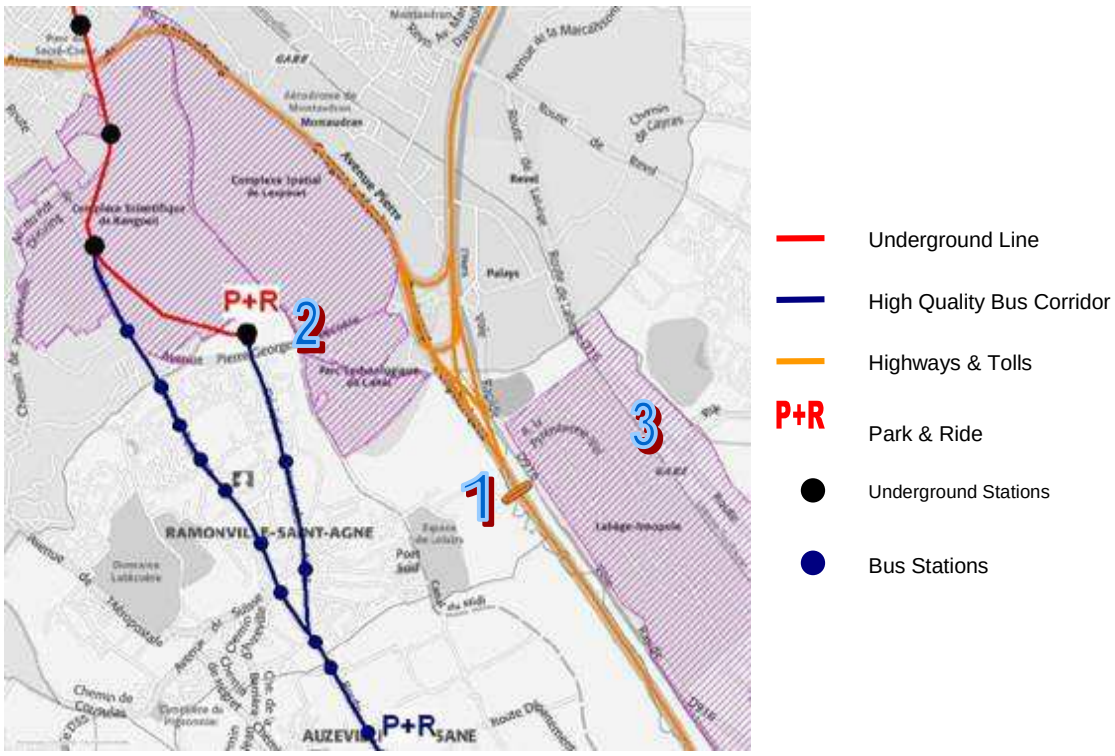
Blagnac's Bus Lines

Future Line E - Tramway

The **South-East connection axis** has hosted the following experiments as part of the MOBILIS project:

- Construction of a High Quality Bus Corridor on the RN 113 (area 1),
- Development of an integrated fare product between highways and public transport (area 2),
- Development of car-pooling services in addition to the public transport service,
- Implementation and Evaluation of the Labège Innopole Commuters Plan (area 3),
- Improvement of the demand-responsive services provided in the area with the lowest population density.

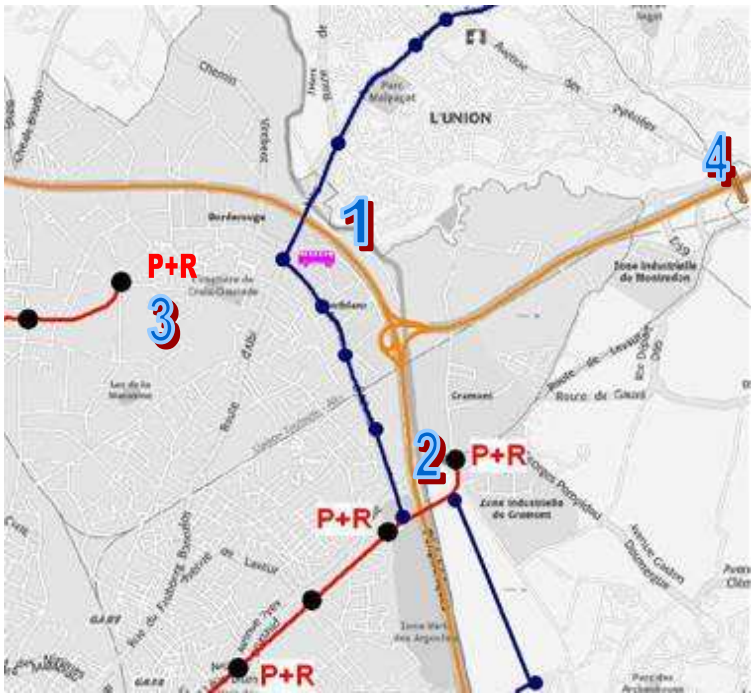
Figure 7: Map of the 3rd demonstration site - South-East connection axis



The **North-East connection axis** has hosted the following experiments as part of the MOBILIS project:

- Development of the CNG bus fleet and of associated supplying infrastructure, especially in area 1 (Atlanta bus depot),
- Construction of High Quality Bus Corridors on the RN 88 (abandoned since 2006 due to environmental matters) and the RN 126,
- Development of an integrated fare product between highways and public transport, especially at the level of the A68 motorway (toll located in area 4) and in the Park & Ride underground (areas 2 and 3),
- Improvement of the demand-responsive services provided in the area with the lowest population density.

Figure 8: Map of the 4th demonstration site - North -East connection axis



Underground Lines

High Quality Bus Corridors

Highways & Tolls

P+R Park & Ride

Underground Stations

Bus Stations

Integration concept in Toulouse

The MOBILIS project has been developed in an integrated manner with account taken of the medium-term application of the Toulouse conurbation Urban Mobility Plan and the construction of major PT infrastructures: the 2nd underground line (18 km and 20 stations that opened in June 2007), completed by the tramway project, planned for the town of Blagnac (N-W of Toulouse) in 2009, and the development of further High Quality Bus Corridors.

Within MOBILIS, the different measures have been integrated at three different levels: geographical, strategic or technical and organisational.

Geographical integration since some measures have been developed on the same demonstration area, creating a synergy and inducting effects (in some cases, measures have been developed on a wider area and were not geographically integrated with others).

Table 7 : geographical integration

Measure	Toulouse City Centre	Blagnac Area	SICOVAL Area	North-East Area
5.1.T	No geographical integration - this measure has been developed at the whole conurbation level.			
5.2.T	No geographical integration - this measure has been developed at the whole conurbation level.			
6.1.T	New car parks policy	New car parks policy		
6.2.T	Space redesign / Underground Line			
6.3.T		Space redesign / Soft Modes		
6.4.T	PT segregated lanes		HQBC development	HQBC development
7.1.T	PT and Park combined ticket		PT and Driving combined ticket	PT and Driving combined ticket
8.1.T	No geographical integration - this measure has been developed at the whole conurbation level			
8.2.T	Jean Jaurès Station			
8.3.T	No geographical integration - this measure has been developed at the whole conurbation level			
8.4.T			Transport on demand	Transport on demand
9.1.T			Carpooling development	
9.2.T			Car sharing experience	
10.1.T	Goods distribution regulation			
11.1.T	No geographical integration - this measure has been developed at the whole conurbation level.			
11.2.T	Cycle parking	Cycle parking	Cycle parking	
11.3.T	No geographical integration - this measure has been developed at the whole conurbation level.			
11.4.T		Airbus & Airport commuters plans	Labège area commuters plan	
12.1.T	No geographical integration - this measure has been developed at the whole conurbation level.			
12.2.T	Bus priority at traffic lights		HQBC development	HQBC development
12.3.T	No geographical integration - this measure has been developed at the whole conurbation level.			

Strategic or technical integration, concerning the interrelation between measures regarding strong strategic/political objectives or technical association through the integration of complementary technology blocks, with a technical dependency or association. The measures in Toulouse can be grouped according to three aims:

- Reorganise the road infrastructure in relation to an urban re-qualification process, promoting sustainable mobility;
- Give an innovative and attractive image to the urban PT network, by improving its quality of service;
- Promote the use of alternative mobility solutions (public transport and complementary services like bicycling, walking, carpooling and car sharing) and develop intermodal behaviour.
-

Table 8: Measure integration

	5.1.T	5.2.T	6.1.T	6.2.T	6.3.T	6.4.T	7.1.T	8.1.T	8.2.T	8.3.T	8.4.T	9.1.T	9.2.T	10.1.T	11.1.T	11.2.T	11.3.T	11.4.T	12.1.T	12.2.T	12.3.T
5.1.T		**X**				x		**X**						**X**	**X**						
5.2.T	**X**							**X**							**X**						
6.1.T				**X**			x							**X**							
6.2.T			**X**			x		x	x					**X**		**X**					
6.3.T																**X**		**X**			
6.4.T	x			x				**X**		**X**										**X**	
7.1.T			x					**X**			x	**X**	**X**		x	x		**X**			**X**
8.1.T	**X**	**X**		x		**X**	**X**		x	**X**	**X**				x					**X**	**X**
8.2.T				x				x									x				
8.3.T						**X**		**X**			x						**X**				x
8.4.T							x	**X**		x		x	x		x		**X**				
9.1.T							**X**				x		**X**				**X**	**X**			
9.2.T							**X**				x	**X**					**X**				
10.1.T	**X**		**X**	**X**																	
11.1.T	**X**	**X**					x	x			x					**X**	**X**	**X**			
11.2.T				**X**	**X**		x								**X**			**X**	**X**		
11.3.T									x	**X**	**X**	**X**	**X**		**X**			**X**			**X**
11.4.T					**X**		**X**					**X**			**X**	**X**	**X**				
12.1.T																**X**				**X**	**X**
12.2.T						**X**		**X**											**X**		**X**
12.3.T							**X**	**X**		x							**X**		**X**	**X**	

X: for a strong integration - x : for a low integration

Organisational integration, where partners have been involved in the same measure development/assessment (partners like CETE/ZELT or AUAT, who act as transversal experts in MOBILIS, are not taken into account, which does not mean that they do not participate).

Table 9: organisational integration

	Tisséo	CAGT	SICOVAL	Toulouse	Blagnac	~~Connex*~~	GDF	CECILE
5.1.T	X					X	X	
5.2.T	X					X	X	
6.1.T	X	X		X				
6.2.T	X	X		X				
6.3.T	X				X			
6.4.T	X	X	X	X		X		
7.1.T	X					X		
8.1.T	X					X		
8.2.T	X					X		
8.3.T	X					X		
8.4.T	X		X			X		
9.1.T	X		X			X		
9.2.T	X		X			X		
10.1.T				X				
11.1.T	X					X		
11.2.T	X	X	X	X	X	X		
11.3.T	X		X			X		
11.4.T	X	X	X			X		
12.1.T	X	X				X		X
12.2.T	X			X		X		
12.3.T	X			X		X		

Measures implemented:

Table 10: Overview table: MOBILIS measures in Toulouse

Measure	Title	Measure leader
5.1.T	Large-scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	**Tisséo-SMTC**
5.2.T	Solutions for alternative fuels in Toulouse and complementary measures to achieve a 100% clean fleet	**Tisséo-SMTC**
6.1.T	Definition and implementation of a new parking management policy in Toulouse	**Toulouse**
6.2.T	Public space redesign in Toulouse	**Toulouse**
6.3.T	Implementation of the Urban Mobility Plan in the Blagnac area	**Blagnac**
6.4.T	High-quality bus corridors in Toulouse and development of PT segregated and secured lanes in the city centre	**Tisséo-SMTC**
7.1.T	Innovative multimodal PT contracts, services and electronic ticketing in Toulouse	**Tisséo-SMTC**
8.1.T	Improving quality and structure of PT services in Toulouse	**Tisséo-SMTC**
8.2.T	Development of proximity services at important passenger transport hubs	**Tisséo-SMTC**
8.3.T	Improving the accessibility of PT services in Toulouse	**Tisséo-SMTC**
8.4.T	Integration of the demand responsive transport as a complementary service to PT in Toulouse	**Tisséo-SMTC**
9.1.T	Promotion of car-pooling and integration with PT services in Toulouse	**SICOVAL**
9.2.T	Implementation of a new car-sharing service linked to PT services in Toulouse	**Tisséo-SMTC**
10.1.T	Clean urban logistics and goods distribution platform in Toulouse	**Toulouse**
11.1.T	Awareness raising campaign for changing mobility behaviour in Toulouse	**Tisséo-SMTC**
11.2.T	Promotion of bicycle use and integration with PT services in Toulouse	**CAGT**
11.3.T	Set-up of a mobility agency and customised services in Toulouse	**Tisséo-SMTC**
11.4.T	Commuter and school mobility plans in Toulouse	**Tisséo-SMTC**
12.1.T	Demonstration of EGNOS/Galileo service use for the PT control and information system of public transport in Toulouse	**CAGT**
12.2.T	Implementation of bus priority scheme in Toulouse	**Toulouse**
12.3.T	Development of an integrated multimodal traveller information system in Toulouse	**Tisséo-SMTC**

Toulouse Objectives and Targets

At the end of 2004, there was great willingness among the different authorities to promote changes in the behaviour of citizens, to improve the attractiveness of Public Transport, and the use of soft modes..

The three key objectives of MOBILIS in Toulouse were to:

- Reorganise traffic circulation in line with an urban re-qualification process and the promotion of sustainable mobility;
- Give an innovative and attractive image to the urban PT network, by improving its quality of service;
- Promote the use of alternative mobility solutions and develop intermodal behaviour.

The 'intelligent' combination of the whole range of MOBILIS measures aimed to stimulate the use of PT and soft modes and thus improve the overall quality of life at the local level, by solving the mobility problem and reducing pollutant emissions.

Toulouse has a long tradition of innovation and took the opportunity of the MOBILIS project to be a pioneer in the field of Intelligent Transport Systems and Satellite Navigation, while confirming its leading role in the field of clean vehicles.

By participating in the ambitious CIVITAS programme, the Toulouse partners aimed to go further on the different topics by performing a detailed evaluation, by working on the measures integration/interconnection and by sharing experiences with other European sites, especially from new Member States and accession countries. The involvement of the local laboratory CETE/ZELT would enable it to share longstanding experience with other EC experts in the domain of systems/measure evaluation and transferability analysis.

The targets of the measure results were to:

- create a modal shift from private car use to public transport and soft modes and therefore to reduce the congestion level specifically at rush hour,
- reduce energy consumption by decreasing the rate of private car use at conurbation level
- reduce air pollution due to private car and public bus gas emissions at conurbation level
- improve the mobility of some dedicated targets groups and transport safety
- increase public awareness of mobility.

3.2 Summary of Measure Results for the City of Toulouse

Measure 5.1: Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels

Introduction

The Public transport operator and the city of Toulouse aimed at contributing to improve air quality at conurbation level by developing clean buses use.

Objectives

During the MOBILIS project, the city of Toulouse and the public transport authority, Tisséo, aimed at large-scale CNG deployment through the implementation of two sub-measures.

1. Tisséo intended to purchase 68 CNG buses, implement a GNV filling station and conduct research on CNG engine optimisation

2. the local stakeholders (city of Toulouse and ADEME) joined forces with GDF (national gas provider and supplier of the CNG compressor) to launch the so-called "CNG at home" solution by providing CNG micro-compressors for households. The AFGNV (national association of CNG users) and ADEME had chosen Toulouse as the first of the ten "CNG pilot sites" for the GDF project.

The expected results and targets were:

1. for the CNG vehicle fleet:
    - To build a new gas filling station with a capacity of 125 buses.
    - To extend the CNG bus fleet from 100 to 168 vehicles.
    - To reduce the pollutant emissions of the bus fleet.
2. for the research activity:
    - To understand the effects of the gas composition on the engine combustion phenomenon observed both in vehicle and laboratory conditions.
    - To optimise and define, with the gas provider and the city bus company, better gas quality for the CNG bus fleet.
3. for CNG at home: <u>to develop the first reference in Europe</u>, to develop and test the "CNG At Home" offer and to spread the word. This involved building some new technical, marketing and commercial tools that would then be used on the French and European markets. The key target was to have 1,000 homes equipped with the small compressor at the end of the project in the Toulouse area.

At the end of 2004, before the start of the CIVITAS MOBILIS project, the public transport bus fleet was composed of 499 buses, including 100 CNG buses and diesel buses with different Euro standards. The only existing CNG filling station capacity was limited to the filling capacity of 125 buses.

GDF had performed some feasibility studies before the start of the MOBILIS project in order to permit a commercial development within the CIVITAS MOBILIS timeframe, but there are no specific previous experiences.

Implementation

The sub-measures were implemented as follows:

1. At the beginning of 2005, Tisséo purchased 28 new CNG buses. It also ordered 40 new CNG buses as part of the MOBILIS project but, because of manufacturing delays, these buses are not due to be delivered until summer 2009, after MOBILIS. The composition of the Tisséo fleet has developed as follows:

Table 11: composition of Tisséo bus fleet in 2004 and 2008

	2004	2008
Euro 0	159	27
Euro 1	133	88
Euro 2	90	72
Euro 3	17	77
Euro 4	0	41
CNG	100	128
Biodiesel	0	81
Total	499	514

For the inauguration of the new bus depot of Langlade (destroyed in 2001 in the explosion of the nearby AZF factory), Tisséo has opened a second CNG filling station, permitting some further developments of the CNG fleet.

2. In October 2005, GDF launched a major communication campaign to promote the CNG micro-compressor. Between January 2006 and March 2008, GDF marketed its CNG micro-compressor and gave several training sessions with the objective of providing the necessary technical knowledge to people installing the micro-compressors and ensuring their maintenance. In March 2008, in view of the commercial results (58 micro-compressors installed two years after official launch), GDF decided to stop marketing the CNG micro-compressor.

The original plan was somewhat hampered by:

- the delay in the construction of the new CNG filling station from June 2007 to January 2008 and its impact on the CNG bus procurement
- the stop of the commercial development of the CNG at home offer by Gaz de France in March 2008. An in-depth Process Evaluation Report gives more details about the actual implementation of the measure. This sub-measure has at least raised citizens' awareness of alternative fuel solutions.

Results

For CNG buses, the evaluation has been carried out by measuring the environmental and economic gains between CNG Euro 3 buses and Euro 3 diesel buses.

According to the 2006 and 2007 data, operational costs for CNG buses are 23.25% higher than for diesel buses.

Nevertheless, it has to be stated that:

- the difference in bus investment costs is almost compensated by the difference in fuel costs, giving as such a similarity when adding these two types of costs,

- the maintenance costs for CNG buses are higher but tend to decrease over the years,
- the construction of a CNG filling station is an extra cost linked to CNG use but not that high with regards to the total operation costs.

The comparison of Nox, CO, HC and particle emissions shows that CNG buses emit + 0.9% more Nox, 75.2% less CO, 61.5% less HC and 91.1% fewer particles than diesel buses. Thus for the year 2008, the operation of 28 GNV buses instead of 28 diesel buses, i.e. the production of 1,003,526 kilometres, resulted in the following emissions: 0.49 ton more of Nox, 16.76 tons less of CO less, 4.31 tons less of HC and 0.48 ton less of particles.

By applying the external costs calculation methodology coming from the ExternE and Cleaner Driver (www.cleaner-drive.com) projects, the results of the cost-benefit analysis of the "CNG public transport fleet" indicates that the final general extra costs for using 28 CNG Euro 3 buses instead of 28 diesel Euro 3 buses (after deduction of external costs) in 2008 amount to around €150,000, but this would be less (€40.31/100 km instead of €52.03/100 km) if CNG buses had the same mileage as diesel buses when calculating operation costs.

The detailed study of the environmental figures and costs of CNG in comparison to diesel fuel has demonstrated that, over a lifetime, the costs are not significantly different. European and national subsidies significantly helped to decrease the cost difference between the diesel and the CNG solution. The building of a second compression station at Langlade is a determining factor in the continuation of acquisition of CNG buses. Tisséo-SMTC has chosen to continue its investment policy in the GNV bus and signed a contract with IVECO, which will supply the next 40 CNG buses.

Tisséo-SMTC conducted various satisfaction surveys which give positive feedback from the inhabitants of Toulouse, since the CNG buses are considered to be "more environmentally friendly".

The targets of this measure have therefore been partly achieved.

Lessons learned and recommendations

In fact, **the "CNG or diesel" choice** is much more a matter of political choice than an economic one. When the measure has been implemented, there were some doubts about the CNG solution, due to unclear figures about real lifetime cost and the lack of a local objective comparison of the environmental performances. To continue with the CNG solution, a clear political commitment to environmental gains and to improving its public image, associated with strong and open management, has been very important.

Before purchasing CNG buses when renewing a bus fleet, it is necessary to take long-term investments into account to force extra investment costs and to conduct a real assessment of the costs and environmental performances of CNG in order to provide decision makers with clear guidelines for developing their public transport fleet. It is nevertheless important to note that the new generation of diesel vehicles is approaching the CNG vehicles in terms of environmental performance, making them competitive with CNG buses for which the regulatory and safety constraints impose specific traffic conditions. Therefore, bus routes are more difficult to define for CNG buses than for diesel buses, which are not subject to the same constraints.

Regarding the **CNG micro-compressor** sub-measure, in spite of the strong local political support for GDF action, the implementation suffered from a lack of political support for CNG at the national level between 2005 and 2007. This resulted in an absence of market confidence and non compliance with the development protocol, signed in July 2005 by the fuel distributors, especially concerning the opening of 300 public CNG fuelling stations before 2010.

To develop innovative products such as the CNG micro-compressor, it is necessary to have a long-term vision, but also to ensure that the project is politically supported at all levels and that all the necessary stakeholders are involved in the project (car manufacturers, fuel suppliers, associations, public authorities, etc.).

Measure 5.2: Solution for alternative fuels in Toulouse and complementary measures to achieve 100% clean fleet.

Introduction

Before CIVITAS, the bus fleet of the public transport authority (Tisséo) was composed of 100 CNG buses and 393 diesel buses. Tisséo's main objective was to use complementary solutions in order to achieve a 100% clean public transport fleet by 2009.

Objectives

The objectives of this measure were to investigate and demonstrate solutions for alternative fuels: bio, diesel, bio-gas; and complementary measures to obtain a 100% clean public transport fleet by 2008.

Three main components are contained in this measure, mostly concerning research and technical development.

1. The first subject, called "biodiesel demonstration", aimed to continue the efforts already underway to find biodiesel suppliers and produce a methodological framework for comparative transnational market analysis, apply the recommendations of the research work and develop a site-specific recommendation on legislative framework conditions for bio-diesel supply and usage. Though fairly well developed in Toulouse, biodiesel will only be used as a complementary alternative fuel, especially in the oldest vehicles, since Tisséo chose the CNG solution for renewing the bus fleet.

2. The second subject, called "biogas", consists in an investigation of biogas potential sources (waste organic sources and dedicated cultivation) in the Toulouse area. The second part is the study of cleaning processes in order to improve purity in good technological, economic and environmental conditions.

   An annual growth in biogas use of between 20% and 30% is necessary to achieve the objectives of the European Commission White Paper of 15 000 kT in 2010, compared with around 3 000 kT in 2002. Since Tisséo owned 100 CNG buses and planned to increase this fleet, it was motivated to support the development of biogas. In France, only the urban community of Lille had used biogas for ten buses.

   The purification process of biogas is an important step for vehicle fuel use. The absorption processes are effective at purifying large quantities of gas and removing two undesirable biogas components, carbon dioxide and hydrogen sulphide. Many of these are based on water absorption, whereas the purification processes of natural gas from Lacq is based on amine absorption. However, there was still no accurate rule of choice and the sub- measure aimed to study a new biogas purification process. This work on biogas has been conducted with an exchange of ideas with the urban community of Lille as well as with the support of the INPT specialised laboratory (Institut National Polytechnique de Toulouse).

3. The third part of the measure, called "Equipping diesel buses with the latest generation soot filters", aimed to equip diesel buses with the latest generation soot filters, in order to reduce pollutant emissions considerably and therefore achieve the political objective of having a 100% clean fleet. A few years ago, it was decided to install new generation soot filters on the

last generation of older diesel buses. Only 39 buses were currently equipped with soot filters at the beginning of the project.

Implementation

The achievement of these studies on biodiesel, biogas and soot filters have contributed to the overall objective of having a 100% clean vehicles fleet in 2009.

1. From January 2006 to November 2006, Tisséo-SMTC performed a feasibility study in collaboration with a school of agronomy in Toulouse, regarding the changeover of part of its diesel fleet to biodiesel and the drawing up of recommendations for the use of biodiesel by the fleet of Tisséo buses. From January 2008, Tisséo test the use of biodiesel (at 30%) with 81 of the fleet's oldest buses.

2. From September 2005 to April 2006, with the support of a Toulouse agronomical engineering school, Tisséo assessed the available biogas sources in the Midi-Pyrénées region. From February 2005 to August 2006, they conducted a feasibility study for the use of biogas by the Tisséo bus fleet. Finally in 2007, they started to plan the implementation of biogas use in the Tisséo bus fleet and lobbying to lift the legal barriers blocking the use of biogas (notably the prohibited injection of biogas in the natural gas network) in Toulouse.

3. Between January 2006 and March 2009, Tisséo bought 101 diesel buses fitted with particle filters and ordered and installed 28 particle filters on the diesel buses already in use.

Results

The evaluation focused on measuring the variations in HC, CO, Nox and particle pollutant emissions between:

- the Euro 2 diesel buses recently fitted with particle filters and the Euro 2 diesel buses not fitted with particle filters,
- the Euro 0 and Euro 1 diesel buses running on biodiesel and Euro 0 and Euro 1 diesel buses running on diesel,
- the impact of biodiesel use and of the particle filter equipment has been defined.

Tisséo has also provided the overall operation costs data.

The main results of the different sub-measures are as follows:

1. For the 81 buses running on biodiesel, taking in account the investment, fuel costs and maintenance costs, the total extra cost amounts to €2.56/100 km

   The comparison of HC, CO, Nox and particle emissions per 1000 km between Euro 0 and Euro 1 diesel buses and Euro 0 and Euro 1 bio diesel buses showed that no change can be identified in NOX and HC emissions, but that biodiesel buses emit 20.3% less CO and 19.1% fewer particles than the conventional diesel ones. In 2008, the use, in the Tisséo bus fleet, of biodiesel on 81 buses instead of using conventional diesel on these buses has prevented the emission of 49.9 tons of CO and 5.3 tons of particles.

2. The CIVITAS MOBILIS project enabled the feasibility of biogas use to be assessed, the development of an implementation plan to get underway and the legal barrier to be identified.

3. For soot filter equipment, the total extra cost is low: €0.28/100 km (investment costs have been calculated according to local depreciation rules). The particles emitted per 1000 km are reduced by 90.9% between Euro 2 diesel buses and Euro 2 diesel buses with soot filters. The installation of particle filters on 27 diesel buses prevented 6.6 tons of particle emission in 2008.

The final general extra cost of the biodiesel and soot filter operations amounts to around = €1,400,000**;** external costs were calculated with the method resulting from the ExternE and Cleaner Drive projects (www.cleaner-drive.com).

Throughout the MOBILIS project during the 2004-2008 period, NoX, CO, HC and particle emissions from the Tisséo bus fleet decreased by 31.9%, 54.2%, 42.8% and 84.4% respectively.

This experiment has also enabled the number of captive fleets using biofuels to be increased, thus making the research work easier on second-generation biofuels.

Lessons learned and recommendations

The main barriers to the implementation of biodiesel were, firstly, the maintenance department's and engineers' doubts over the viability, cost effectiveness and environmental performance of the use of biofuels and secondly, for biogas, the legislation, which does not allow biogas producers to inject it in the natural gas network. Tisséo's political commitment to presenting the Toulouse public transport network as a clean, environmentally friendly network, and the working group's motivation were key positive features in the implementation of biodiesel. An objective in-depth multi-criteria analysis of the different fuel options involving environmental, societal and cost-benefit assessments, and meetings with national and local experts in order to discuss the advantages and disadvantages of using biodiesel have been useful to further develop a clean public transport fleet.

Tisséo has involved the Urban Community of Lille in order to assess biogas use in Lille and how to transfer it to Toulouse. The most involved stakeholder in the national territory was "partenaires diester".

A complete in-depth multi-criteria analysis is absolutely necessary before taking any decision on biofuels.

Biodiesel promotion is planned, as Tisséo considers that using biodiesel is a way to promote biofuels research. Tisséo will now include soot filters as a necessity in call for tender specifications when buying diesel buses.

Measure 6.1: New parking management in Toulouse

Introduction

With 12,000 spaces, Toulouse city centre offered a predominantly free range of car parking facilities until 2005. There was pay parking in only a few roads of the city centre, where most areas had free parking. This situation led to conflicts of use between shopkeepers, residents, commuters and visitors to the city centre.

To improve this situation and allow city centre residents and shop customers to park more easily, while reducing traffic in the city centre, the Toulouse city council decided, under the MOBILIS project, to introduce a pay parking scheme – via its *Plan Local de Stationnement* (PLS – Local Parking Plan) – for residents in four central sectors.

Objectives

The measure objectives of this new policy were to:

- Optimise the management mode for car parking, as a springboard for global mobility policies, in order to encourage a more balanced use of different modes of transport and preserve the economic activity of the city.

- Reduce the amount of space allocated to private vehicles in the city and improve the availability of car parking provision.
- Define and implement a Local Parking Plan in order to reduce car access to the city centre.

The main quantifiable target of this policy was the reduction of 2,000 parking spaces in the city centre.

Implementation

The municipality of Toulouse decided to implement its Local Parking Plan on 25th March 2005. This plan comprised the following three main sub-measures:

- The creation of a “Resident” rate with a monthly pass available, in some zones from 6pm to 9am, in other ones for full-day parking, costing around €15 per month,
- The extension of pay parking time from 9am to 8pm instead of 6pm into areas in which a “Resident” rate is created,
- Consistent monitoring throughout the perimeter, including the systematic reporting of drivers who overstay their allotted time, given that it will be possible to use 20 centime coins in the parking meters (corresponding to 8 minutes of parking, thus allowing time for shoppers to make last-minute purchases).

The survey carried out in September 2005 helped to provide a diagnosis of the initial situation prior to the implementation of “Resident” pricing in four of the twenty city centre districts (in October 2005).

On 3rd October 2005, “Resident” parking was introduced in four trial districts in the very centre. The idea was to test the new regulations before extending them to all of the city-centre districts.

This test confirmed the overall suitability of the scheme with regard to the stated targets. In May 2006, new roads in these first four sectors switched over to pay and “resident” parking schemes (for a total of 2,156 places). Two new sectors were also added at this time.

The positive reactions observed in the first districts prompted the city to start extending the regulated parking zones. Furthermore, the new restrictions seem more acceptable and less constraining for stakeholders in light of the growing awareness of environmental and quality of life issues, along with the expansion of the public transport network with the opening of the extension of underground line A and its two new park and ride facilities, followed by the arrival of underground line B.

In October and November 2006, “Resident” pricing was extended to several new streets and two new sectors in the central business district.
In February and March 2007, several new streets and three new sectors were included.
In September and October 2007, it was decided to include five new sectors in the “Resident” parking scheme.
Finally, in December 2007, it was the turn of the remaining districts of the city centre to adopt the “Resident” parking provisions.

The Local Parking Plan is strictly overseen in order to be sure of its consistency. A parking observatory and yearly satisfaction surveys were set up, which allow supply to be adapted to the demand. Several types of regulations were implemented according to the type and intensity of the demand observed. For example, the rates were adapted in 2008 with the launch of the preferential rate for emergency professionals.

For the districts where the local parking plan is in force, the impacts of this measure were observed from the 2005, 2006 and 2007 surveys. In 2007, the balance assessment was considered "positive".

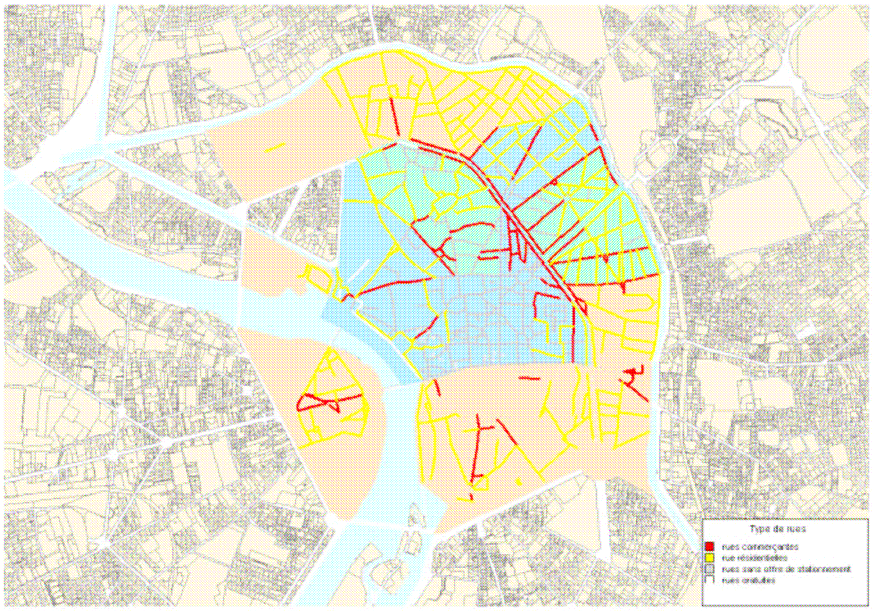


Figure 9: Resident pricing areas at the end of 2007

Results

The policy of regulated car parking organised throughout the city centre since 2005 gave the following results in December 2007:

- The “Residents” pass system is a success; the ratio of the number of subscribers to the number of available places throughout the area has thus been rising steadily since the introduction of the PLS in 2005 from 20 to almost 50%. The time spent by residents parking has been reduced from 23 to 5 minutes. The satisfaction rate is high: the latest satisfaction survey showed that 78% of the residents in the 19 areas were satisfied.
- In September 2005, the number of pay parking spaces was evaluated at 2,158, compared to 9,302 free places. At the end of 2007, the free provision was reduced to 4,669 places, whereas there were 6,938 pay spaces. 5,464 of these were “24-hour Resident” and 1,474 were “6pm/9am Resident” spaces. The “rate of free space” (25% on average) meant that public space could be reorganised, sustainable transport modes (bicycle stations) could be developed and emergency professional needs could be taken into account.
- the occupation and congestion rates of parking spaces have dropped significantly, by 17%,
- the rotation rates now vary between 2 and 4% in the main business areas, now corresponding to the averages observed in other cities. This has improved access to parking spaces for all users: tourists, businesses and services users, the town centre inhabitants with or without "resident status"
- the illegal parking rate has decreased by 2% ,
- the compliance rates (number of legally parked vehicles to the number of vehicles parked in pay spaces), varied between 37% and 58% according to the sectors which could prevent the scheme from operating correctly, but the population gradually adapted to this new situation.

The presentation meetings given by the technicians and politicians of Toulouse before each resident parking area was set up proved worthwhile, as they allowed residents and shopkeepers to understand the benefits they were supposed to obtain through this regulation. The extension of pay parking can be

considered as a constraint for car drivers, but the improvement of spaces for soft modes is a help and incentive for these modes.

In Toulouse, the parking rules need to be better adapted to the urban infrastructure and to the variety of users (rates, timetables, perimeters). A more effective control of illegal parking would have increased the impact of the policy, but could have decreased the observed compliance rate.

Lessons learned and recommendations

The measure firstly considered as risky due to the failure of previous experiments has been finally even more successful than expected.

The previous parking conditions, the gradual implementation of the measure, the low price rates for residents, the public consultation process, the communication strategy and the political support helped to implement the measure and facilitated its acceptance.

No specific barrier has been noted. Nevertheless, some users' categories require a better adaptation of the parking rates taking in account their professional constraints.

The implementation of this measure highlighted that:

- The parking policy, taking into account the increasing demand and the limited public space, requires significant skills to make relevant decisions, which assume a good knowledge of parking supply and use.
- In a passionate context between the different users, it is important to introduce objectivity. This is the purpose of car park inquiries upstream and car park policies, as well as the look-out posts in car parks. There are relatively few of these in France, although their use is of interest. Indeed, a look-out post in car parks can be used to:
    - assess the specific impact of measures that have been taken
    - anticipate drift and provide information for new decisions to set
    - obtain objective data to communicate.
- Introducing pay parking in just a few districts makes it possible to evaluate how well the system is accepted and works before its extension to a wider area.
- The project should be presented to residents: the dialogue step should not be neglected. Parking is a sensitive field and the displayed proposals need to be explained and understood to be accepted.
- The project should also be monitored and its stakeholders, technicians and elected representatives, should be attentive to the parking users, in particular the subscribers who pay for a service.
- Ultimately, a regulated parking policy needs ongoing surveillance by the Police. This is the main key for success.
- Although motorists may consider the expansion of pay parking to be a constraint, the improvement of services for alternative modes of transport is an asset and acts as an incentive to use these methods.
- Nevertheless, it is possible that parking conditions will deteriorate in certain peripheral districts. Schemes designed for these sectors could work alongside the city centre measures.

Measure 6.2: Public space redesign in Toulouse

Introduction

The programme for the 2001-2007 term of the city council elected in 2001 planned to extend the pedestrian areas in the city centre. During the 2001-2005 period, the works on underground line B affected the boulevards and prevented any other work being carried out in the areas. Pedestrianisation only concerned the Wilson Square area (Square located near Jean Jaures underground lines A and B main station) and the surrounding streets (Lafayette, Montardy, Lapeyrouse, Roosevelt Alleys). The other areas of the very centre were mostly devoted to cars.

In preparation for the opening of the 2nd underground line, planned for 2007, Toulouse carried out an integrated package of accompanying measures and mobility changes in the city centre.

Objectives

The objective of these measures was the urban renewal of the city centre in order to:

- facilitate mobility and the use of public transport (PT);
- improve pedestrian areas and access to the underground stations (by restructuring the entrances to the 20 underground stations of the new line B);
- redesign public space with pedestrians and cyclists in mind, by installing new bicycle parks around all new underground stations for instance ;
- create special areas for deliveries.

Implementation

This programme covers a series of measures, such as the modification of the traffic layout, urban planning for bicycles, pedestrian zone extension and delivery area implementation right in the city centre.

The traffic layout was modified on Capitole square (the main central square) and the surrounding streets (Tamponières, Taur, Rémusat, Cujas, Peyrolières, Ste Ursule). The two-lane streets were reduced to single lane streets; some parts were closed to car traffic, the direction of travel changed in some streets and wider passages were designed for pedestrians and cycles. In particular, Alsace-Lorraine Street (one of the main roads of the very centre) was redesigned from having 2 bus lanes and 1 car lane to 2 cycle lanes, 1 car lane and a wider passage for pedestrians. The central part of this street was also closed to road traffic. The bus lanes were moved to the surrounding boulevards (Strasbourg, and Carnot). The very centre of Toulouse is therefore now devoted to pedestrian and cycle areas. Special areas were also designed for freight delivery. The remaining road traffic streets are for residents and delivery traffic; through traffic is now prompted to avoid the very centre.
By the end of 2007, the second underground line, line B and the bicycle rental system, VélôToulouse, rounded off these new developments.

Figure 10: the Alasce-Lorraine road before and after

Results

These public space developments have modified the modal share, but also the habits and routes of cyclists right in the city centre.

Car traffic, particularly through traffic, has generally decreased. Between 2006 and 2008, car traffic reduced by 12.5% in the morning rush hour and 17% at off-peak during the morning. Between 2006 and 2008, through traffic has been reduced by 5% in the morning rush hour and 2.5% at off-peak during the morning. There has been a very distinct drop in car traffic along the previous main road (Alsace-Lorraine Street). That said, the traffic has increased on the road that connects the Boulevards to the main square.

Cyclist habits and routes have changed. Between 2006 and 2008, cycle use decreased during the week overall, by around 10% (but increased compared with 2001). Nevertheless, cyclist numbers have increased quickly on Alsace-Lorraine Street, which highlights the importance of public space reorganisation in favour of more environmentally friendly means of transport.

The results are much more positive on Saturdays, when cycle use has shot up, by around 40%, specifically on Alsace-Lorraine Street and along the Garonne River. The smallest increase on Saturdays has been observed around the main square.

As with the bicycle counts, pedestrian numbers have globally decreased with an average reduction of 4.5% during the week. Nevertheless, the results of this measure are very positive on Saturdays, mainly in the new pedestrian areas of the city centre. The average increase on Saturdays is 4%. These variations depend on areas in the very centre and the new underground station location. Some people who used to walk now travel on the underground.

The impacts of the delivery areas laid out in the very centre have not been assessed.

As a result, the pedestrianisation of the main Squares and roads in the very centre of Toulouse (Alsace-Lorraine Street, Wilson and Capitole Squares and Roosevelt Alleys) is a positive consequence of this measure, even if the general downward trend does not meet the initial objectives.

Lessons learned and recommendations

The measure leader identified the following possible barriers to the success of the redesign. Bars, restaurants and shops use more public space (normally devoted to pedestrians), which reduces the comfort of its use.

The appeal of the new area could also attract more visitors at night, which could cause more nocturnal noise.

To date, these identified risks seem to be overcome due to the high acceptance of the measure, thanks to effective communication with the general public, local citizens and shop owners.

Positive features were also identified, the main one being the strong political support for the implementation of the measure.

A second factor was the close coordination with the local citizens and shop owners. The technicians and politicians of the city presented the project to each individual shop owner. A local meeting for citizens was held to discuss the individual parts of the plan. General public meetings were organised to present the project to a wider public.

At the same time, the city implemented several accompanying measures to improve the overall situation (cleaning of buildings, improvement of streetlights, general improvements of public space). This helped to get a favourable opinion from the local citizens and shop owners.

The design of a city centre has to be combined with the renewal of the parking policy and the development of public transport. The needs of the inhabitants must be clearly identified.

The redesign of a city centre clearly attributes to the liveability and quality of the city centre for inhabitants, but such an action must be strongly supported by local politicians and effective communication campaigns explaining, specifically to shopkeepers, what the benefits will be for them.

Measure 6.3; Implementation of the Urban Mobility Plan in the Blagnac area

Introduction

Blagnac, a town in the Toulouse suburbs, had 20,600 inhabitants in 1999. It is growing fast, particularly in economic terms with the A380 motorway partly running by it. The town therefore faces transport issues inherent to suburb towns: major internal flows but also an intense transit flow on its main axis. So as to deal with these challenges, and in the framework of the Urban Mobility Plan for the urban area of Toulouse, the town of Blagnac adopted its own Local Urban Mobility Plan, seizing the opportunity of the arrival of the light train line E, initially planned in 2009.

Objectives

One of the main objectives of the Blagnac Local Urban Mobility Plan was “better parking management” and development of soft mode infrastructure.

The associated actions planned in the Blagnac Local Urban Mobility Plan were evaluated for this MOBILIS measure: the “Blue area” settlement and the distribution of a brochure promoting alternative modes of transport to the car, especially public transport and cycling.

The brochure "How to get around in Blagnac without a car" has been delayed with the tramway works being postponed, and so the reorganisation of the bus network has not yet been established. So no evaluation is available for the impact of this brochure within the required time of MOBILIS.

Implementation

Parking was totally free in Blagnac before MOBILIS, but difficult in the town centre. A survey carried out in 2005 showed that there were enough parking spaces in the centre in comparison to needs, but:

- the spatial distribution of the parking spaces was not suitable (the centre was saturated and neighbouring areas were underused
- long-term parking (employees and inhabitants) used most of the parking spaces, to the detriment of visitors (shoppers and users of the administration buildings)
- the Saturday morning outdoor market caused a saturation of the centre, whereas parking spaces remained free in the area surrounding the centre

To improve the situation and solve the issues of local shopkeepers and inhabitants, the Blagnac Town Council chose to implement a "Blue zone" in this area. The concept is that parking is free, but regulated and short-term; the authorised parking duration in these spaces is 2 hours maximum. The Blagnac Town Police is responsible for the regulation. Hourly disks are handed out free of charge to drivers by shopkeepers or by the Blagnac municipal employees. Regulation is in force during the demand peak periods (Monday from 2 pm to 6 pm, Tuesday to Friday from 8 am to 6 pm and Saturday from 8 am to 1 pm.).

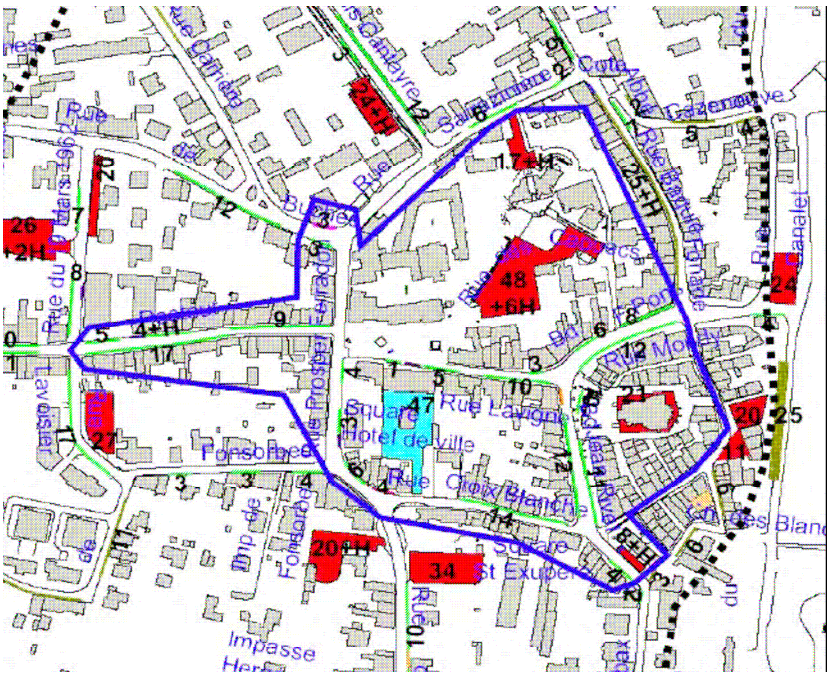


Figure 11: Blagnac centre bue zone area

The town council considered that regulated short-term free parking was a better solution to the town's parking issues than paying parking.

Before the implementation of the "Blue area", Blagnac ran an extensive information campaign. The written communication focused on diagnostic learning, the solution, the area concerned and the regulation through different means:

- In the local newspaper ("La Dépêche du Midi") and in the Blagnac Town magazine "Le forum" with a special 4-sheet leaflet entitled " For my city to move, I share my parking space" and accompanied with a time disk.
- On posters: a public notice with the colours of the control disk, placed in shops and in the Blagnac City services hosting public.
- By flyers put on car windscreens indicating the new regulation rules and the possibility of obtaining disks from the Blagnac Town reception.

At the same time, the Blagnac Town police were supposed to note down those vehicles in breach of the law, once the "Blue area" was in service. Unauthorised parking would be an offence after 1st March 2006.

The Blagnac Town services also organised a public meeting to share the diagnostic learning and inform the inhabitants and shopkeepers about the new regulation.

The "Blue area" was established in April 2006, on the perimeter of the very centre. The perimeter has not been changed since, but it may be extended in the future.

Results

The assessment methodology is based on a comparison between "before" and "after" situations. It focuses on the operating costs, the acceptance level and parking use.

It cost around €24,000, ex VAT (one-off sum) to set up the "Blue area". Running costs have been estimated at €68,200 a year, ex VAT, taking into account the equivalent of two employees for the "Blue area" control and the equivalent of half an employee for the "Blue area" management, professional tax, running costs and investment returns.

The positive aspects noticed are:

- better access to the centre for shops and service customers, as the turnover ratio has increased by 2.7% in the "Blue area". 82 % of the vehicles parked in the "Blue area" are parked for less than 2 hours.
- a decrease in long-term parking by 59%;
- globally, a better distribution of the parking demand;
- a slight increase in the average occupancy rate, by 0.7% at town level, but a strong decrease, by 7% (4% at peak hours) in the "Blue area".

However:

- some streets are still saturated in the very centre and at its limits. (As quoted during the interviews, it seems that some users turn their hourly disk every two hours without moving their vehicles. This behaviour is hard to control and fine.)
- some periods are still problematic: between 12 pm and 2 pm, and on Saturday mornings; 18% of vehicles do not respect the regulation and are parked on roughly 44% of parking spaces, restricting the smooth running of the system. The global town policy is to not be very repressive and no stricter enforcement ideas have been considered,.

- the amount of vehicles coming to park in the centre, and therefore the number of car moves, have strongly increased in outlying areas.
- Lastly, the issue of medium-term parking should be taken into account, as it widely increased in both the "Blue area" (by 63%) and the outlying areas (by 29%).

Lessons learned and recommendations

It seems that, in the case of Blagnac, the barriers are quite limited. Very few inhabitants' challenges have been reported to date, and very few remarks or questions were reported during the frequent local council meetings about the set-up of this new parking regulation.

This project met a public demand. Since parking in Blagnac centre had become very difficult, the town centre's "users" (inhabitants and shopkeepers) were demanding the set-up of this "Blue area", passed on by newspaper articles. Moreover, extra parking spaces existed in the outlying area, allowing long-term parking to be shifted.

This kind of configuration seems to be particularly suitable for establishing a "Blue area".

Communication between the different stakeholders is a key point for the success of such a project. It is recommended to target shopkeepers to ease the acceptance of the new rules by inhabitants; they are ideal for passing on the information in a friendly way and for handing out the disks.

The newspaper information, flyers, and the first "warnings" given out by the policemen raised the wider public's awareness of the new rules and so avoided any feelings of unfairness towards the measure.

Finally, the public meeting is a key step as it makes it possible to share the results and the main lessons of the initial assessment; distribute information, hold a direct exchange and answer some difficult questions.

Measure 6.4: High quality bus corridors in Toulouse and development of PT segregated and secured lanes in the city centre

Introduction

In preparation for the new underground line B, Toulouse has improved a number of Public Transport routes by developing high quality public transport corridors in peripheral areas and segregated bus lanes in the city centre. Standardisation and evaluation of the different concepts enable a more efficient use of these systems and qualitative improvement of the bus services.

Objectives

This measure was divided into two sub-measures concerning the creation of dedicated Public Transport (PT) lanes in the city centre and of High Quality Corridors (HQC).

1. **"PT lanes in the city centre"**

   The objective of this sub-measure was to develop PT segregated lanes in the city centre by reorganising the PT network infrastructures in the city centre, creating PT segregated and secured lanes in the city centre, in order to:

   - Increase bus efficiency and appeal

- Improve road safety on these segregated lanes
- Provide incentives for the use of clean vehicles and alternative fuels
- Improve the acceptance of access restriction policies for sensitive areas.

2. High Quality Corridors "HQC"

The objective is to develop two High Quality Corridors (HQC) on the roads: RN126 (East of the conurbation) and RN113 (South-East of the conurbation), in order to:

- Increase the Public Transport offer and improve the connection between the bus and the underground networks, especially in the peripheral areas.
- Consequently improve bus commercial speed and regularity, linked to an overall increase in the level of quality of the PT service on these lines (P&R, bus priority system, information system and ticketing system).
- Develop PT use in the peripheral areas of the conurbation by proposing a competitive alternative to the private vehicle and improving PT accessibility in these areas.

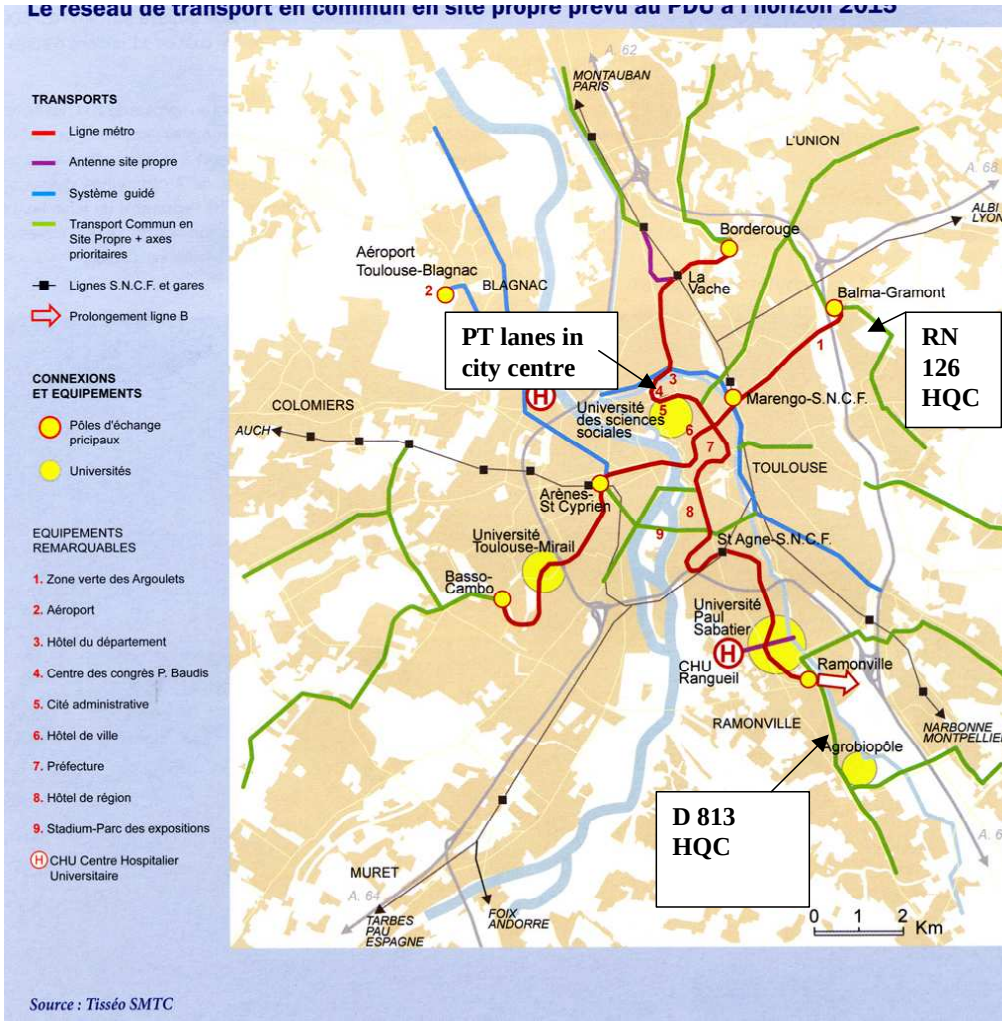


Figure 12: PT lanes and high quality bus corridor sites

Implementation

1. **"PT lanes in the city centre":**

The definition of the segregated lanes in the city centre was associated with the definition of the new PT network. Created at the end of the major underground building works, they were opened in July 2007, at the same time as the second underground line.

2. High Quality Corridors "HQC":

The RN126 HQC opened in two phases: the first stretch in November 2005, followed by the second stretch in November 2007. It is 10.9 kilometres long with 9.5 kilometres of segregated lanes. 11 bus stops are located on the line.

The RN113 HQC opened in two phases: the first two kilometres in September 2007 and the whole line in December 2007. It is 6.9 kilometres long with segregated lanes all the way along. 11 bus stops are located on the line.

Results

The key results obtained concern:

1. **"PT lanes in the city centre":**

Overall, for both sides of the roads included in the area studied (boulevards between Monument aux morts and Héraclès square and Jean Jaurès avenue, i.e. around 6 km), the key results linked to the implementation of the dedicated bus lanes are as follows:

- It has reduced the average bus travel time, not including commercial stop time, by 12%, and therefore the average total bus travel time by around 10%.
- The dispersion of the intervals between "frequency" buses has been reduced by 5 points.
- Average private car speed has increased by 14%, and their travel time in the area has reduced by 23%.
-

2. High Quality Corridors "HQC":

On the whole, the new infrastructures have improved travel time reliability during the day and more specifically:

- for line 62, the opening of the bus lanes and underground line B have reaped significant travel time benefits. The commercial speed on this line has increased from 10-15 km/hr to an average of 30 km/hr.
- on the 4km bus lane between Balma centre and the underground line A terminus, there have been fewer benefits. Commercial speed increased slightly to 25 km/hr, but the route is shorter.
- on line 77, the route is now longer, but the commercial speed is faster, reaching an average of 30 km/hr. Travel time has been constant since 2004 and no longer depends on the traffic conditions.
- Car travel time is quite constant, in comparison to the situations without any bus lanes
- The solutions mixing PT with the car are unworthy of note.

- The P+R areas located on the HQC are not used much; the high number of changes required in the transport solution may explain this.
- Bus stop access has been improved for pedestrians, cyclists and the disabled.

Lessons learned and recommendations

The difficulties encountered when implementing this measure were:

- The public enquiry process delayed the validation of each HQC design, the time between the public consultation and the planned start of work was considered too long (2.5 years)
- The political changes that intervened in MOBILIS time at the executive board of the public transport authority modified the local policy choices.
- The delay in the development of priority and information systems has impacted the complete integration of services

This being said, the construction of the second underground line (B) has opened up an opportunity to modify and improve a number of Public Transport routes in Toulouse. The public transport authority and surrounding cities were jointly committed to seizing this opportunity to improve the public transport services from these residential boroughs to Toulouse city centre.

High quality bus corridors are an affordable option to enlarge the scope and improve the services of public transport. In comparison to the underground and tramlines, their costs are considerably lower. As a result, they are perfect on highly congested routes, where the density of population does not justify a tram or underground construction.

Two guides (both in French) “a retrospective study” and “design and material choice” have been produced to develop learning practices and could be used as input for training.

The development processes in particular during the planning phase of the HQBC can be used by other European cities as an innovative tool to work towards a realistic development plan.

Measure 7.1: Innovative multimodal PT contracts, services and electronic ticketing in Toulouse.

Introduction

The urban public network of Toulouse was equipped since 1992 with a multimodal ticketing system, based on magnetic system (ISO tickets). The same ticket allowed public transport users to travel by bus, underground and on one railway line. Reduce fraud and obtain better knowledge of PT users’ practices had motivated this choice.

By implementing this measure, the different transport authorities of Toulouse aimed to totally renew its ticketing system and tariff rates to develop electronic contact less ticketing and intermodal pricing.

Objectives

Initially the measure objectives were very ambitious. It foresaw to:

- Establish an interoperability chart between the different public transport operators and apply it for the development of multimodal contracts (the decision of other PT authority to develop their own ticketing system for 2009, partly postponed this objective)
- Realise a marketing study and in relation to the study results develop new types of services and develop innovative integrated/ combined ticketing,
    - Development and implementation, due to the new functions of the ticketing system, of incentive public transport contracts focusing on specific users' groups.
    - Introduction of a new mobility card integrating new type of services
    - Develop an electronic purse and multi- service support (access to restaurant, library complementary to transport access) for pupils and students. (for technical and administrative reasons, the electronic purse could not be integrated)
- Develop and promote a new offer targeting residents of the city centre and combining car park and public transport use.

Implementation

After a delay in the development, the contactless ticketing system and the associated card (Pastel), based on European and ISO standards, was set up in June 2007 when the second underground line has been running, creating a major extension of the PT network. The classical magnetic tickets are still available and usable. The contactless Pastel card is personalised and only the subscriber is allowed to use it, the travel price is similar to the price with classical ticket.

Local political authorities wished an in-depth analyse of the users' practices and needs towards the new ticketing system and especially of the impacts of the new PASTEL card. The work methodology and the overall objectives of the measure had to be reviewed. The measure focused then more on the in-depth analysis of the whole final users' behaviour in term of travel and PT contract use. The public transport authority has launched a marketing study. A qualitative enquiry, involving 6 specific users' groups and a quantitative one based on the answers of two samples (3,800 frequent or occasional users and 400 non-users) have been carried out to understand why people still buy classical tickets, define subscribers 'expectations, evaluate the services that would increase PT operator's incomes. The results of this analysis were obtained in February 2008 and were very rich and useful. The marketing and financial analysis results revealed that the public transport authority should target users by considering age classes and PT use frequency.

In March 2008, the majority changes that intervened after the local elections modified Tisséo priorities.

Finally, Tisséo undertook only some specific demonstrations of innovative PT products, considered as relevant regarding the marketing study conclusions:

- anonymous smart cards associated to impersonal public transport subscription
- ACTIVEO cards for employees who subscribe an annual contract and whose company has developed commuter mobility plan.

The different public transport authorities (Region Council, County council and railway operators) have studied the administrative and technical conditions required to develop interoperability t. These partners have postponed the implementation of the appropriate ticketing system. It is planned for 2009, so multimodal contracts will be developed in the second half of 2009. Tisséo and the regional railway operator have successfully conducted the first test by the end of 2008.

Results

The public transport use per network km has globally increased (by around 49%). More than 300, 000 PT users are Pastel card subscribers.

The ACTIVEO experiment is globally very conclusive and seems to have introduced modal shift from private car to public transport or combined journey (car and PT). The ACTIVEO subscribers (1331 ones from April 2008 to September 2008) are satisfied: 90% of them are willing to recommend it to friends The success depends of the company location the awareness promotion at company level and of co-financing (around 50%) by the employer. Some administrative and financial procedures might be improved.

Due to the late development of the anonymous card, no results are available yet.

Lessons learned and recommendations

The measure had to be modified for the following reasons:

- delay in the development and installation of the new ticketing system from November 2006 to June 2007 in relation with the delay of the achievement of the second underground line,
- delay of the other public transport authorities in renewing of their own ticketing system,
- the extension of the park and ride offer has introduced technical difficulties to integrate their access control in the new card.

The numerous partners have complicated the measure development. More, political sensitivity to financial issues and political changes have modified the measures objectives.

The marketing study revealed that the number of PT users had increased but the increase of free PT users (unemployed, pupils, elder people, etc) had deeply limited the incomes of PT operators.

Public transport users whish a PT network able to satisfy their mobility needs. Pupils and students are the major users; people over 30 years old are mainly occasional users; the benefit of free access for elderly people (over 65) has little impact on the financial results.

Most clients expect easy to use travel cards and tariffs, better adapted to their way of life.

Measure 8.1: Improving quality and structure of public transport services in Toulouse

Introduction

Before CIVITAS/ MOBILIS, major network modification and infrastructure building, the public transport authority, Tisséo SMTC, wanted to guarantee and improve the overall quality of service of the bus public transport network, and increase the use of it. At that time, public transport service quality was assessed through pollsters who rated the different components of quality, defined by the Tripartite Committee[12].

Objectives

Initially, the measure aimed to:

- Create a customer-oriented and efficient public transport system for the entire urban area with reliable and high-quality services.
- Structure all urban public transport services and the whole network and define the associated level of quality (operating procedure and constraints – inboard and stop information– ticketing facilities, etc.).
- Define benchmark indicators to assess public transport service quality.
- Change the overall image of public transport by using new technologies, providing new types of services (complementary to the transport one) and improving the overall level of quality. In particular, it was necessary to have an effective measurement means in accordance with quality standard EN 13816 for passenger transport to achieve the twofold objective of analysing sources of irregularity in services and assessing public transport network line services with a view to obtaining national certification (NF).

Since 1st January 2006, the authority has directly managed the urban public transport network. It was no longer possible to follow the planned activity sequences of the up-down approach: general objectives -> implementation -> impact assessment. The working group concluded that this measure should be turned into a more pragmatic approach, applying a bottom-up approach: assessment of indicators -> analysis of the quality of service -> inputs for the development of a strategic frame/ contracting between operator and authority.

Even if the final goal of this measure remains similar to the original one, the content, the methodology and management of this measure have been completely modified.

After the mid-term report, the measure objectives consisted in improving route time and passenger load measurements in order to:

[12] The Tripartite Committee unites the Public Transport Authority, the Public Transport Operator and the association of public transport users (AFNAUT). One of its objectives is to approve service quality commitments, proposed by the public transport operator, and give opinions about the measurement principles (at least periodicity and observation mode).

- increase the reliability of progress tables and therefore the consistency and punctuality of 44 buses equipped with specific sensors and the associated system for the collection and processing of data;
- make discussions of route time measurements with social partners more objective;
- perform parallel quality measurements and define a new methodology using automatically collected data for bus lines under a quality certification process;
- highlight the different causes for lost time in order to justify road improvement requests or traffic light programming with the local authorities with a view to improving our service and defining an iterative process for the overall improvement of public transport quality;
- have a system interfaced with our vehicle traffic plotting / display software (Hastus) and used in addition to the AVL system.

Implementation

At present, the measure only deals with methodology. The measure has been implemented in six stages.

1. The call for tender to select the system to be installed on the buses was launched in January 2007. The contract in automatic measurement and analysis systems for route times and passenger numbers was awarded in July 2007 to TDE Transdata and UVT joint companies. The selected system was the Opthor product. The information collected was used to analyse the breakdown of route time (time lost, passenger exchange time, driving time) and the time lost (waiting in a queue, traffic, waiting time at traffic lights and at stop signals).
2. 44 buses, representing almost 10% of Tisséo fleet, were equipped with the Opthor system, in September 2007, in order to carry out different measurement campaigns.
3. In parallel to the measurement campaigns, Tisséo defined, between January 2008 and November 2008, a new certification methodology with a dedicated action plan. This new certification methodology integrates the data collected by the newly installed tool.
4. Since January 2008, the public transport operator has launched some measurement campaigns on several bus lines and in different conditions (peak hours, off-peak hours, holidays, week-end, etc.) in order to collect complete operation data of the different bus lines, which are undergoing certification.
5. During the meeting in September 2008, the Tripartite Committee validated the use of Opthor as an observation mode for the certification process.
6. In November 2008, Tisséo presented data of several bus lines and of the two underground lines to the national standardisation authority and certification body (AFNOR)[13] in order to obtain the associated certification; results of this certification phase will be known from February 2009 onwards.

Results and lessons learned

According to the implementation timetable of this measure, there are no specific impacts yet. Its outcomes are much more relevant in terms of process evaluation than in terms of impact evaluation.

[13] AFNOR is the entity in charge of certifying the different public transport bus lines.

During the CIVITAS MOBILIS lifetime, the second underground line was opened (July 2007), the two High Quality Bus Corridors were inaugurated (December 2007 and January 2008) and the bus network was fully reorganised.

In addition, the works on the first tramway line (line E) have started; it will be inaugurated in 2010. At the same time, a new Automatic Vehicle Detection (AVL) system will also be implemented; the general management of the quality of the public transport network (through its measurement system) will really evolve from now on.

The decision to postpone the reorganisation of the public transport network after the opening of the second underground line and the political misunderstanding have hindered the measure implementation.

The commitment of the Public Transport Operator to developing the measurement system under direct management has been a potential success factor.

The success of the methodology application itself lies in two points:

- the automatic measurement of indicators through the data collection system,
- the cooperation with the national certification body (AFNOR) to validate the certification process and to demonstrate the reliability of the automatic indicator collection system, which is being carried out in the framework of the CIVITAS MOBILIS project to improve the process. For bus lines that are already certified, the quality level will be continuously assessed.

The Tripartite Quality Committee has integrated the public transport users' point of view into the debate about the quality level of the public transport network. AFNOR's acceptance of the data collected by new measurement system has facilitated the certification process.

Since citizens often have a choice of multiple transport options, a high quality of public transport is essential to increase its use. Automatic measurement of service quality and public transport service certification helps public transport to achieve the desired quality and standards.

The methodology developed to define quality strategy and obtain quality-certified public transport services is an excellent learning practice for other bus operators that want to use the full possibilities of a so-called "floating bus" measurement system.

Tisséo-SMTC will continue to draw benefits from the automatic "Opthor" tool by performing a continuous assessment of the quality level of the different bus lines of the public transport network in the coming months and years. This process should enable Tisséo to obtain more certified bus lines than without the Opthor tool.

Opthor use will certainly evolve when Tisséo has its own automatic vehicle detection (AVL) system in 2010.

Measure 8.2: Development of proximity services at important passenger transport hubs

Introduction

The CIVITAS MOBILIS project aimed to take accompanying measures in Toulouse in preparation of the new underground Line B. The development of a services area in the Jean-Jaurès underground station, a public transport junction, was considered an essential condition for creating added-value for passengers and enhancing the attractiveness of public transport. Before CIVITAS, the Jean Jaurès station was a normal station of line A, with very few services in the station area. Its development came only with the decision to intersect the two underground lines at this point of the Public Transport network.

Objectives

The main objectives were to develop local services in order to modify the way Public Transport is used, especially at the intermodal junctions, and to change the overall image of Public Transport by providing new types of services, in addition to just transport, and improving the global level of quality.

Jean Jaurés is proving to be the busiest of all the underground networks because it is strategically located at the junction of two Toulouse and suburbs underground lines. This is why it was decided to revamp Jean Jaurès Metro station and to build a shopping centre in it.

Implementation

The measure was implemented as follows:

Tisséo-SMAT and the Pronometro Company carried out the preliminary study in 2005, then the underground building works that included the setting aside of sale areas at this station. At the same time, Tisséo defined the accompanying marketing campaign for the period 2007-2010 and chose the Promometro Company. In 2006, the shopping area was created and it opened on 30th June 2007. The shopping area was completed from 2007 to 2008.

Results

The results are presented under sub-headings, such as economy, transport and society.

- In terms of economy, the general generated monthly turnovers were €28,617 in July 2007, which corresponds to the opening of the shopping area, and €248,261 (+767%) in September 2008. The turnover trends clearly show that the shopping area in intermodal junctions is a new concept, at least in Toulouse, and people are gradually making use of it.

- In terms of transport and society, the transport ticket validation data provided by Tisséo Réseau Urbain and the counts made at the entrances and exits of the Jean Jaurès underground station have been used to calculate the number of people travelling through Jean Jaurés station. The surveys were held at the same time, from 4th to 9th February inclusive at 4 count points (the station entrances) in the morning (8 am. to 10 am.), at midday (11 am. to 2 pm.) and in the evening (4 pm. to 7 pm.). The flows in front of the shops thus represent only approximately 17% of the overall flows of travellers in Jean Jaurès underground station (line A and B) and, on average, 21,221 users per day pass in front of the shops in the shopping centre. Another study was carried out through 400 qualitative questionnaires from 12th May 2008 to 17th May 2008 in order to determine the attractiveness of the shopping area linked to the use of public transport. It turned out that almost 75% of interviewees live within Toulouse, 58.3% of surveyed people were women and employees and students represented the most surveyed, with 86.1% for both. Concerning the reasons for passing by, Jean Jaurés is a destination station, not a transit station, only 26% are changing underground lines and more

than 60% of interviewees take the metro at least once a day. 91.4% of those surveyed have already noticed the shops in the shopping centre. Only two shops in the shopping centre (Paul: bakery-sandwich bar and Monop: small grocery supermarket) were spontaneously mentioned by those surveyed for the question "have you ever heard of these shops?" The vast majority of people surveyed noticed the shops when going through the shopping centre in Jean Jaurès station. Among the users of the underground station, 51.3% are satisfied with the presence of the shopping area. Thus, it means that adaptation and/or readjustments need to be made in the context of the development/continuity of this shopping centre, so that it is suited to the clientele and so that the latter make better use of it.

Concerning the application of shopping areas to other multimodal nodes, the underground stations most often quoted relate to stations located in the city centre or in the interchange centres (P+R and regional trains). The relevance of applying this approach to other stations must take into account the following elements: location of the station in the public transport network and types of services/shops proposed. The development of other services/shopping areas in other intermodal hubs has nevertheless started.

Lessons learned and recommendations

The main barrier encountered is the delay of the measure. The first delay was in the construction of underground line B (planned in February 2007 and actually opened on 30th June 2007), and the second delay was in the opening of some shops. This was due to the fact that some of the shopkeepers were waiting until the station was able to generate enough passengers and possible customers to open their shop, especially Paul (bakery), which was waiting for the supermarket (MONOP') to open in order to create a sufficient pool of commercial services.

Two positive initiatives can be highlighted:

- A very particular success was the recruitment of a specialist marketing agency that helped the public transport authority to define and implement the services/shopping area and develop the innovative marketing concept, managing relations with shopkeepers..
- The implementation of the measure has benefited from the decision of the public transport authority and the public transport operator to implement the services/shopping area from the outset, when the first architect plans for the station were designed.

The concept would be of interest for other public transport operators, willing to use local commercial services as a tool to increase the overall attractiveness of public transport. Shopping centres should not be opened in public transport stations without taking into account the specific features of the transport area in question and the type of services/shops expected by the users. Moreover, local services and other ancillary services for public transport passengers can be a source of additional financing for public transport.

Measure 8.3: Improving Accessibility to Public transport services

Introduction

Accessibility is one of the key factors of success in the development of public transport policies. Tisséo SMTC aimed to develop an innovative charter that would standardise and improve the accessibility of its public transport services with a special focus on disabled persons.

Before CIVITAS- MOBILIS, Tisséo-SMTC, the public transport authority (58 bus lines and one underground line), had already improved the accessibility of persons with reduced mobility to public transport at the level of the Urban Public transport perimeter (95 towns and villages).

This improvement was obtained through three main initiatives:

- Creation of a dedicated transport service for persons with reduced mobility (MOBIBUS), based on a transport-on-demand concept.
- Ensure the accessibility of persons with reduced mobility (using lift and special ticketing control lines) at all underground stations.
- Procurement of low floor buses with special equipment for wheel chairs.

Accessibility was integrated into the technical requirements of bus fleet renewal and construction of the second underground line.

Objectives

With this measure, Tisséo aimed, during the MOBILIS project, to:

- assess the overall accessibility of the PT network (in relation with local associations) and propose a panel of measures to improve the accessibility to PT in line with the national legislation on "accessibility for disabled persons".
- establish a specific chart to define, in line with the PT quality scheme definition, concrete objectives (in term of vehicle accessibility, station access, modal change, dedicated services, etc.) to ensure high-level accessibility to persons with reduced mobility on the whole of the PT network.
- implement the recommendations of the reference at the reception points for users, which are not all fully accessible yet.

The expected results and targets of the measure were the creation of an accessibility chart at the whole PT network level and improvement of disabled person accessibility to transport, but also to information points.

Implementation

In February 2005, the national law about disabled persons came into force, requiring that all Public Transport Authorities ensure a 100% fully accessible network by 2015. The law has modified the initial objectives of the measures.

The two High Quality Bus Corridors, laid out between 2005 and 2007 as part of the CIVITAS MOBILIS project, have therefore integrated all necessary accessibility standards such that these newly created public transport infrastructures are "fully accessible". The "accessibility chart for High Quality bus corridors", drawn up from this experience, is now a national reference defining technical requirements for all new public transport infrastructure projects.

In September 2007, TISSÉO SMTC signed a contract with an engineering company, which conducted a review of the Tisséo public transport network and drew up an action plan for achieving the regulation's commitments: a fully accessible public transport network by 2015.

The political board of Tisséo voted in favour of validating the Accessibility Master Plan in January 2009, so actions for improving the accessibility conditions of the public transport network will start

according to the predefined calendar. These actions are divided into eight themes: passenger information, agent training, substitution services, listening, follow up and assessment, customer reception points, rolling-stock, and finally stops.

Before its validation of the Accessibility Master Plan but in relation with it, in December 2007, Tisséo:

- organised a training session allowing Public Transport Authority and Operator employees to assess the level of accessibility of the different infrastructures, services and premises.
- installed a new customer point in the Jean Jaurès underground station integrating all the accessibility standards. Each point, which is due to receive some customers (including disabled people), will now be built in such a way.
- started to adapt its website in order to make public transport timetables accessible to blind people (through HTLM language and decoder).

Results and lessons learned

At the end of the MOBILIS project, the results of this measure were difficult to quantify. That said, quantifiable targets such as the validation by the political board of Tisséo of the Accessibility Master Plan and its associated action plan, the Accessibility chart for High Quality bus corridors (HQBC) and training plan for accessibility of the customer at reception centres have been fully achieved. But both the accessibility of the Tisséo website and the standards compliance for customer reception centres were only partially achieved. A database for managing complaints was opened in parallel to assess, over time, results and agreed actions to make the Tisséo network accessible to everyone.

The level of network accessibility on a scale of 0 to 10 is estimated at 6 in 2008.

- Bus stop accessibility: 50% of bus stops are accessible.
- Accessible bus lines: 30%
- Accessible rolling stock: 55%
- Underground: 100% accessible

By 2015, all indicators must be at 100%.

During the MOBILIS project, this measure came up against two difficulties: the measure had, first, a low priority at public transport operator level and the works to perform in order to reach 100% accessible public transport network are very costly.

The legal obligation has been effective at forcing the public transport authority to consider accessibility as a priority. The strong commitment at the political level and good integration of different associations representing disabled public transport passengers have helped to define the necessary actions for reaching the legal targets.

After MOBILIS, actions of the Accessibility Master Plan will be implemented gradually. Accessibility of the public transport network is a crucial issue for many public transport users. A fully accessible public transport network is a very expensive goal and even if the public transport operator and authority are willing to achieve this, the overall costs are high. A strong political involvement will be needed to upgrade the public transport networks to meet accessibility standards requirements.

Measure 8.4: Transport on Demand as a complementary service to Public Transport

Introduction

The measure intended to develop and implement new flexible demand-responsive public transport services for low-density areas and low traffic periods, in connection to the most important intermodal (bus-underground) nodes.

The urban Public Transport perimeter of Toulouse, composed of 95 towns and villages around Toulouse, is very wide. On the peripheral areas, the average density is very low and originally, these areas were poorly served by the public transport services because they could not justify the operation of a regular bus line.

At the end of the nineties, the public transport authority, Tisséo, created a demand responsive service, which consists in ensuring a transport-on-demand service performed by a taxi for the same price as a PT journey. It is subcontracted service. This system was originally developed when public transport dashboards highlighted that, for several bus lines, there were fewer than 3 customers per hour in off-peak periods (former bus lines 51, 53, 55, 60 and 69), for three different areas (in the East and South part of the conurbation). It helps to reduce the operational costs of transport (reduction of bus frequency or elimination of a non efficient bus service) while ensuring high-quality transport in connection to the first underground terminus.

In 2002, following the extension of the urban PT Perimeter, Tisséo extended this type of service to a total of 14 dedicated areas. In 2004, there were only 5 transport-on-demand lines operating in the Toulouse conurbation, served by “taxi-bus” and/or special commercial vehicles. They were operating in a certain area where stops and timetables were installed and determined in advance. The customer had to call the chartered taxi company in order to tell them where s/he wanted to be picked up, where s/he wanted to go and at what time. Each transport-on-demand line had its own booking service and phone number.

Before CIVITAS, it appeared that these services needed to be fully integrated into the PT network offer in order to increase and standardise efficiency and to improve the connection with the main public transport network.

Objectives

The objectives of this measure were to propose an efficient transport/mobility solution for the whole conurbation level, including for the lowest density area of the urban transport perimeter by:

- extending the transport-on-demand services to other low-density areas,
- developing an innovative management tool for the reservation centre of the transport-on-demand service,
- defining a new organisation for managing the transport-on-demand service.

The expected results and targets were:

- to develop the demand-responsive offer at the level of the whole conurbation
- to improve the service quality of the reservation centre,

- to integrate the transport on demand solution into the offer and management of other PT and mobility services.

Implementaton

The measure has been implemented in four stages. Firstly, from December 2005 to December 2006, Tisséo identified the potential improvements of the existing transport-on-demand services. Secondly, in December 2006, Tisséo-SMTC contracted a company in charge of managing the whole central booking system for all transport-on-demand users; the booking must be made at last two hours before the trip. Then, in November 2007, Tisséo implemented, in the SICOVAL area, new transport-on-demand services connected to major public transport infrastructures (last underground stations and High Quality Bus Corridors. At the end of 2008, 18 transport-on-demand lines were in operation. Lastly, in February 2008, after the reorganisation of the bus network (linked to the opening of the Underground line B), Tisséo-SMTC launched a continuous assessment analysis of its subcontracted services (such as the transport-on-demand services) in order to improve and optimise them.

Results

The evaluation of the measure is mainly based on the results of a satisfaction survey, which was carried out in June 2008 on the transport-on-demand 106 line (considered to be a “standard” transport-on-demand line) with the support of the drivers.

The objective of this survey was to assess the customers’ satisfaction with the transport-on-demand services through its different aspects such as the new booking system, the transport offer, the journey or the transport-on-demand system as a whole. 300 questionnaires were collected and analysed.

To assess transport and environmental impacts, the RTD 106 service has been compared to a regular bus service in the same area (number of passengers and km covered). These results are presented below.

In terms of society, with the development of the transport-on-demand lines, 84 municipalities in the Toulouse conurbation are now served by public transport (vs 52 municipalities in 2004). The transport-on-demand 106 users really appreciate the service and this is particularly true for the new booking centre, journey safety and timing and the quality of the itineraries. Around 95% of people surveyed are globally satisfied with the line 106 transport-on-demand offer and quality, even if some would like a departure frequency increase at the Underground station (every 15 minutes instead of every 30 minutes as it is currently). 80% of the customers are satisfied with the new TAD booking

system but a lot of customers would like to be able to book the TAD only one hour in advance (instead of two hours as it is currently) and 21% of the customers consider that the waiting time on the telephone is too long. 64% of customers consider the transport-on-demand 106 line to be a local service; 87% of customers are satisfied with the journey and the itinerary quality of the transport-on-demand service; 95 % of customers consider that safety is ensured during the journey and appreciate the drivers' welcome; and arrival timetables were not met for only 12% of people surveyed.

In terms of transport, in 2008, there has been a continuous increase in its use: the average daily number of passengers using the transport-on-demand 106 line is 4 times higher than in 2004, increasing from 3 customers per journey in 2004 to 6.4 per journey in 2008.

When using 15-seater diesel vehicles for transport-on-demand instead of a regular bus, yearly gains in term of investment and maintenance costs, fuel consumption (around 115,000 litres of diesel saved per year) and environment (180 fewer tons of greenhouse effect equivalent CO2) are high (around €1.6 million/year).

Lessons learned and recommendations

The implementation of the measure came up against three main barriers:

- The wide daily and seasonal variation of passenger numbers requires the vehicle capacity to be adapted: 9 or 15 seats.
- The user's constraint of booking at last two hours before the journey.
- The lack of ticket checking in the transport-on-demand encourages customer fraud.

The main success factors of this measure were the commitment of the public transport authority to developing public transport use by serving less populated areas with frequent services that would not be provided by buses and by developing appropriate connections with the underground and bus stations, and the acceptable cost of the transport-on-demand for the local authority and the customer.

To set up this type of service, it is recommended to sign a quality-monitoring contract with the operator, both for the booking unit and for transport, to carry out a satisfaction survey every year to adjust the service to customer' expectations and, lastly, to plan for the replacement of transport-on-demand by a bus service in high use periods by school children for example.

Tisséo plans to assess how the current booking system could also be extended to car-sharing and car-pooling services in the future.

Measure 9.1: Promotion of car-pooling and integration with PT services in Toulouse

Introduction

One of the objectives of the Toulouse Urban Mobilty plan, approved in 2001, was to reduce the proportion of private cars, specifically at rush hour. In 2004, the inhabitants of the Toulouse conurbation made 3,635,000 trips a day, 64% of which by private car with, on average, 1.27 people per car. Carpooling was not a common practice, except through the implementation of some commuter mobility plans.

The public transport authority, TISSÉO, which is also responsible for implementing the urban movement plan, considered that developing carpooling as a complementary service to public transport would help to achieve this reduction in private vehicle traffic, particularly because 77% of commuter trips, which represent 63% of all mode journeys, are made by car.

In August 2003, some volunteers founded a car-pooling non-profit making (1901 French law) association called "COVOITUVAL" to develop carpooling in the south-east of Toulouse (SICOVAL area). They contacted people individually to introduce them to this service[14].

In November 2003, the public transport authority (TISSÉO) and another local authority (the south-east city syndicate -SICOVAL) became financial partners of the association. This enabled COVOITUVAL, at the beginning of 2004, to recruit one person (part-time) and invest in the development of sophisticated software to compose carpooler teams. The COVOITUVAL association had to report its activity results twice a year to their subsidy providers.

Objectives

To develop the car-pooling practice within the Toulouse conurbation, the partners aimed to:

- improve the efficiency and level of service of the existing car-pooling activity of the non-profit association,
- propose an integrated solution between public transport (PT) and car-pooling solutions,
- create, in the public authority structure, a dedicated service to manage and promote carpooling at the conurbation level as a complementary service to Public Transport[15].

The objective was to limit traffic congestion due to individual car trips in the conurbation (3,635,000 p/day in 2004) and its consequences on energy consumption and air pollution The quantitative target was to reach at least 1,000 registered car-poolers and the reduction of at least 1,000 individual daily car trips in MOBILIS time.

Implementation

To launch this measure, in mid 2005 TISSÉO asked for an exhaustive study of the COVOITUVAL activity to analyse the strong and weak points and put forward measures to develop carpooling at conurbation level. The study results, presented in September 2005, highlighted the need to reinforce the links between TISSÉO and COVOITUVAL and to develop the promotion of COVOITUVAL and its awareness activity by focusing on company managers and employees.

In September 2005, the south-east community (SICOVAL) and TISSÉO decided, with the support of the Midi Pyrenees Regional Council and ADEME, to create a "Mobility House" in the large business area located south-east of Toulouse, offering various services regarding public transport information and mobility advice.

[14] At first the car-pooling service included commuter and occasional trips at conurbation level.

[15] The integration of car-pooling services within the public transport network offer and ticketing system was initially considered as a key success factor for the enlargement of car-pooling habits. But, for operational and technical reasons, the idea of creating a dedicated PT contract for carpoolers has been dropped. Indeed, it was initially planned to manage its delivery in relation with the Park and rides (P&R) management, but due to the operational choice of managing P&R, its implementation has proved more complex to develop.

The COVOITUVAL staff integrated the “Mobility House” where they could run its activity. The COVOITUVAL website was linked to the SICOVAL one. This gave the COVOITUVAL activity quite an official status.

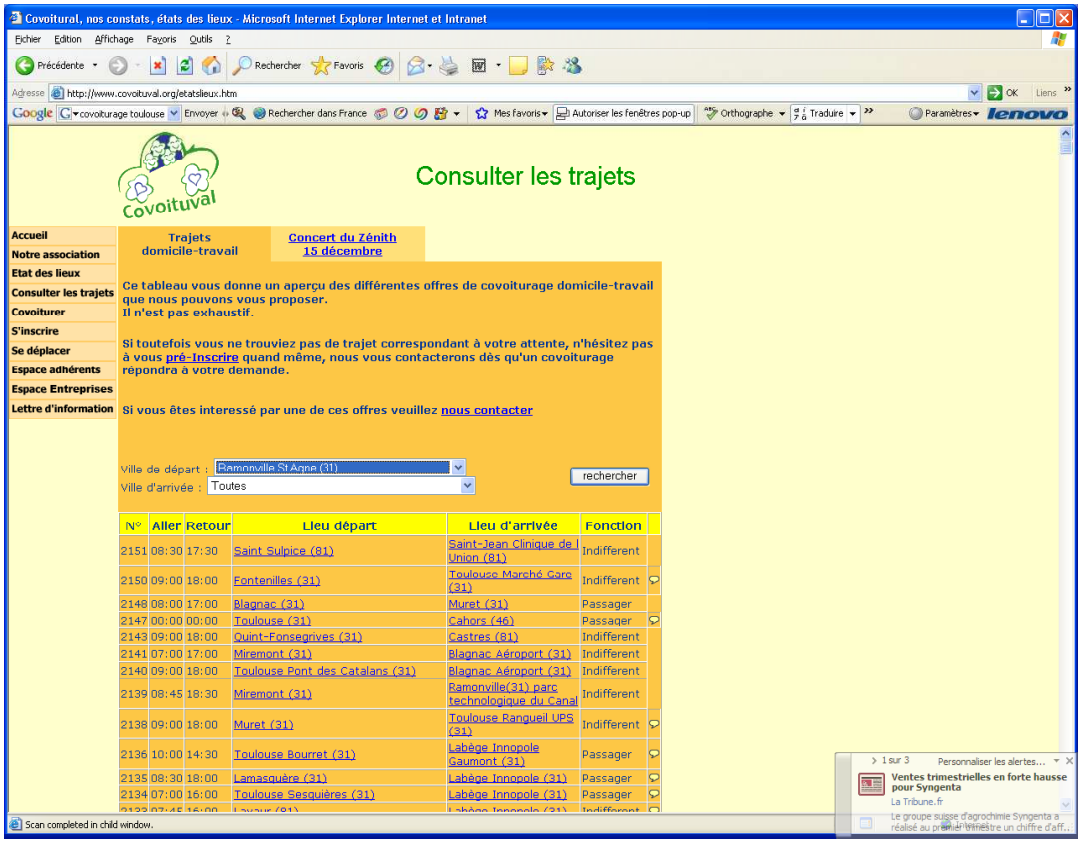


Figure 13: COVOITUVAL Internet site

The association then started to meet with the Labège Innopole company managers who at first feared that carpooling would create an alternative solution to public transport network extension and that those employees practising carpooling would become less flexible.

In March 2006, to reduce car-pooling barriers, COVOITUVAL established a “good behaviour” car-pooling chart, in which COVOITUVAL committed itself to:

- checking driver’s licences and insurance and getting the chart signed. The registered data are confidential.
- proposing carpooler partners, composing teams and monitoring the team evolution.
- ensuring a return trip: if the driver misses his original car trip, the association proposes a solution, such as another carpooler or bus, or even taxi, and bears the costs.

The Mobility House partners recruited a full-time mobility advisor who has created promotion tools (newsletter and carpooling guide), helping to distribute the car-pooling chart and “better mobility” information inside the companies located firstly in the south-east business area, then also in other ones. The companies welcomed this communication, specifically when they were implementing a commuter mobility plan, because car-pooling development is often the main initiative. In MOBILIS time, more than twenty companies have contracted with COVOITUVAL to set up and manage their carpooler volunteers’ database.

The initial objective of creating a dedicated service, in the public authority structure, to manage and promote carpooling at the conurbation level as a complementary service to PT, has evolved during the

MOBILIS time, due to the parallel study related to the setting-up of a mobility agency and customised services in Toulouse (§0 measure 11.3.T).

On 24th October 2007, the dedicated working group piloted by the Public transport authority of Toulouse, TISSÉO, chose the concept of a large mobility agency based in Toulouse that would offer global mobility services under the management of TISSÉO. The other local partners involved in the management of the local mobility agency of Labège are also members of TISSÉO's Board of Directors, and they agreed to integrate it as a local office of this central agency. TISSÉO allowed the COVOITUVAL association members, working at the local Mobility House, to integrate the car-pooling department of this new structure. This arrangement meant that the new structure could benefit from COVOITUVAL's past experience, reinforcing it at conurbation level and confirming carpooling as a complementary service to public transport.

The opening of this central mobility agency, first planned in June 2008, has been delayed after the local elections that took place in March 2008. The concept of a central mobility agency has recently evolved and several territorial mobility agencies are now planned, located at important interchanges. In January 2008, the local mobility agency and COVOITUVAL employees joined TISSÉO.

The evaluation of the measure has focused on the impacts of the COVOITUVAL association between 2005 and December 2007.

Results

The integration of the car-pooling service offered by the COVOITUVAL association within the more institutional framework of the local mobility agency, and the financial support of the local authorities, helped to promote and disseminate information about the car-pooling service. The awareness and marketing initiatives taken as regards companies prompted a swift increase in carpooling, and developed this practice at conurbation level and even wider. In December 2007, 38% of carpoolers were living outside of the city of Toulouse and SICOVAL area.

Between February 2005 and December 2007, the number of registered persons and of successfully connected people increased by approximately ten and seventeen respectively. A larger database of people registered for commuter journeys has made successful connections easier and COVOITUVAL registered carpoolers appreciate the potential number of carpoolers as well as the ease, efficiency and quality of the service provided.
In comparison to the business-as-usual scenario, between February 2005 and December 2007 around 4, 000 daily journeys were avoided. The number of avoided kilometres as passengers has increased more than the number of kilometres covered by drivers; so we may even suppose that, sometimes, more than two people travel in the same car.
People mostly practise carpooling for commuter journeys (80%) and before more than 80% of car-poolers were driving, and they are still doing so, primarily to go shopping. Finding a better car alternative than public transport is the main motivation for carpooling, although this service is yet to offer a real alternative for people without a car. Regular carpoolers help to continue promotion and networking initiatives in favour of carpooling.

The energy saving of 52,302,44 L eq. petrol between February 2005 and December 2007, due to the development of the car-pooling service, is around 1,000% higher than the results of the business-as-usual scenario. The environmental impact of the measure is a 340,000 kg eq. CO^2 saving for the same period.

Lessons learned and recommendations

Carpooling is a good solution for commuting, due to the economic geography of the conurbation of Toulouse, which has large business areas where road access is difficult at rush hour and where public transport is only partial. The simultaneous implementation of commuter mobility plans (measure 11.4) has fostered car-pooling development in different firms and therefore contracts between COVOITUVAL and companies.

The involvement of the association COVOITUVAL and its employees, partly volunteers who are highly motivated to develop carpooling, has been a strong impetus for the development of this measure. The financial and administrative support of the local authorities, specifically TISSÉO and SICOVAL, has prevented any unmet technical needs from limiting COVOITUVAL action.

Nevertheless, the development of carpooling is limited by variable working hours and by the dispersion of residential areas in comparison to work areas, which makes it difficult to connect registered persons and compose teams for carpooling.

The implementation of this measure highlighted that:

- car-pooling practice is adapted to the current difficulties encountered by people in reaching their workplace because of traffic, the lack of parking areas and a limited access to public transport networks;
- commuter mobility plans and parking policy in favour of carpooling are good support initiatives;
- the launching of a car-pooling service must be accompanied by the implementation of a dedicated management system and human advisor presence;
- Public awareness campaigns are compulsory, but one must also be dedicated to the car-pooling service target groups. Links on public transport and other local authorities' websites to the car-pooling service website are a good way to spread information.

Measure 9.2: Implementation of new car-sharing service linked to PT services in Toulouse

Introduction

Longer distances and travel times have contributed to widespread use of the private car, in particular within and around large urban areas. Carsharing is one of the alternatives to private car use in large cities. It involves setting up a fleet of vehicles that can be reserved for different lengths of time. This service enables users, most of whom live in the city, to obtain a vehicle on demand, without paying ownership costs and guide them to a more sustainable use of transport modes.

Carsharing has been encouraged in France since the late 1990s. In 1998, Wallgreen Company introduced in Toulouse their own experimental carsharing, by organising an initial test phase. This obtained interesting results, but the lack of promotion limited them and the test stopped. Before CIVITAS, carsharing was not yet in practice in Toulouse and, in MOBILIS, Toulouse partners wanted to carry out an experimental car-sharing service as a complementary mobility offer to analyse its potential and added value to the existing public transport offer. The measure leader was the public transport authority (Tisséo).

Objectives

The primary objectives of the measure were to analyse car-sharing success conditions and develop, at Toulouse conurbation level, a financial sustainable service meeting the users' expectations.

The expected targets of this measure were to demonstrate a car-sharing service composed of around 20 cars that will be used by 50 users per month and to integrate the car-sharing service in the mobility transport offer developed within the project.

Implementation

The implementation of the measure was planned in the following stages (working group defining the specifications of the call for tender for a marketing study and the definition of the car-sharing service specifications, then implementation of the car-sharing service).

Due to a lack of human resources in the measure leader structure, this measure was launched later than planned. The specifications of the call for tender were completed at the end of 2006 and the marketing and feasibility study were carried out between August and December 2008.

The study revealed a low awareness level among the public, but also among politicians and decision-makers: 80% of citizens who already have access to car-sharing services do not know what kind of service it is or confuse it with carpooling.

The financial analysis highlighted that carsharing only provides long-term benefits. Implementing a carsharing service demands high investment (€5,500 for each car-sharing station) and running costs too (€9,600 a year for each car + employees' costs[16] or management subcontracting ones). 80% of the running costs are fixed and 80% of takings are variable; the management of park development is crucial. The small balance between takings and running costs is achieved with around 45 vehicles and 1,500 subscribers. An experiment is structurally in deficit. In all cases, public financial support is compulsory to launch a car-sharing service.

24 scenarios were drawn up at conurbation level. For the basic one (15 vehicles at the end of the year, A0, available in city centre and 50 vehicles at the end of the year, A0+5), the global deficit after 5 years will reach €480,000, but the small balance should be reached after 5 years. A scenario with 50% of the car-sharing stations implemented out of the city centre (20 vehicles at the end of year A0 and 50 at the end of Year A0+1), the global deficit after 5 years should be €1.2 M.

The selected scenario aimed to implement 11 stations of 2 vehicles in the city centre and a progressive increase to reach a "small balance" in five years with 40 to 50 vehicles and 2,000 subscribers.

The public transport authority confirmed that it would support this scenario in January 2008.

In March 2008, the majority of the municipal council changed. The newly elected team wanted to organise large debates about mobility. The conclusions confirmed that citizens did want a carsharing service.

Meanwhile, a non-profit association had implemented its own car-sharing service called MOBILIB'. The founder had been a member of the dedicated working group.

The car-sharing scheme initially adopted had to evolve to integrate this initiative. Tisseo and the city of Toulouse have decided to participate in financing Mobilib'.

Finally, the MOBILIB' service was launched in March 2009, with 11 vehicles displayed at 6 stations in the city. The business plan is to reach a "small balance" in 3 years, while increasing the fleet of vehicles to 20 next year and 35 in three years.

Results

Due to the implementation of the measure, no impacts have been assessed, but the results of the marketing study have increased knowledge in car-sharing services, although they do not correspond to real values measured from the MOBILIS measure.

[16] Six employees is the usual rate for 45 vehicles

Lessons learned and recommendations

Changing mentality and practice helps to develop awareness of carsharing and some initiatives may appear out of the official framework. Nevertheless, the involvement of several different stakeholders (local political bodies, public transport operators, associations, private companies, etc) introduces a lot of complexity.

The development of carsharing requires four conditions: a high density of population, a relevant and complete offer of public transport, a parking management policy introducing constraints for private cars and financial support, at least initially.

The lack of legislation about carsharing does not facilitate the financial involvement of public transport authorities in its development.

There are three main recommendations.

- Integrated political management of mobility must support carsharing and consider it as complementary to public transport and other transport modes.
- To be cost-effective, the car-sharing service needs to propose a relevant and complete offer, and thus to be available in many stations covering a complete and dense enough network of the area in question.
- Extended communication initiatives, especially targeting the public, are crucial to promote the car-sharing service. The economic aspect is one of the most important levers to convince people to turn to carsharing, and thus, to gradually change population behaviour about mobility.

Measure 10.1: Clean urban logistics and goods distribution platform in Toulouse

Introduction

In 2005, improving freight delivery right in the city centre was a critical issue for the municipality of Toulouse, which was involved in a project to enlarge pedestrian zones in the very centre.

Daily traffic in Toulouse city centre was exceeding 10,000 veh/day; it had increased by around 3% in one year on the main access routes to the very centre of the city. Car drivers were highly intolerant of the traffic congestion due to the freight delivery operations. A municipal freight delivery regulation existed, but it was quite complex, depending on the sectors in the very centre and the access routes, and did not meet shopkeeper needs. As a result, the regulation was not complied with for around half of the deliveries in the very centre.

Objectives

The measure had two objectives:

- to improve transport and freight delivery in the very centre of Toulouse by implementing a new freight regulation,
- to prepare for the development of a logistics platform at conurbation level: an urban delivery centre (UDC) through the implementation and evaluation of a new protocol delivery system led by Chronopost , a mail and parcel delivery company.

Implementation

To implement the measure, the Toulouse department of transport first studied the freight delivery regulation in other cities and the first experiments of an urban delivery centre at European level, analysed the positive features and constraints and drew up recommendations for developing and implementing the measure in Toulouse.

In January 2006, the steering group composed of representatives of the municipality and of the regional trade council presented the urban delivery centre concept to the different road haulers and discussed the proposals for a new freight delivery regulation in favour of small and clean vehicles. The small road hauler companies were opposed to the creation of an common urban delivery centre located in the suburb; they thought that this structure would favour big carrier companies too much. They accepted the idea of renewing the delivery regulation, but only in agreement with shopkeepers.

Between January and March 2006, the city representatives defined, with shopkeepers and the road haulers, the new freight delivery regulation and the location of dedicated delivery areas in the very centre of the city. The new regulation is described in the Table below:

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

The city, road haulers and shopkeepers also signed a delivery chart laying down the good delivery practices and presenting an information channel between the stakeholders.

Since May 2006, the municipality has implemented the new regulation and the associated quality chart about freight deliveries in the city centre. It has also created video-controlled delivery areas according to the decisions validated by the city municipality services and the stakeholders. The road haulers and shopkeepers using clean vehicles have received specific stickers offering them priority to enter and park in the very centre of the city.

The steering group went on working from 2006 to 2007 on the creation of an urban delivery centre and the organisation of freight delivery between the UDC and the city centre with clean vehicles, the purchase of which would have been paid for by the city of Toulouse and ADEME. The city of Toulouse abandoned the project of UDC creation in June 2007, due to the opposition of many road haulers, and produced a process evaluation report analysing the failure of the project, more clearly identifying the barriers and giving recommendations on how this could be overcome in the future.

In parallel, in 2005, Chronopost, which provides express delivery of letters and parcels, wanted to present itself as an environmentally friendly company. It thus modified its delivery organisation, previously ensured by 6 diesel lorries, between its logistics platform located close to the airport and the six areas of the very centre. The city council was interested in this trial and its evaluation to prove to other road haulers 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. The city of Toulouse made professional premises in the city centre available to Chronopost. Using them as a micro delivery

platform, Chronopost has initiated morning rounds to the six central areas by three electrical commercial vehicles, one CNG commercial vehicle and two Chronocity that are electrically self-propelled, moved by a walking deliveryman. A CNG commercial vehicle does one more round, if necessary, for large parcels. Only the three electrical vehicles and the CNG one are used for the afternoon rounds. The parcel collection is unchanged. One diesel lorry and one natural gas medium one transport the mail and parcels from the airport platform to the city destinations.

Figure 14: Delivery with the Chronocity vehicle

Results

The main results of the different parts of this measure are as follows:

1. The new delivery regulation implemented with the agreement of road haulers and shopkeepers:
    a. It has limited the tonnage for goods delivery lorries and the delivery duration during the day in the very centre.
    b. Discussions between the city, the carriers' and the shopkeepers' representative have led to a freight delivery quality chart being drawn up, involving the different partners, to define and implement controlled freight delivery areas. Moreover, the new parking management regulation and the public space redesign of the city centre helped to free up delivery parking area access.
    c. The shopkeepers have accepted the slight constraints this new regulation has created well.
2. The multicriteria analysis of the implementation of the Chronopost mail delivery platform in the Toulouse city centre is advantageous on all fronts: environmental, economic and social.
    a. The economic assessment is satisfactory as the cost of the new organisation is quite similar to the previous one.
    b. The very positive environmental assessment results in a decrease of 58% of CO2 emissions, representing a saving of 15 tons/year.
    c. The new delivery organisation is relatively transparent for Chronopost customers, who seem to appreciate environmental protection action connected to the use of clean vehicles.
    d. The deliverymen really appreciate the clean vehicles and the work organisation from the new platform in the city centre.
3. Despite its failure, the urban delivery centre project has made it possible to initiate, for the first time at Toulouse level, a consultation between road haulers and the city representatives with a global approach to freight delivery in the city centre and dissemination towards professionals in favour of clean vehicles.

Lessons learned and recommendations

The urban delivery centre is the only part of the measure that came up against barriers. It proved impossible to federate all the freight road haulers as envisaged, because competition is tough in this sector, with every road hauler fighting for its market share and there is therefore little confidence between the different stakeholders. The legal and financial constraints of the envisaged urban freight centre proved to be too complex. Furthermore, the city of Toulouse did not gain access to information on the cost structure of the different freight operators, as this was considered to be sensitive market information. Moreover, the initially planned incentives did not attract most of them, as they are actually located fairly close to the city centre (less than 10 km). The expected cost savings therefore proved insufficient to attract them to a new Urban Freight Centre. The stakeholders were strongly opposed to a new carrier turning up, willing to manage the urban freight centre.

However, Chronopost's commitment to undertake environmentally friendly initiatives has led to a change in its delivery organisation. The support brought by the city of Toulouse to create the Chronopost platform in the city centre, where commercial property is quite rare, has been a highly positive feature.

Finally, the consultation and dialogue between the local authorities and the stakeholders (road haulers and shopkeepers) enabled the implementation of the new delivery regulation and the establishment of the delivery quality chart, ensuring partnership at least in the medium term.

Before creating 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 mindset. This might take a certain time before the effects are visible.
- develop cooperation with the final recipients (shop owners) or the goods manufacturers to create a demand for grouped freight deliveries, which will force the competing carriers to cooperate.

The freight delivery sector is subject to a high competition level and small margins. This context makes it difficult to build up a relation of trust and carry out a joint project with carriers. The development of an urban freight centre can only be the result of a long process of problem assessment, recognition by the stakeholders, public awareness and willingness to cooperate and improve the situation. The city's support of private companies motivated by environmentally friendly experiments creates an example that may encourage other companies to undertake similar changes.

Measure 11.1: Awareness raising campaign for changing mobility behaviour

Introduction

Potential public transport users sometimes have specific mobility needs which are not fully identified by public authorities, but could easily, at least partly, be fulfilled by existing public transport services.

The different public transport stakeholders have developed an individualised marketing process, through the deployment of a users' panel, and launched awareness campaigns to promote the use of public transport as a sustainable mobility option. By giving public transport an attractive image, Tisséo aimed to change citizens' mobility behaviour.

Objectives

The measure objective was to develop an individualised marketing approach to promote use of public transport.

With the renewal of the ticketing system and the development of new heavy public transport infrastructures (underground, high quality corridors, etc.), this marketing action aimed to modify final users' behaviour by promoting the benefits of public transport use and an attractive complementary service offer.

Implementation

The reshaping of the public transport network, the installation of the new ticketing system and the opening of the 2nd underground line scheduled for June/July 2007 highlighted the fact that this measure would be more successful if it were launched after these modifications had been made.

Regarding the required competences in marketing analysis, Tisséo decided to employ a specialised consultant who had already worked on the marketing analysis of the new ticketing system (measure 7.1 T). The campaign has been developed in different phases:

- definition of the strategic axis and of the detailed action plan in September-October 2007;
- establishment of the users' panel (1,000 people) in October-November 2007 (at the same time as the enquiries that had been conducted within measure 7.1.T);
- 3 'global' communication campaigns focused on a dedicated topic, linked to the PT and new contactless card promotions. They took place during three distinct periods in 2008 (winter – spring – summer);
- three meetings with the panel focusing on themes identified in the strategic axis definition and each topic of the 'global' communication campaigns. Three meetings on four main themes with the panel took place during three distinct periods in 2008 (winter – spring – summer). The themes were: tariffs, information and advertising strategies, partnership with other PT operators and back-office services.
- summary of the individualised marketing report in October 2008.

Results

This measure has no quantifiable results in terms of transport, energy and environment.

Nevertheless the transport public operator has acquired better knowledge of users' needs and expectations regarding tariffs, information and services.

The panel enquiry has also provided results regarding public transport image, satisfaction level and promotion campaigns.

Tisséo will take these results in account to develop further commercial strategy and provide new services. It will only be possible to assess the impacts of this new strategy after MOBILIS time.

Lessons learned and recommendations

This type of measure has highlighted that it creates a useful and appreciated link with passengers and generates effective exchange with 3 to 4% of the panels. Emailing is not a reluctant communication support for non-users, quite the opposite, it is fairly well accepted.

Continuous measurements and analysis of the opinions of a panel of users is an efficient strategy to:

- Find out more about transport users' practices and identify their needs and thus adapt further projects to their expectations,
- Follow the changes in their satisfaction level,

- Assess the impacts of communication and promotion campaigns.

The development of an ambitious marketing approach integrating individualised and relational marketing requires a global process. Common action with other sustainable mobility managers could benefit all sustainable transport modes.

Such a measure requires the close involvement of the commercial and communication departments of the PT operator and other stakeholders.

Measure 11.2: Promotion of bicycle use and integration with PT services in Toulouse

Introduction

In the light of two key surveys (Household Surveys) performed in 1990 and 1996, which showed that the cycling modal share was around 4% at the conurbation level, Toulouse partners aimed to develop and promote cycling through the MOBILIS project.

Since 1990, to prevent the decrease of cycle use, the City of Toulouse had implemented a global plan in order to promote bicycle use in the urban area. This plan was a consequence of the observation that use of this transport mode was decreasing, as at the same time the use of private cars was increasing. Between 1990 and 1996, the conurbation authorities built or improved the bicycle network and extended it in 1997 and 1998. They drew up a new framework to plan the infrastructure building for the period 1998 to 2005, based on the results of the cyclists' and the cycle infrastructures' needs identified by the study conducted as part of the European CENTAUR project (THERMIE programme) from 1997 to 1999.

With the study results indicating that 25% of the cyclists questioned took a variety of transport means: train, underground or use of parking sites for cycles, in September 2003, Tisséo-smtc decided to set up a cycle rental - guard service located at the Matabiau bus station. In March 2004, the city of Toulouse opened the Capitol cycle-rental station for which Tisséo-SMTC signed an agreement of interoperability with mutual tariff recognition and supplied 200 cycles.

At conurbation level, the cycling competencies are shared between different authorities that were conscious that to develop cycling, as a full-worthy transportation mode able to fulfil daily mobility needs, it was compulsory to offer dedicated infrastructures, equipment and bicycle renting services.

Objectives

The objective of the measure was initially only to promote bicycle use by defining strategic cycling policies to develop in the next few years, focusing on the complementary features between bicycle and public transport services.

At the end of 2006, the city decided to implement a bicycle renting service. This action has been integrated as sub-measure.

Implementation

The measure leader created a cycling technical working group, uniting representatives of each authority with bicycle competences. From April 2005 to September 2007, this working group updated quantitative and qualitative knowledge about bicycle practice and current bicycle use as seen by the cyclists: their wishes, the barriers and limits of bicycle use: major problems, real and subjective ones (e.g. security, theft, etc.). To estimate the quantitative and qualitative changes in bicycle use and conditions and the cyclists' needs, a survey was carried out in 2006, mostly among cyclists and by

putting the questionnaire on the intranet site of the city hall of Toulouse. The results of this survey have been compared with those already collected during a previous similar survey, carried out in 1998.

This state-of-the-art analysis was the first step towards developing the necessary actions on the part of the authorities.

The project partners decided to extend the initial working group to other local structures involved in the development of cycling in order to improve knowledge with other approaches and to work on six strategic policies: the definition of a cycling lane development scheme, a cycle parking development scheme and a cycle marking out development scheme, the implementation of a cycling network monitoring system, the creation of a cycling observatory to monitor bicycle use trends, the development of communication through pragmatic demonstration initiatives and the development of inter modality solutions.

The main achievement within this part of the measure is the production of the “how to promote cycling” guide, for which several issues like developing infrastructure for cyclists, improving signs, facilitating services and improving communication are being addressed. This guide is now considered in the revision of the urban Mobility Plan (PDU) to draw up a coherent action plan at conurbation level.


CIVITAS TOULOUSE

Projet MOBILIS – Mesure 11.2
Développement de l'usage du vélo dans l'agglomération toulousaine

document de travail

GUIDE PRATIQUE A L'ATTENTION DES COLLECTIVITES SOUHAITANT METTRE EN ŒUVRE UNE POLITIQUE CYCLABLE

Plan d'actions stratégique pour la promotion de l'usage du Vélo

At the end of 2006, the city launched a call for tenders to open bicycle rental stations, placed at the entrances of the underground stations and large bus interchanges, at the same time as the opening of the second underground line in June 2007 in order to promote intermodality between public transport and bicycle use. These new services and their expected outcomes were considered when defining the future strategic policies. The procedure cancellation at the end of January 2007 delayed the implementation of these services.

After a new call, the city selected the company JC Decaux to install the "Vélô-Toulouse" system, available at the beginning from 6am to 1am for bicycle renting and 24h/24 for bicycle return. Since January 2009, bicycle renting is also available 24h/24. The financial terms of the 15-year contract cover the investment and maintenance services of the Vélo-Toulouse system.

On the official website (**http://www.velo.toulouse.fr/**), Internet users can find information on how to use these bicycles, where the stations are situated and safety advice. The first thirty minutes of use are free of charge for each user. For one day (€1) or one week use (€5), the renters can pay at the vending

machine of the velo-station; for longer rental durations, two subscribing options are available online (€10 for one month or €25 for one year).

The first 60 stations, equipped with 600 bicycles, opened on 16th November 2007 in the very centre. By the end of 2008, 253 stations (2,400 bicycles) had been implemented, 200 to 300 metres from each other.

Results

1. Definition of cycling policy at conurbation level

Most of this sub- measure's impacts cannot be assessed during the project; they will only be measurable in few years.

Nevertheless, this measure allowed the local actors involved in the promotion of the urban cycling, firstly to update the knowledge on the "cycle landscape" at Toulouse conurbation level (2006 State-of-the-Art of bicycle use) and elaborate a "guide for cities wishing to implement a cycling policy-Strategic action plan to promote cycle use". This practical guide will be now considered in the revision of the Urban Mobility Plan (PDU), which is under progress and help to develop coherent bicycle policy at conurbation level.
The extension of the cycle route network by around 70% at conurbation level, the new secured cycle racks, which opened for use at the end of December 2008, at underground stations and the implementation of the new bicycle rental system can already be seen as positive outcomes of the common work of the cycling working group.
The cyclists' numbers have already increased at weekend in the city centre, where the pubic space has been resigned in favour of "soft transport modes". The number of accidents/km involving cyclists had fallen since 2004.

2. bicycle rental services

The implementation of the new bicycle rental service is a success
By the end of 2006, TISSÉO and Toulouse municipality had rented 63,000 bicycles in the year. By December 2008, since the opening of the Vélo-Toulouse service in November 2007, around 2,714,00 bicycles had been rented, 11,460 subscribers had registered, 614,000 daily and week cards had been sold, around 3,800 cycle rentals had been registered daily on average and each bicycle had been rented 2,4 times a day. The number of cycle renters has tripled in one year
The majority of users are long-term subscribers and the survey carried out by JC Decaux highlighted that men represent two thirds of long-term subscribers. Most users are between 26 and 35 years old (36%), 22% 18-25 years old, and 22% 36-45 years old. 60% of rentals take place between 12pm and 8pm. The implementation of the Vélo-Toulouse system created 42 new jobs.
Due to the 253 automatic rental stations, bicycle has become more visible, firstly in the city centre and secondly at city level.

Lessons learned and recommendations

Despite the successful implementation of this measure, the complexity of the new ticketing technology for public transport delayed the integration of the bicycle parking charge into the public transport ticketing system and the opening of the secure bicycle racks. The implementation of the automatic rental system has met no specific barriers.

The widespread political support in favour of bicycle use and the organisation of a European project obviously motivated the different participants to participate and work actively and efficiently. This measure contributed to establish an actors' network willing to act in favour of cycle promotion and use in urban zones. The coordination between the different authorities sharing cycling competencies helped to establish coordinated actions;

Traffic congestion and a lack of car park in the city centre and citizens' increasing environmental conscious has developed a favourable context to develop cycling use in large cities.

Bicycle use undoubtedly depends on a multitude of factors such as the offer and quality of public transport, the car traffic and car park conditions and the constraints of each person.
To develop cycling policy and promote cycling use, it is essential to create a cycling working group involving all appropriate stakeholders, identify users' needs and expectations as clearly as possible, develop integrated strategic bicycle promotion with the cycling working group (including marketing, infrastructure and "software") dealing with all these factors and finally draw up a list of priorities for implementing the actions within the strategic policy.
The cycling technical working group should meet regularly on major projects such as the definition or revision of the cycling network development scheme, the implementation of communication strategy and the development of an inter-community investment project about bicycles.

The implementation of automatic rental stations must be adapted to citizens' needs and urban structure. Its setting-up needs place; the resign of city centre space offers a good opportunity to implement this type of service. The system must be easy to use and largely available, if possible during 24th /24hours.
An important promotion of this service must be led, at the beginning at least, to integrate it into the chain of transport.

Measure 11.3: Set-up of a mobility agency and customised services in Toulouse

Introduction

Within Toulouse, the mobility policy of the local authorities seeks to promote real alternative transport modes to the private car, especially for commuters whose car use reached 77% in 2004 against a mere 7% for public transport. This policy intends to reduce traffic congestion, which had increased by 30% between 1996 and 2004, as well as energy consumption and related pollutant emissions.

The public Transport Authority (TISSÉO) in Toulouse had noticed that the lack of appropriate travel information constituted a barrier for the use of public transport. As a result, to better serve their customers and, more generally, increase use of the public transport network and alternative mobility solutions to the private car in Toulouse, it planned to develop a website and create a new central place, a "mobility agency", dedicated to mobility.

Objectives

The creation of this mobility agency intended to:

- offer to final users easily accessible mobility information and advice about existing public transport solutions in order to increase their use at conurbation level;
- Integrate other mobility services (carpooling – transport on demand – bicycle rental,) in order to propose a panel of adapted modal solutions to car use;
- Promote new mobility behaviour at the individual level and at the collective level (in relation to a commuter plan for instance).

The objectives of this measure were ambitious, specifically because:

- it first of all needed the appropriate legal organisation, which would enable this kind of integrated information and advice to be delivered,

- the general public transport context was changing, in MOBILIS time, due to the construction of the second underground line, which opened in June 2007, and the bus network reorganisation that was planned to accompany it.

Implementation

The measure was implemented in different steps.

First, the SICOVAL, a local syndicate of towns located in the South-East area of Toulouse, decided to open a local "Mobility House" in its main activity and shopping area (600 firms with altogether around 13,000 employees, one very large shopping centre). It must be noted that SICOVAL is a partner of the local Transport authority. SICOVAL decided to involve a local association of carpoolers in running the activity. The Transport Authority, TISSÉO, provided a financial and functional partnership.

The "Mobility House" opened in September 2005, offering different kinds of services. These are mainly information and advice about public transport, cycling, walking and carpooling, as well as bicycle rental and public transport travel ticket sale. The target groups were initially individuals, companies' employees. Communication was based on debates, meetings, and public information stands, together with the creation of an appropriate and dedicated website linked to the SICOVAL one.

Figure 15: the local mobility agency in Labège

Firm managers were then included as a target group as a next step. The "Mobility House" employees organised mobility awareness workshops in firms and helped firm managers to implement some of their commuter plan actions like carpooling. The local mobility produced twice-yearly activity and yearly financial assessments that were communicated to their partners. The public transport authority (TISSÉO) kept a close eye on the development of this local Mobility House, which was considered a local concept test.

Results

The local mobility agency activity impacts were evaluated in June 2008. The evaluation highlighted that:

- The mobility information service met a real need of the public. Since the Mobility House opened, visitor numbers have been increased threefold. The local Mobility House receives around 200 visits a month. Requested information mainly concerns what public transport is available and available public transport connections (33%), then cycling 31% and carpooling (19%).

The website, with around 800 visits a month in 2008 (an increase of 220% in two years), is a good way of disseminating information and directing the public to the Mobility House. Links to it from other transport websites should have been favourable, however.

- Bicycle rentals increased by 80% between 2007 and 2008 – the Mobility House rents the equivalent of 164 "bicycle days" per month. It offers a complementary mode to PT transport

- ticket sales are a useful, but anecdotal activity

- People using public transport are more aware of the mobility agency's existence and it therefore appeals more useful to them. Most people (over 80%) deem the principle of a mobility agency and the services it provides useful.

- 30% of the interviewed people from the different samples, who drive at present, are willing to change their transport mode; obstacles to change are mainly the infrequent services and total journey duration of public transport.

It has not been possible to assess the impacts of the communication initiatives through public meetings or at company level. The mobility club sessions, held in the Mobility House, became monthly a year after they started and average audience levels slightly exceeded the theoretical maximum audience allowed (15 people). They seem to have aroused interest, but the physical limits of the venue introduces a bias in the possible impact evaluation.

Lessons learned and recommendations

The SICOVAL structure and TISSÉO financial involvement helped to develop the local mobility agency activity. The SICOVAL website was a good way to publicise the local mobility agency.

The need to wait for the new underground line to open and the new bus network to be reorganised, which absorbed a considerable amount of resources, introduced a delay in setting up the central mobility agency.

At the beginning of 2008, TISSÉO decided to create a website, a call centre and a central mobility agency, with local agencies like the first one in Labège that, which was integrated into the TISSÉO structure in 2008. These defined the optimised location of the main mobility agency, the employee profile, and the business plan, which specified the different services to offer to the two main targets, individual people and companies. TISSÉO recruited the Mobility House manager. It was due to open in June 2008.

In March 2008, the local elections introduced political changes at city and public transport authority levels. From April until the end of June 2008, the city council set up a participatory debate about mobility in Toulouse. The population of the whole urban area of Toulouse was invited to give their opinion. Implementation of the mobility agency went on standby. The existing business plan has not been validated and the studies have been started again.

The public transport authority (TISSÉO) was convinced of the need to provide better information to final PT customers. This was the driving force, yet it did not help to move the measure on, as previously described.

Measure 11.4: Commuter and administration mobility plans in Toulouse

Introduction

In 2004, the conurbation of Toulouse counted around 300 000 employees in the private sector. Only 16% of active people worked in their residential area and 17 % of the daily journeys in the conurbation (533 630 among 3 635 000) are commuter journeys; this type of journey represents 63% of all mode journeys during the morning peak hour. 77% of them are made with cars, 7% with public transports, 7% by walking and 3% by cycling. The traffic on the ring roads between 2001 and 2005 had increased by 12,6%.

The main activity areas are located in the north west, around the airport and Airbus industry, and in the southwest area. Each employee covers daily an average distance of around 15 km between home and work places. These journeys lead to a traffic demand concentrated on 3 time bands and create a commuting traffic.

The French regulation regarding Urban Mobility Plan establishment obliges the transport public authority of Toulouse conurbation (TISSÉO) to encourage and support companies to draw up commuter plans. Commuters and Administration Mobility Plans are considered as dedicated “micro-“mobility schemes, which aim to improve company stakeholder mobility within their respective activity zones. To draw them up, companies have to know their employee, but also visitors’ and stakeholders’ journeys and analyse their needs. They establish action plan, in particular, to develop alternative transport modes to private car for their employees. Actions mainly concern improvement or development of company accessibility, dedicated PT services and infrastructures and /or complementary transport services. Before MOBILIS, ten companies had already drawn up commuter plans on the basis of a methodology developed by CERTU and ADEME and some public administrations had already started to develop and implement an Administration mobility plan (Commuter plan for public administrations): local State administrative headquarters (Cité Administrative), City of Toulouse and the Public Transport Authority TISSÉO.

Objectives

The measure had two components, that will be called firstly "Commuter plans» and secondly "Administration mobility plan”. For each of them, the objectives were the following:

1. "Commuter plans”: to develop and assess four commuter plans with major companies in the Northwest of the agglomeration (Airbus - Airport Area) and the South-East (Canceropôle - Labège Innopole). That included the development of dedicated PT services and infrastructure in connection to the Airbus factory and the Airport, an improvement of accessibility for all modes (including freight delivering), the development of complementary services (for bicycles users and freight delivering).
2. Administration mobility plan”: to build, implement and evaluate a Mobility Plan for all the employees of Blagnac City.

Implementation

1. Commuter plans

In 2004, Tisséo observed that underground and high frequency buses served only 33 % of work places and that 22% of them are not served by public urban transport

Within MOBILIS project, the public transport authority has firstly assessed its methodology in order to improve it before applying it to new commuter plans. It has evaluated the overall results of the Commuter Plans established before the project, specifically in the two main business areas. The methodology included carrying out enquiries to identify employee commuter housing areas, transportation mean used and expectations, the definition of transport models allowing to calculate benefits offered by available transport options, the evaluation highlighted further possible improvements of the commuter plans already implemented and transferability conditions for the development and implementation of new plans.

The main lesson learned was that mobility should be included as soon as possible in urban planning process of new industrial or business areas, so that employee can easily reach work places by alternative transport modes to car.

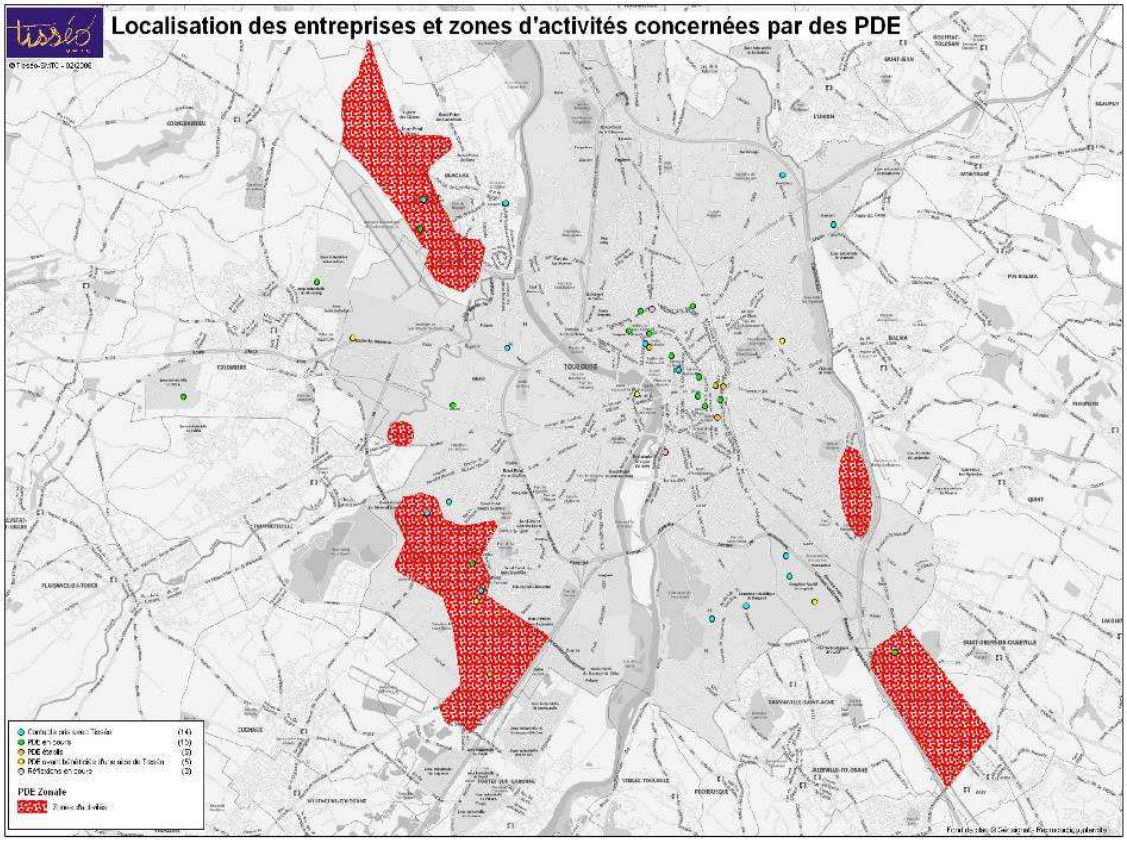


Figure 16: Business areas concerned by commuter plans in Toulouse conurbation

In the end, the public transport authority has contributed also to develop three sector commuter plans in business areas and different company commuter plans, among which two in these main business areas.

- sector commuter plan in Labége area and implementation of the associated action plan (from 2005 to now).
- sector commuter plan in Blagnac business park area and implementation of the associated action plan (from 2006 to now).
- preparatory studies about commuter plan in Cancéropole area and development of a commuter plan in the south west business area (from 2006 to now).

The PT Authority has also developed an educational toolkit that will be distributed to 1000 companies in the Toulouse conurbation to promote the Commuter Plan concept.

2. Administration mobility plan

An engineering department carried out a study / survey on the mobility behaviours of the employees of the City of Blagnac, and proposed to the politicians an action plan.

They validated the following actions: implementation of secured bicycle parking, department property bicycles, carpooling management, financial participation to PT subscription and appointment of someone dedicated to the implementation of the Administration plan within the Municipality of Blagnac, and asked for a technical and financial examination of the adopted recommendations before their implementation.

They rejected the proposal of car sharing pool creation and of picking up the employee with city buses

The implementation of the administration mobility plan has been seriously delayed and no evaluation result is available.

Results

The measure implementation revealed that:59% of the firms where commuter mobility plans have been implemented are private companies, 41% are public actors. The big companies (>250 employees) represent 88% of the commuter plan managers. Globally, the firms involve in commuter plan for environmental, social and economical reasons. Only 12% of the firms have not perpetuated their commuter plan. The appointment of a dedicated project manager to implement, follow and produce regular evaluations maintains the interest and the efficiency of a commuter plan. The necessary time between the decision to develop a commuter plan and its implementation varies on average between four months and one year.

The development and implementation of sector commuter plans introduce consistent actions at sector level, including smaller firm departments that would not develop their own commuter plans and should so create scale savings.

The assessment of the economical impacts of a commuter plan is quite difficult because it requires asking precise account data to private companies that are not always willing to give them and some data are not available. The assessment of already implemented commuter mobility plans highlighted that the modal share of private car use had decreased on average by 3% per year, in favour of cycling and public transport use; the decrease is higher for companies located in city centre. In terms of energy, we can only estimate that this measure has caused a global energy consumption decrease. About environment, the implementation of each commuter plan is slightly reducing the air pollution at conurbation level.

The evaluation, when it intervenes (only 47% of the commuter plans) creates a new dynamic around the objective adjustment and renews the partner interest.

Lessons learned and recommendations

This measure met the following barriers:

- The local election context has delayed the administrative mobility plan implementation.

- The complex legal status and management of the university land property has prevented the validation and implementation of a commuter plan. The University mobility plan is taking a new start out of the MOBILIS project time.
- The companies often communicate their development and settlement strategies late to the public authority. This one is not always able to develop appropriate solutions as wished by the companies because the rhythm of decisions and the necessary time for investment realization is different between local authorities and private companies.

The drivers were the following.

- The methodology developed by Tisséo revealed itself to be very efficient.
- The companies concerned by the measure were important ones with big strategic interests for most of them. They were really motivated to develop and implement commuter mobility plan. The employee representatives have précised their needs, contributed to the action definition and implementation. They often have a keen interest for the subject. The creation of a project referent and a good support of the company create favourable conditions to develop and implement a commuter plan
- The integration of the public transport and other local authorities involved in the workgroups at company or sector level have contributed to build proposal of actions and to implement coordinated actions, external to the company. The financial contribution of the company to the public transport subscription of the employees is motivating.

The development and implementation of a commuter plan is a federative project that involves company managers, employees and the local authorities that try to integrate the needs and constraints of each partner for better environment context.

The implementation of a commuter mobility plan present benefits for the different partners:

- For the company: integration in an environmental policy, money saving, improvement of the employee work context and of the visitor and partner reception
- For the employees: better transport mode offer, improvement of the quality of life and money saving.
- For the conurbation: reduction of the traffic congestion and air pollution

Nevertheless, it is difficult to develop actions integrating most constrains linked to the urban spreading and therefore to the residential spreading of the employees, but also to work schedule or work constrains of some employee categories.

Four main recommendations may be given to cities interested to develop mobility plans:

- An unfavourable urban and public transport context is a constraint to the implementation success of commuter mobility plans.
- When it is possible, the development and implementation of sector plans upstream from commuter plan development at company level allow the partners to elaborate global solutions and to involve smaller companies settled in the same area.
- The methodology and the project management quality impact the objective achievement. The diagnostic phase, appointment of project manager and the active attendance of all partners in the working group are good success factors. The mutual involvement of the managers and employee representatives is a very important to succeed to implement and maintain the will to move to sustainable transport.

- The periodic assessment of the results helps to maintain the interest of these partners and help to adapt the actions and objectives in relation with the evaluation results.

The financial contribution of local authorities to the commuter plan implementation and of the company to the public transport subscription of the employees is also motivating.

Finally, the methodology developed by Tisséo is easily transferable to other cities.

Measure 12.1: Demonstration of EGNOS/Galileo services use for the control and information system of public transport in Toulouse

Introduction

A group of small and medium-sized aerospace companies (CECILE[17]) carried out a dedicated experiment of technological tools with the EGNOS systems in order to improve the performance of the navigation equipment installed in the buses. The general objective of the measure was to validate the feasibility of the use of GNSS systems (EGNOS & Galileo) to support the exploitation of surface public transport. This was achieved by demonstrating the added value of future GNSS systems (EGNOS & Galileo) in improving the control and information system of public transport by benefiting from the regional competencies and background.

Objectives

The project had two main objectives:

- to perform a test campaign to map the performances of the EGNOS system in the Toulouse urban area. The campaign would validate a simulation tool and enable it to be used to perform a Galileo performances simulation campaign over Toulouse by using a 3D model of Toulouse.
- to define the GNSS performance requirements and to validate the appropriateness of the performance requirements with the achievable level of performances.

Implementation

The project was broken down into three phases:

- The first phase consisted in a test campaign in real conditions in the Toulouse area.
- The second phase consisted in the Galileo simulation campaign.
- The third phase consisted in defining the required level of performances for basing the next generation of public transport management systems on GNSS systems only. The aim of this phase was to prepare for the next Galileo system by taking it into account in the design of the next public transport management system.

[17] The CECILE Group, which managed this measure, works in GNSS downstream business, application and value- added services. CECILE members are involved in many projects and product development related with innovative satellite navigation technologies such as EGNOS and Galileo

- Figure 17: data collector installation in bus

At the end of these three phases and over the months that followed, a dissemination activity was carried out to promote the results in other European cities willing to learn about the potential added value of EGNOS and Galileo systems in the management of public transport systems.

Due to the nature of the measure, no impact evaluation has been carried out, only the functionalities have been evaluated. Indeed, the measure aims to evaluate the performances of GNSS in analysing the effectiveness of public transport. No implementation was expected, and thus the measure had no impact on existing services or uses. The evaluation only deals with GNSS performance indicators and the comparison with actual requirements for positioning in public transport exploitation systems.

Results

The key results are as follows:

The measurement campaign provided a consolidated evaluation of GNSS performances over Toulouse City for bus positioning. It demonstrated today's reliability of the technology, confirming that future bus management systems should mainly rely on GNSS.

The simulations revealed that, with the use of several constellations such as GPS and Galileo, GNSS receivers will be able to use about 15 to 20 satellites at any one time and in all parts of the city. This combination will provide a global availability of positioning, with a high level of accuracy and integrity, enabling new services related to transport.

A requirement analysis of public transport positioning-based services was conducted during the project. Considering the current GNSS performance results from the measurement campaign, and anticipated performances from simulations, an interview document has been submitted to different stakeholders of the Toulouse bus network operation. A meeting has finally been organised to present results and prospects, and to discuss current and future needs.

Lessons learned and recommendations

Although the highway operator ASF (MOBILIS third party partner) has showed a strong interest in the development of the "**Integrated Information Scheme between P&R and the Urban Highway**", the exploitation problems encountered by the PT operator have held up the implementation of this measure. Indeed, the current reliability of the P&R occupancy rate is not correct, even though it was the information to be used.

The delay in the "**Development of multimodal information in the SGGD"** partnership is due to the cooperation difficulties between the different stakeholders involved.

A partnership like the SGGD consists of many different organisations with very different perspectives on transport and mobility. The concept of multimodal information instead of monomodal information is rather new and some of the organisations do not see the need for multimodal information and have therefore not prioritised the project.

The identified need at the highest political level for better passenger information provision has helped to develop the public transport information system.

The following lessons were learned:

- Optimal use of GNSS performances would require modification of the communication means between buses and the monitoring centre. The location frequency report is too low with respect to expected GNSS accuracy. Consequently, it was difficult to analyse the impact of accuracy improvement on the system.
- Due to necessary investments, the network management system is expected to develop over long periods (10 to 20 years). This represents a major barrier for the integration of measure conclusions and recommendations into today's and future systems.
- The use of GNSS has potential impacts on many services and consequently is closely tied in with other measures of the project, such as a bus priority scheme or multimodal traveller information system. Related measures had their own constraints and timetables, developing services on existing infrastructure and/or technologies. Consequently, the use of GNSS is actually not taken into account in the development of related services.

The measure has been conducted in the favourable context of regional GNSS industry and market development and benefited from the complementary skills and expertise of stakeholders on the GNSS field and the transport sector. Policy leaders and decisions makers have shown a lot of interest in the implementation and results of the measure, and this has encouraged motivation and reactivity from all stakeholders.

Measure 12.2: Implementation of bus priority scheme in Toulouse

Introduction

Toulouse is characterised by significant demographic growth and a large geographic residential area.

The Public Transport network includes fifty-six urban bus lanes, two underground lines (automatic vehicles – VAL -15 km and 18 stations) and urban railway lines to two towns in the urban area. It would like to improve service quality to increase and promote the public transport modal rate, which is low (around 7%).

National French studies[18] have shown that bus priority systems save between 20 and 30% of crossroads travel time. The public authority transport of Toulouse (TISSÉO) owns around 400 buses, which potentially cross 500 crossroads, so it has already tested bus priority systems on a small scale within the city centre.

[18] STIF, 2001.technical guide for bus priority system at crossroads. STIF Report, Paris.

CERTU, 2001. Traffic light priority system for public transport vehicles. CERTU 108 Report.

Since 1973, the city of Toulouse has developed a road traffic control system that determines the best strategy scheme to adopt for managing the traffic light cycles and prevent or improve traffic congestion. But this does not include any priority system or buses.

Objectives

The aim of this measure was firstly to develop a bus priority system at the level of the urban area and to adapt the existing traffic control system to integrate the bus priority information, and secondly to test a radio priority system. The building of a centralised control system at bus network scale and its integration into the existing road traffic control system to create a multimodal control system needs sophisticated tools, which have proved too long to develop in comparison with the MOBILIS project timetable. The centralised approach has therefore been postponed.

In the end, the measure focused on the development and the implementation of two different bus priority systems in two different traffic schemes, in line with local concerns. The objectives were:

- to study and implement a new transmission system between the regulation system and the junction controllers,
- to evaluate the implementation of two PT priority systems at dedicated junctions, especially at one of the High Quality Bus Corridors (roads only dedicated to buses and urgency vehicles) in order to assess the impact of each system on the bus travel time and on private vehicle traffic.

The purpose was to verify that these bus priority systems were reducing bus travel time and regularity without increasing private vehicle traffic congestion. The level of knowledge on decentralised bus priority systems would therefore improve.

Implementation-1

The **radio call priority system** developed by the COMATIS Company together with FARECO and CERYX functions with an onboard command box that communicates action codes to the traffic light controller, but it does not have remote access to the controller cycle data. The two junctions chosen for testing the radio priority system are located in the south-east of Toulouse, close to the main Toulouse University, where average daily traffic is around 7,000 veh/day on the main roads. The bus there (No. 2) has two route branches: one crosses straight through the main crossroads and the other turns right when arriving from the city centre.

In each direction, the frequency is one bus every 10 minutes, giving a sample of approximately 200 trips (there or back) per day.

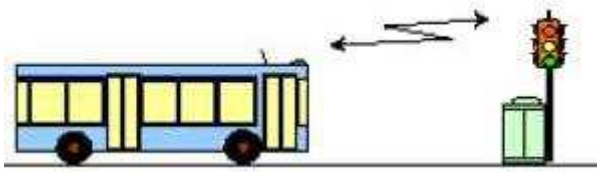


Figure 18: radio call bus priority system

Results-1

The evaluation of the radio bus priority tested on two crossroads reveals successful implementation, impacts and acceptability.

- The system functioned properly; 96.4% of the priority requests are satisfied.

- Bus regularity and journey times have improved. The impact on the global approach journey time in the defined zones is a decrease by 16%, (10 seconds).

  The average bus waiting time at traffic lights was reduced by 52% (9 seconds). It is specifically efficient at rush hour, when the decrease varies between 51% (8.8 seconds) at morning rush hour and 59% (11.4 seconds) at evening rush hour. Reduced speed duration increased on average by 4% and commercial downtimes fell by 15%.

  Nevertheless, the layout of the surrounding crossroads area has a large influence on the bus priority system results.

  The efficiency of the tested bus priority system varies with the bus directions and the approach line layout. For example, the average bus waiting time at traffic lights is between 17% and 65%, depending on the bus route. A last bus stop placed near the crossroads, a bus stop placed near a traffic light or a short approach line are critical factors.

- This bus priority system had no negative impact results on traffic flow, neither for journey time nor waiting lines of the crossing direction, but this road usually has a low saturation level. The private vehicle traffic rate slightly increased on the roads with bus priority.
- The bus drivers appreciated the ease of the system.

Implementation -2

In the High Quality Corridors, the buses are equipped with adequate beacons that activate electromagnetic loops to obtain priority at the traffic lights of the crossroads and indicate the end of the request.

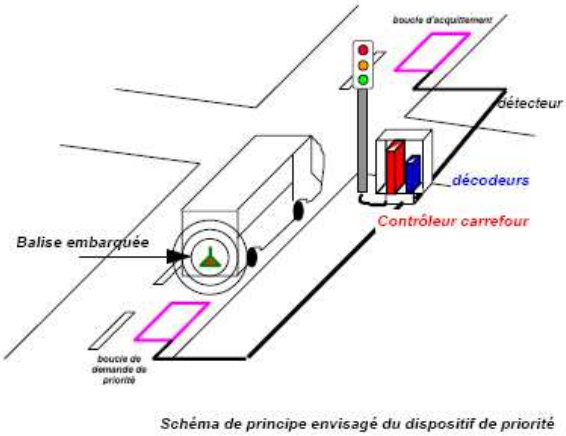


Figure 19: loop bus priority system

Results-2

The evaluation focused on the buses travelling on the corridor between the terminal station of the underground line B and a suburb town. At peak hours, 14 to 25 beacon-equipped buses per hour are travelling on both bus corridor lanes.

- The corridor follows a two-way road and crosses some junctions, including two large roundabouts with heavy private vehicle traffic (around 4,000 v/hr) and different traffic flows. At these two junctions, the traffic lights only manage bus and private vehicles lanes. The different bus lanes leaving or joining the bus corridor at the junction and the modification of the bus corridor position in comparison to the private vehicle lanes before and after the cross roads have introduced many difficulties for defining the traffic light cycle algorithm. In particular, the installation of a bus stop just before the traffic light lane disrupts the priority request efficiency.

- At the second crossroads, the priority requests are 89% satisfied in one way only, in the other directions the rates vary between 32 and 55%. Private vehicle traffic flow decreases

by 6% on the opposite roads to the bus priority. Almost 30% of private vehicles do not respect the red phase of the traffic lights on the stretches in question.

The traffic modelling of these two roundabouts showed that an increase by 50 to 100% of priority request-equipped vehicles (intercity buses and taxis for example) would require a complete overhaul of the algorithm to prevent private traffic congestion.

Lessons learned and recommendations

The decision to renew the AVL system (Automatic Vehicle Detection) hindered the implementation of a centralised bus priority system in the project time. A centralised solution is also much complex to manage.

The conviction of the engineers that the bus priority can significantly increase the regularity of the bus services has been the main driver for this measure.

A bus priority system, often seen as a very technical measure, can provide substantial benefits in terms of journey times and improved regularity of the bus service. Furthermore, it shows that the local authorities are clearly committed to favouring public transport over the private vehicle.

Nevertheless, the evaluation of the measure highlighted the importance of integrating the constraints of the crossroads surroundings into the development of the priority system tools and of checking the performances of the systems implemented. The bus priority systems have to be flexible, and having a set of solutions available allows better adaptation to the context constraints.

Measure 12.3: Development of an integrated multimodal traveller information system in Toulouse

Introduction

Connected transport services need a multimodal information system for users. Before CIVITAS, in the urban area of Toulouse, the level of information provided to public transport users was rather low, mainly because the offer in public transport had been quite low until recently: the first underground line opened in 1993 and the second line in 2007, and one tramway line will be opened in 2010.

At the end of the 1990s, the mobility stakeholders of Toulouse started to work on the multimodal information needed to create the integrated mobility management system (Système de Gestion Globale des Déplacements (SGGD)) through the cooperation of the main mobility stakeholders in the fields of public transport, urban and/or interurban routes. SGGD cooperation[19] was considered to be the backbone of further developments regarding multimodal information in Toulouse.

[19] The stakeholders who are involved within the SGGD cooperation are the following : the State, the Region Midi-Pyrénées, the County Council of Haute-Garonne, the Greater Toulouse Authority, the City of Toulouse, the SICOVAL (local authority covering several municipalities in the south-eastern part of the conurbation of Toulouse), RFF (national company in charge of managing the railway infrastructures), SNCF (national railway operator), AUAT (local territory planning agency) and Tisséo (Public Transport Authority and Operator).

Objectives

This measure aimed to improve the level and quality of the multimodal information for travellers and users of the public transport network. It was composed of three independent sub-parts:

- the development of a passenger information system;
- an integrated information scheme about park and ride (P&R) and urban highway traffic, through a specific information system based on the travel time calculation algorithms developed by ASF and the integration of underground travel time to get to the city centre;
- multimodal information provision at the strategic level between the different mobility stakeholders, within the SGGD cooperation – using websites and diverse multimedia means – including private operators' systems (radio – web – telecom, etc.).

The expected results and targets were:

- to promote PT use with high-quality multimodal information;

Therefore, to reduce the use of private cars in the city, the cooperation level between all partners had to be intensified and the fact that the development of sustainable mobility must be a shared goal rather than a patchwork of isolated initiatives had to be highlighted.

Implementation

1. PT passenger information system:

Between July 2006 and December 2006, the Public Transport Authority defined with the Public Transport Operator the m **Development of Integrated Information Scheme between P&R and Urban Highway** most appropriated places in which to implement the PT information systems. They concluded that this was at all the intermodal nodes of the underground network and decided to install the variable message signal at the opening of the second underground line. All the intermodal underground stations were equipped with display panels between July 2007 and January 2008.

Figure 20: information panel

2. Development of Integrated Information Scheme between P&R and Urban Highway

From December 2005 to October 2007, the Public Transport Authority and the Public Transport Operator (Tisséo) met with the ASF company (highway operator) several times in order to determine

the feasibility of this sub-measure. ASF provided Tisséo with the necessary requirements in terms of data provision, but it turned out that Tisséo was not able to manage and determine the occupancy of the P&R itself. After the mid-term review, the partners decided at the local level to postpone this 2nd sub-measure and to carry it out after the MOBILIS project. The public transport operators needed to solve its operation problem before continuing with it, which justified this decision.

3. Development of multimodal information within the SGGD cooperation

From January 2006 to July 2006, all the stakeholders involved in the SGGD partnership confirmed their support for developing the SGGD information system and defined an associated implementation plan together.

The multimodal Information Management centre was based on the integration of traffic and PT operator information in the same tool, with:

- A common geographical reference,
- A system allowing exploitation data to be shared (Système d'Exploitation de Partage et d'Organisation des Données – SysPEOD),
- an information data provider producing multimodal information managed by TISSÉO-SMTC.

The information broadcast would be treated independently from the SGGD. Each member is responsible for this mission.

They commissioned Tisséo-SMTC to draw up the call for tender for developing the SGGD information system. This call for tender was launched in March 2007 and attributed to a group of companies in autumn 2007.

From September 2007 to September 2008, the SGGD cooperation worked on defining the specifications. The multimodal information server will be installed during the first half of 2009. This multimodal information centre will then be considered the central pillar of the passenger information system for the Toulouse public transport network.

Only the "PT information system" sub-measure has been subject to impact evaluation as part of this measure. It has not been possible to carry out impact evaluation regarding the "Integrated Information Scheme between P&R and Urban Highway" section because this part of the measure has been suspended. The same applies for the sub-measure relating to SGGD (*overall trips management system*) multimodal information, as the system will not be implemented until January 2009.

Results

The "PT information system" sub-measure has been assessed on the basis of two surveys, a quantitative and a qualitative one, whose purposes were to:

- find out the use and perception of information panels for network customers,
- identify their needs and expectations in terms of the information on these panels.

The survey was carried out in two stages:

- A quantitative phase: A survey was conducted at several underground stations on lines A + B, with participants aged 15 years and over using the underground and making a connection with a Tisséo bus during their journeys.

- A qualitative phase: Two meetings with groups of 4 or 5 participants, lasting two hours, organised on 11 and 13 August, with those network customers who had responded to the quantitative survey: Participants were recruited based on the following 4 profiles:

- Profile 1: had not noticed the panels and said they needed information,
- Profile 2: were not happy with the current locations of the panels,
- Profile 3: always or nearly always use the panels,
- Profile 4: occasionally look at the panels, because they are not appropriate to their needs,

Care was taken to ensure a balanced distribution in terms of age, sex and socio-professional group.

Its analysis was carried out in partnership with the BVA survey institute and the results highlighted that, for:

1. the quality of the PT information

Tisséo appears competent in terms of information, except in critical cases where it could be appropriate to be even more so in order to reassure and support customers disrupted in such a situation. All the participants considered the information provided by TISSÉO to be effective, with a special mention for the website that the majority of the users consider to be well designed, complete and easy to use.

A single criticism emerged: as soon as a problem occurs, customers had difficulty finding the information on connections to take in such a situation, on how long they had to wait and on route changes:

2. Assessment of the different sources of PT information

There is no common behaviour when it comes to using a given source of information. Everyone uses them according to the type and context of their trip (regular or not), urgency of their needs and their culture.

Most of the time, participants make trips that are familiar to them; signs essentially help them, step by step, almost without thinking, to confirm a timetable or a direction.

3. Assessment of how well the PT variable message panels function

In its current state, these panels suit the context and are potentially effective, but people have not really taken to it because the common point is not perceived as this information is only available in stations and so it is not used. Survey participants criticise the readability of the screens as well as the variety of information displayed. Nevertheless, the survey highlighted the need to spread the variable message panels throughout the underground network.

Lessons learned and recommendations

Although the highway operator ASF (MOBILIS third party partner) has showed a strong interest in the development of the "**Integrated Information Scheme between P&R and the Urban Highway**", the exploitation problems encountered by the PT operator have held up the implementation of this measure. Indeed, the current reliability of the P&R occupancy rate is not correct, even though it was the information to be used.

The delay in the "**Development of multimodal information in the SGGD"** partnership is due to the cooperation difficulties between the different stakeholders involved.

A partnership like the SGGD consists of many different organisations with very different perspectives on transport and mobility. The concept of multimodal information instead of monomodal information

is rather new and some of the organisations do not see the need for multimodal information and have therefore not prioritised the project.

The identified need at the highest political level for better passenger information provision has helped to develop the public transport information system.

To boost the appeal of a public transport network, it is very important to install an effective information display system, adapted to the information needs of the PT users.

The multimodal information system enables people to travel from their starting point to their destination in a multimodal manner and with sustainable transport modes. Its development is based on various data and a complex partnership between Public Transport authorities and road infrastructure managers. The use of standards and norms for data formats facilitate further exchanges.

To achieve its aim, such a partnership requires a strong coordination of each stakeholder's competences and vision for the development of integrated multimodal information. It is also very important that representatives of companies or local government departments agree to work together and go over their own company's interests.

3.3 City 2: DEBRECEN

Debrecen is situated 220 kilometres from Budapest, at the largest railway and road junction in the eastern part of the Hungarian Great Plain. Debrecen Airport has had international status since 2001.

It is the second largest city in Hungary, with a population of 207,000, a city area of 461 km² and a centralised urban structure. The many historical buildings reflect the important role of the City in national history.

Debrecen's place in the economic, educational, commercial, cultural and medical network is of great importance.

The city is the seat of Hajdú-Bihar County and the centre of the North Plain Region. The Debrecen–Hajdúszoboszló–Hortobágy triangle is one of the most popular tourist destinations in Hungary. Consequently, most of the commercial premises in Hajdú-Bihar County are located in this area. Debrecen is also one of the regional centres for higher education with over 30,000 students across 15 different faculties. Besides the internationally renowned research centres and programmes of the medical and scientific faculties, training in humanities, natural sciences, music, economics and agriculture is also possible. Debrecen University is one of the most popular universities in Hungary, educating foreign students as well. This outstanding system of higher education is further enhanced by the internationally respected medical training for foreign students from all over the world. Debrecen has all forms of medical services. There are 500 hospital beds, and 73 physicians per 10,000 inhabitants. Debrecen offers quality services for health tourism (spas), conference and business tourism, as well as for incentive tourism.

Debrecen Description: MOBILIS in Debrecen

The MOBILIS project has made a major contribution to improving the quality of life of Debrecen citizens by raising the standards of urban mobility. During the project, Debrecen has focused on environmental and economical aspects, but specifically on social aspects, to identify, understand and meet the specific needs of different social groups.

The main goals of the project partners were to maintain the current modal shift and to create a well-organised sustainable mobility framework for all transport modes in order to improve the quality of life for citizens by raising the standards of urban mobility.

The focus of the demonstration activities has therefore been on:

- Creating a solid basis for producing and using alternative fuels;
- Promoting mobility alternatives to the private car;
- Upgrading the public transport services to make them more appealing for all citizens;

The demonstration measures selected for the MOBILIS project are based on the official Operative Development Plan of the city, as well as on the interests of key private companies in the field of mobility that have supported the guiding idea of Sustainable Development. The measures were also tied in with the aim of achieving compliance with the European Commission White Paper[20] policy guidelines.

Considering the direct impacts of the measures, Debrecen has distinguished two approaches: one concentrating on protecting the **city centre** from individual car traffic, and the other considering the **whole city** as a living environment.

Main demonstration sites in Debrecen

City Centre

To help to make the city more liveable, one of Debrecen's main aims was to protect the inner city from motorised traffic. The local Authority therefore looked into the possible solutions. Access and parking management in association with extending the existing pedestrian area seemed the most promising measures to contribute to achieving the project goals.

[20] European transport policy for 2010: time to decide, COM(2001) 370 (12.9.2001)

Figure 21 : Debrecen city centre map

Whole city

Among the measures having a city-wide impact, the improvement of tram service quality through a priority scheme and real-time passenger information system (measure 12.4) was considered to have the most effect on the city centre by reducing individual traffic flow to the inner city and also by increasing the overall PT modal share city-wide.

Integration concept in Debrecen

The intended connections and integration between the different measures are described in detail below.

Table 12: Over view of MOBILIS measures and geographical integration in Debrecen

Measure	Title	Primary goal	Main IMPACT	Lead partner

5.3.D	Operation of bio fuel and CNG vehicles and framework conditions for alternative fuel use in Debrecen	Sustainable mobility	Whole city	Hajdú Volán
6.5.D	Access and parking management for the city centre	Alternative mobility modes	City centre	Debrecen
6.6.D	Accessibility scheme for the conference centre and pedestrian zone	Alternative mobility modes	City centre	Debrecen
8.5.D	Safety and security training for public transport drivers	PT promotion	Whole city	DKV, Hajdú Volán
9.3.D	Car-pooling service for students	Alternative mobility modes	Whole city & regional impact!	Debrecen
11.5.D	Integrated and extended cycling network	Alternative mobility modes	Whole city	Debrecen
11.6.D	Sustainable city-traffic development plan for Debrecen	Sustainable mobility	Whole city	Debrecen
12.4.D	Tramway public transport priority scheme and real-time passenger information system	PT promotion	Whole city	DKV

The MOBILIS project's main goal was to make the city more liveable for its citizens. The focus therefore has been on the people, all citizens, as well as on specific groups.

To obtain the highest possible gain for society from MOBILIS, each integrated approach had specific target groups besides addressing a broader audience. The criteria that the overall gain for society should be the highest in the medium term determined the selection of these groups. Attention was paid to using the most effective channels to ensure their involvement.

Table 13: Target groups within the framework of MOBILIS in Debrecen

	Sustainable mobility	Alternative mobility modes		PT promotion	
General target group	Everyone	families	younger generations	everyone	
Specific target group	Everyone	car owners	students	handicapped	students

Debrecen's MOBILIS project has integrated the planning processes at measure and city level to ensure planning synergy.

Table 14: The integrated planning process of the related measures

Measures within the CIVITAS – MOBILIS project	Access and parking management for the city centre	Accessibility scheme for the conference centre and pedestrian zone	Integrated and extended cycling network	Sustainable city-traffic development plan for Debrecen	Tramway priority and passenger information system
Plans and studies drawn up within the measures	Study for access restriction and parking management in Debrecen	Study for the accessibility of the conference centre with Implementation plan for the planned extension of the pedestrian zone	- Bicycle network development plan and study of bicycle storage locations	- Analysis of the current traffic situation, definition of mobility objectives, visions, targets and strategy, implementation plan for priority measures	Design study and Traffic analysis for AVL - Design study for the traffic control centre

To achieve the goals defined in MOBILIS, the consortium partners have worked closely together during the project.

Table 15: Cooperation in Debrecen to achieve MOBILIS goals

	5.3	**6.5**	**6.6**	**8.5**	**9.3**	**11.5**	**11.6**	**12.4**
Debrecen		XXX	XXX		XXX	XXX	XXX	
DKV				X			XX	XXX
Hajdú Volán	XX			XXX			XX	X
HBM ÁKK	XX	XX	X			XX	XX	XX
UoD	XXX				X			

Degree of cooperation	indication
Lead partner	XXX
Close cooperation	XX
Positive impact from less formalised involvement	X

Measures implemented

Measure	Title	Lead partner
5.3.D	Operation of bio fuel and CNG vehicles and framework conditions for alternative fuel use in Debrecen	Hajdú Volán
6.5.D	Access and parking management for the city centre	Debrecen
6.6.D	Accessibility scheme for the conference centre and pedestrian zone	Debrecen
8.5.D	Safety and security training for public transport drivers	DKV, Hajdú Volán
9.3.D	Car-pooling service for students	Debrecen
11.5.D	Integrated and extended cycling network	Debrecen
11.6.D	Sustainable city-traffic development plan for Debrecen	Debrecen
12.4.D	Tramway public transport priority scheme and real-time passenger information system	DKV

Debrecen; Objectives and Targets

The main goals of the MOBILIS partners in Debrecen were to:

- Create a solid basis for producing and using alternative fuels;
- Promote mobility alternatives to the private car;
- Upgrade the public transport services to make them more appealing for all citizens.

The targets were:

- to reduce the air pollution due to vehicle emissions,
- to encourage modal shift from private car to soft transport modes,
- to improve the quality of available transport services,
- to improve the accessibility for citizens.

3.4 Summary of Measure Results for the City of Debrecen

Measure 5.3: Operation of bio fuel and CNG vehicles

Introduction

Debrecen's biofuel programme aimed to create a sustainable mobility system through wide integration of waste management, district heating, electricity production and public transport.

Before CIVITAS, public transport in Debrecen was provided by 160 buses, and the fleet of the public transport company, Hadjù Volàn, consisted of 374 buses EURO-3, including12 CNG vehicles and 1 dual fuel vehicle (CNG/diesel). No project on biofuel tests had taken place in Hungary before.

The measure contained two actions linked to biofuel use: the implementation of biofuel and CNG in public transport vehicles and the accomplishment of related research activities.

Objectives

The different objectives were initially to:

- convert conventional diesel buses to CNG mode, and purchase CNG buses in order to have seven CNG vehicles in operation at the end of the project
- measure the efficiency and environmental performance of diesel vehicles using biodiesel mixture[21]. The study should indicate which biofuels are worth using. If the results of the necessary studies point in favour of implementing a full-fleet-scale usage of biofuels in the non-electric part of Debrecen's public transport system, it will be planned to:
    - identify the best approach for stimulating production, supply and use of alternative fuels for public transport use in Debrecen by:
    - analysing the technical, financial and legislative conditions of the production and use of alternative fuels in Debrecen, and
    - recommending regulations to stimulate the use of alternative fuels

The targets were to:

- improve the efficiency and environmental performance of diesel vehicles using biodiesel mixture to reduce the air pollution due to vehicle emissions,
- encourage modal shift from private car to soft transport modes,
- improve the quality of life for citizens.

The AKSD Company, responsible for waste management in Debrecen, asked for the total amount of biogas produced at the waste-pile to be used for house heating, because it was very favourable in terms of energy efficiency and cost savings. As a result, ASKD could not be the supplier of the MOBILIS project.

Due to the lack of biogas production for public transport, the measure has focused on:

- the conversion of diesel buses to CNG fuel mode and purchase of new CNG vehicles in order to have 7 CNG vehicles put in operation within the project.
- the implementation of extended tests to measure the efficiency and environmental performance of diesel vehicles using biodiesel mixture in different proportions and weather conditions; this had never been done in Debrecen before

Implementation

Concerning the actual implementation of the measure, Hadjù Volàn purchased three new Polish 100% CNG gas-operating buses, three others were transformed into clean gas-operating buses, and at least one gas-operating bus was transformed into a clean gas-operating one. This modification includes purchase and installation of CNG engines and a CNG fuel tank, reinforcement of the vehicle chassis, necessary modifications of vehicle electronics, necessary tests and a state licence procedure.

[21] The original plan was to test biogas and biodiesel fuels. The necessary quantity of biogas would have been bought from the local waste disposal site because only part of the amount produced was used for heating.

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The converted CNG vehicles are used – like the existing ones – in the inner city centre to contribute to the improvement of emission impacts. To date, no evaluation has been performed on the impacts of these new or modified buses.

Biodiesel tests took place in spring 2008. The use of different mixture rates (10%, then 20 and 50%) was compared to that of normal fuel (4.4%). The buses selected for tests have undergone diesel-operation stand-testing and emission-rate measurement. They have also been tested in regular road traffic.

Results

The evaluation results mainly concern the comparison of the measurement data of the laboratory and on-road tests. An AVL 4000 type instrument, which is generally used for regular environmental testing, measured the emission rates. The bus drivers have participated in the experiment through a survey.

The test results revealed that the average consumption rate is higher with the biodiesel mixture than with the natural gas one. A 10% mixture has the lowest consumption rate for biodiesel mixture, and a 20% mixture the highest one, higher than a 50% mixture. The test results highlighted that increasing the biodiesel mixture rate proportionately decreases engine performance, even if, in real conditions, the majority of the bus drivers have not noticed any real drop in performance.

The emission rates have been measured for the three concentrations. The AVL 4000 type instrument could not detect any significant decrease in emission rates, with any of the different biodiesel mixtures. The result is significant with all selected vehicles.

The bus drivers noticed that, on average, engine noise was no louder with these bio-diesel mixtures, but no noise measurements have been performed.

Overall, the drivers participating in the test agree that using biodiesel mixture is not effective.

According to the test results, it is obvious that although biodiesel is not a real alternative to traditional fuels, it can be used to replace a part of traditional fuel, if not more than 20-50%. So the further studies, such as the complex feasibility analysis of producing and using biofuels in Debrecen first planned were not carried out. The quantifiable targets, such as carrying out extended tests with the biodiesel mixture and a complex feasibility analysis of biofuel production and use in the Debrecen area, have been achieved.

Lessons learned and recommendations

This measure came up against two main barriers:

- the cost of biodiesel, which is higher than traditional diesel. This is therefore an obstacle to the conversion of regular buses to this type of alternative energy,
- the decision of AKSD Company, responsible for waste management in Debrecen, to keep the total amount of biogas produced at the waste-pile, which cancelled the biogas tests.

Thanks to the measure, the city council and the public transport companies have reliable and objective information about the risks and benefits of biodiesel mixture use and of converting buses into biodiesel mode.

Measure 6.5: Access and parking management for the city centre

Introduction

Two roads from the north-eastern direction provide the main access to the city centre of Debrecen in terms of number of junctions as well as traffic density, creating traffic jams at rush hour that can affect public transport as well.

In the city centre, there is a 25,000 square metre pedestrian zone, accessible only by public transport (tram). The underground parking of the conference hall and the connected exhibition hall is open to public use, but citizens still prefer to use the traditional parking facilities because parking charges in Debrecen are spatially differentiated and more expensive in the centre zone. The Főnix event and conference hall, located at the entrance of road no 4, pretty far from the centre, has a large parking capacity as well and is not used when there are no events in the hall.

To limit private vehicle traffic going into the city centre, the city of Debrecen intended to develop the use of the Főnix Event Hall car park as a park and ride (P+R) facility to Debrecen centre. In addition, the city aimed to install, in the existing traffic control centre, an on-line system to monitor air quality.

Objectives

The measure's overall goal was to provide a soft control of the traffic through the urban traffic control centre. The specific objectives were the following:

- decrease of transit traffic in the city centre
- limit the traffic accessing the city centre at rush hour
- renew parking policy in the city centre
- improve the traffic flow at high traffic junctions
- improve driver and passenger comfort
- improve traffic safety

The innovative aspects were based on providing a soft control of the traffic through the urban traffic centre.

Implementation

In July 2007, the General Assembly accepted the conclusions of the study for access restriction and parking management. This Traffic Plan is now the basis for further developments. The working document had already helped the city services to carry out specific measures, like the purchase of 50 electronic display countdown meters installed at the traffic lights of 15 junctions in June 2005. The countdown meter displays the seconds remaining until the next traffic light cycle (red/green) for both drivers and pedestrians. The system, set up next to the traffic light signals, allows drivers to get ready to go.

At the same time, the city of Debrecen has modified the traffic light cycles at these junctions in order to improve traffic flow, and installed a traffic light control central post.

Finally, in April 2008, the city services installed static information signs and variable message signs on Road 4, informing drivers about the P+R availability at Főnix hall.

Red tape has slightly delayed the implementation of the traffic control plan. To install variable message sign, the State Road Maintenance department has to issue a permit on the basis of detailed technical specifications, and this procedure has taken longer than expected.

Results

On 14th and 17th November 2006 (Tuesday, being a normal week day, and Friday, a peak day), students of the Department of Sociology counted the number of vehicles crossing two junctions of the city, one equipped with the countdown meter display and the other without it. The two junctions were next to each other, so that the differences in traffic flow could be analysed.

On the same days, students surveyed car drivers at two car parks in Debrecen; one located in the city centre (Dósa Nádor square), and the other near a shopping centre right next to a recently installed P&R information panel.

The counting and the survey were conducted at morning, midday and evening peak hours.

The modification of the traffic light cycles, creation of the traffic control system and installation of countdown meters have had quick positive impacts on the city centre traffic. At present, the average number of private vehicles crossing a junction at rush hour has increased by almost 20% per green cycle, but it has decreased by around 10% for lorries, which are usually very old and cannot move off as fast as before. 46% of lorry drivers think that the countdown meters improve lorrry traffic flow at a junction, 27% that it has been worth it and 15% that it has not made a difference.

41% of drivers have a positive opinion of the efficiency of the countdown meter and 11% are doubtful. According to age group, 45% of youngsters think that the new system has not improved the daily traffic conditions, whereas 45% of middle aged and 47% of elderly people consider that they have been improved.

This measure has developed long-term strategy. It is not yet been possible to assess the global impacts of the traffic plan.

Lessons learned and recommendations

Acess restriction must be accompanied by actions in favour of Public transport improvement and car park creation around restricted access zone.

Measure 6.6: Accessibility scheme for the conference centre and pedestrian zone

Introduction

A few years ago, Debrecen created the first pedestrian area in its historical centre. The Debrecen city board wanted to develop tourism and tram use to reduce traffic congestion in the city centre. The City of Debrecen had a lot of blueprints and plans for developing the downtown area, but a comprehensive implementation plan had not been drawn up until the project.

Over the past few years, construction of the Kölcsey Conference Centre, one of the largest and best-equipped buildings of this type in Eastern Europe, has been the most spectacular investment in the life of Debrecen city. It was built on an area of 13,000 m2 located close to the first pedestrian area and finished at the end of 2005. Below the centre lies a 9,000m2 car park (300 parking spaces). The city politicians were strongly committed to extending the pedestrian zone.

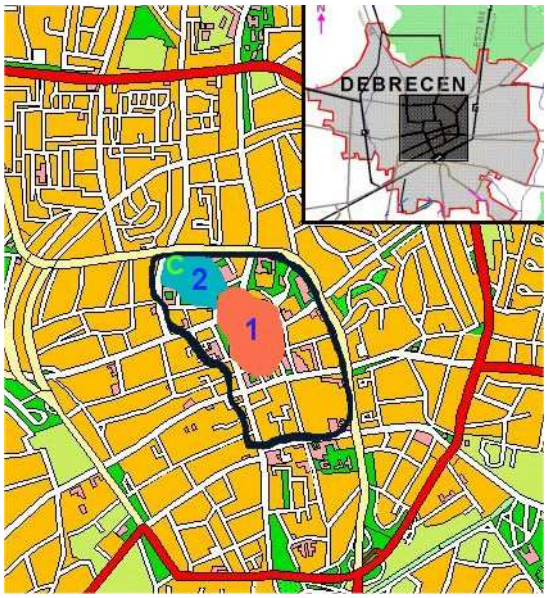
Objectives

The final objective of this measure was to enlarge the former pedestrian zone in the city centre, towards the conference centre zone in order to increase the attractiveness of the city centre.

The expected result of this measure was to obtain construction permit approval for the extension of the pedestrian area, a prerequisite for its implementation. The construction should be financed outside of the project.

Figure 22: Extension of the pedestrian area and the expected "impact zone"

1: current pedestrian zone, 2: extension of pedestrian zone, C: new conference centre



The expected impact area of this measure should cover the dense commercial area with a lot of commercial units as well as destinations related to social, religious and administrative activity areas.

Further extension of the pedestrian area would reduce on-street parking. The use of the underground car park of the centre as a "park and walk" facility provides a direct connection to the pedestrian zone for the conference centre and access to the tram.

Implementation

The municipality launched a call for tender to define the project. According to national law, designers were asked to prepare and submit their concept in a proposal. The chief architect of the city and the evaluation committee selected the best solution. The mayor signed the contract with the winning designer in 2006.

In February 2007, the city leaders accepted the project developed for the extension of the pedestrian zone. After a long evaluation process, the construction permit was obtained at the beginning of 2008, valid for 2 years. After the expiry date, the permit validity can be renewed several times through an accelerated process.

Unfortunately, due to ongoing financial problems, the city's annual budgets could not meet the cost of the construction during the project. The planned evaluation, concerning in particular the citizens' acceptability of the pedestrian extension, has not been carried out as a result.

Results

The direct outcome of the measure is the implementation plan of the pedestrian zone that can provide a basis for further developments.

Lessons learned and recommendations

Car access restriction must be adapted to the local context of cities (local traffic and transport situation).

Measure 8.5: Safety training for public transport drivers

Introduction

The measure focused on educating public transport drivers in vehicle new technology (ABS, ASR, ESP, ASC), on driving methods for special environmental circumstances and on energy-efficient driving.

Before CIVITAS, most of the training sessions, in which public transport drivers had usually participated, aimed to confirm their physical competences and did not include cost-effective driving teaching. Even if accidents in Debrecen are not frequent, considering the number of vehicles and the lines operating daily, some of them could still be avoided. Wet or frosty roads especially during the winter months can be very dangerous for bus passengers, particularly because, in public transport vehicles, passengers are standing most of the time and do not have safety belts when they are sitting. Moreover, the economy and cost-effectiveness of public transport vehicles mainly depend on the driver's driving skills, as an appropriate driving method can reduce the consumption of the vehicle. These are the reasons why the public transport operators believed that additional training could be useful for public transport drivers.

Objectives

The main objective of this measure was to improve the skills of bus drivers, to increase public transport safety and decrease PT operational costs.

Implementation

Hajdú-Volán (bus transport operator) and DKV (tram and trolley bus transport operator) organised the training session in August 2007, at a special facility, in *Mogyorod*. Ten groups of five drivers participated one after the other; each group spent one day at the facility. Participants were employees of both transport operators; the young drivers had volunteered to participate, while the older ones had mostly been appointed.

The experts of Hajdú-Volán prepared and organised the training, which included theoretical and practical parts. The theoretical elements were: reasons for unsafe traffic situations occurring, the roles of roadholding, of under- and over-steering during driving and finally functions, use and impacts of new safety technologies (AB, ABS, ARS, and RETARDER).

The theory learnt could be practised as well, under the supervision of a professional trainer. The practical elements were: emergency braking, braking and avoiding, entrance into a slippery curve, sudden getting out of the way without braking, slalom, driving uphill and downhill on a road with a 9% slope and energy-saving driving methods. Due to the low number of drivers at each session, they had the opportunity to ask all their questions and explain any everyday problems they encountered.

Results

To assess the impacts of the training, in June 2008 the Department of Sociology and Social Policy, in charge of the evaluation, distributed a questionnaire to 30 trained drivers. The questions concerned mainly the novelty and daily applicability of the training elements. Direct interviews were not possible due to the working conditions of these drivers, who are rarely at the company's Debrecen-based office.

The drivers questioned were relatively young. They were between 27 and 56 years old, with an average age of 33 years. Two-thirds of them live in a small town or village, at most 30km from Debrecen. The rest live in Debrecen.

On the evaluation scale (1 =not applicable, 7 =fully applicable), in the general assessment, the practical part received a higher average score than the theoretical one but both scores represent a high level of satisfaction regarding the training material composition.

Some elements of the training content were more or less known by the drivers, therefore both the level of novelty and applicability respectively received a lower score. The results regarding the training content were as follows:

- reasons for unsafe transport circumstances occurring (Novelty: 5.57, Applicability: 6.07);
- emergency braking (Novelty: 5.0, Applicability: 6.0), role of breakdown (Novelty: 4.28, Applicability: 5.23),
- entrance into slippery curve (Novelty: 5.64, Applicability: 6.7);
- role of under-and over steering (Novelty: 4.76, Applicability: 5.71),
- sudden turn without braking (Novelty: 4.78, Applicability: 5.71), slalom (Novelty: 4.92, Applicability: 5.78)
- role of road holding was already known, but drivers did appreciate the opportunity to upgrade their knowledge: (Novelty: 5.14, Applicability: 5.78).

The drivers considered the information about new technology (ABS, AB, ARS, RETARDER) to be the most novel, although they had few opportunities to work with these innovative instruments because the company's vehicles are not yet (or are only partly) equipped with them.

Lessons learned and recommendations

The support of Hadjù Volàn has been very important in organising the training activities.

The registration rules, that gave all interested drivers the opportunity to participate, the organisation of the training in small groups and the technical and practical mixed content of the training ensured high acceptance of this measure.

By developing such a measure, it is important to ensure that all drivers (especially new recruits) have the opportunity to take part in it so as to improve professional and safe driving skills and find out about new technology uses.

Measure 9.3: Car-pooling service for students in Debrecen

Introduction

Alternative transport modes, which help reduce the negative impacts of individual mobility, are not yet widespread in Hungary.

The measure aimed to develop carpooling in Debrecen to increase seat-occupancy rate of private cars and limit car traffic. The city has considered that students were a very good target group to initiate the development of carpooling before extending it to city level.

Debrecen University currently has 24,000 students who live in the city and regularly return home for the weekend. Before CIVITAS-MOBILIS, students were mainly public transport users, mainly because they benefit from a travel discount of 65% and public transport is much cheaper than car use. But as the standard of living is slowly increasing, more and more students are becoming car owners. Debrecen therefore seemed like a good location for developing carpooling among students.

Objectives

This measure aimed to increase the number of passengers per car by creating and implementing a carpooling system at city level, based on an online service, to help find partners for common journeys.

Implementation

From November 2007 to March 2008, the City services drew up a consistent concept in relation with some students and a related promotion study. The software was developed in March 2008. Finally in April 2008, the City bodies implemented the Web-based car-pooling system. The city opened a web space on the official page of the City (see www.utitars.debrecen.hu), where everyone may get information about the available journeys and post advertisements. A monitoring system checked the number of daily users.

Results

There was no available precise data on public transport and car use to define the situation in 2005.

In August 2008, 17 of the 68 registered users were interviewed to discover the strengths and weaknesses of the software, provide recommendations for improving it, and outline its popularity.

The results of the interviews were that more than half of the respondents (54%) had posted more than 5 ads, and 28% only one. 40% only replied to 2 or 3 ads and 50% replied to 4 of them. This reveals a very important characteristic of users: according to the societal process of preferring car-ownership, users more often look for partners than for opportunities to be a passenger. In August, 77% of the users had visited the page at least 5 times, the rest only 1 to 4 times. Only 30% of the website users had visited the car-pooling site within the last month; the rest (70%) had not visited it since June (the university holidays might have introduced a bias in the answers).

The average age of website users is 23.13, which reveals that only students visit it. Among 50 registered users, 20 are women and 30 men. 88% of the interviewed users had forwarded the address of the website, helping to promote it and therefore to increase the number of potential carpoolers.

All of the respondents who had carpooled for a journey were satisfied. People consider that this type of journey is a very good opportunity to make friends and widen their social network.

Lessons learned and recommendations

The only obstacle to the measure success is the lack of suitable and efficient advertisements about the service, which may disappoint users. The cooperation with students' representatives had a positive impact on the success of the measure.

To develop carpooling, it is recommended that awareness and information campaigns use all the available resources for advertisement, such as: the students' official administration system (www.neptun.hu), other popular community web pages (like www.iwiw.hu), and other universities' official portals, regional websites of towns and villages and direct links from other city-coordinated websites to www.uitars.debrecen.hu.

Measure 11.5: Sustainable city-traffic development plan for Debrecen

Introduction

The measure is composed of two sub-measures:

- creation of a mobility working group to assist the process and implement the framework recommendation across the whole city mobility network
- development of the sustainable city traffic development plan_for Debrecen under the supervision of the mobility working group.

Before CIVITAS, the City of Debrecen had no up-to-date transport plan. The last transport development plan was drawn up several years ago, and sustainability was not taken into account when the city took decisions regarding transport. Furthermore, due to public transport management and the political situation, the different transport stakeholders were not involved in the political decision process. The City of Debrecen, or the government of Hungary, runs the different public transport companies. Since the regime changed in 1989, a polarisation has occurred among citizens and in the institutional area: a right wing Mayor has led Debrecen for more than ten years and some municipal-operated institutions belonging to the left-wing institutions have been in political opposition for a long time. This is why there was no communication or collaboration neither between them and the city, nor between themselves.

Politicians were aware that it was important to draw up a strategic, long-term sustainable transport plan and to involve the different stakeholders in the process to be able to address the challenges ahead regarding transportation in Debrecen. The city of Debrecen therefore decided, in the framework of MOBILIS, to set up a transport strategy, to launch regular exchanges about city traffic and transport for stakeholders and to involve citizens in the development of a transport development plan, paying particular attention to sustainable mobility.

Objectives

The objective was to maintain the current modal shift in order to protect the city and the environment from high levels of motorised traffic in the future.

Implementation

In March 2006, the local experts and decision makers set up the mobility working group and called on the consultancy company COWI to help it to form professional written opinions or advice and to draw up the traffic development plan.

With the mobility working group, the contractor drew up three working documents, which were submitted for validation by the General Assembly:

- The *analysis of the actual status* of the traffic is the first of the plan's three documents. .To measure the present traffic demands, the contractor and the working group used the previous road traffic counts and public transport surveys, made partly by the city operator and themselves, and new traffic counts. From two household surveys, regarding only drivers and a questionnaire about parking customs, the working group was able to establish a statistical database of the motorisation and parking customs of citizens.
- The second part of the plan was the *sustainable transport and traffic development strategy*, which stated that the typical urban traffic problems have appeared in Debrecen and will only get worse. The city therefore had two options to manage the situation: either increase road capacities and continuously adjust the supply to actual demands to fulfil the traffic needs of citizens, or influence the traffic demands by the renewal and deliberate management of the transport system. The most important targets of the second development strategy were to:
    a) Develop a traffic system to protect the downtown area.
    b) Modify the road traffic network to decrease environmental load.

c) Promote low emission traffic modes, hindering further increase of individual car use, primarily in the downtown area.

d) Provide transport modes adapted to the function of the area.

e) Improve accessibility to the concentrated commercial and industrial areas.

- From these strategic solutions, the contractor drew up a *proposed development programme with priorities*, which specifies the actions to take and sets up a schedule as well. This programme is a basis for further planning and investment programmes. Some programme elements can be shifted depending on the financial sources available.
  - In the short term, the recommended actions are those that are feasible in a short time and for which the city does not need significant investments.
  - The mid-term programme (4-6 years) is composed of actions, which could stop negative tendencies, and for which implementation needs more time due to a long design and approval process or financial needs.
  - The long-term programme contains actions which support the long-term solution of problems partly handled by short and mid-term actions, or whose implementation needs significant financial, technological or infrastructure investments, or the drastic modification of regulations.

After the approval of the mobility working group, the sustainable city traffic development plan was submitted to the city's leadership first, then to the political committees of the city council and finally, to the General Assembly which validated it on 5th July 2007.

Results

It has not been possible to assess the impacts yet. The actions could not be implemented in one year, so the number of PT users and the modal shift rate do not show significant change to date.

The city has performed an in-depth process assessment to highlight the importance of the completely new approach of decision concept for Hungary. Because of the MOBILIS project, city transport planning in Debrecen is carried out systematically and with clear goals within the framework of the sustainable urban transport plan. The involvement of the stakeholders in the process ensured their acceptance of the plan, as shown by their vote of approval. The mobility working group still exists and is now considered by politicians to be an expert adviser group.

Lessons learned and recommendations

The mobility working group action encountered various difficulties. Firstly, stakeholders were very sceptical at the beginning, as it was not usual in Debrecen for politicians to involve stakeholders and experts in the decision process. Secondly, the different stakeholders often had opposing needs, wishes and suggested solutions. Thirdly, several representatives of the mobility working group changed jobs during the process. This delayed the process, because the new members had to familiarise themselves with the work already done and some questions had to be reopened.

As the work progressed however, the stakeholders were convinced of its merits. The participation of a non-biased moderator who could suggest compromises and maintain focus on the goal has facilitated the mobility group work.

In retrospect, some of these problems could have been solved, if the representatives had signed some kind of "letter of intent", which explicitly stated that they represented their organisation and were committed to working for a common situation.

This measure could partly be taken up by other cities that still do not ensure the involvement of the relevant stakeholders. It can also provide relevant information for involving a mixed working group to develop and implement a sustainable plan.

Measure 11.6: Integrated and extended cycling network in Debrecen

Introduction

In recent years, cycling has become a popular mode of transport in Debrecen for all age groups. The elderly use cycling mainly for shopping and everyday administration, whereas the younger generation cycle more for sport or entertainment. Since cycling itself has gone through a considerable transformation, more and more cyclists are on the streets without suitable cycling facilities, and it became urgent to improve the current infrastructure and storage facilities.

From the 1950s to ‘80s, cycling was the most common mode of transport. But with the development of public transport and private cars, cycling started to lose priority, except in villages where it remained popular. Over the last few years, considerable efforts have been made, such as extending the cycle network, increasing and promoting cycling. The municipality had several plans to expand the cycle network by an extra 30 km, but this was not possible due to a lack of funding. Due to a high risk of bicycle theft, the municipality placed storage shelters in the city centre, which were not numerous enough to meet demand. More safety solutions were therefore necessary.

Objectives

The main objective of this measure was, in the immediate term, to improve the safety and security of cyclists in two ways: firstly by providing better network connections and accessibility and secondly by setting up new safety bicycle racks. The expected result was an increase in the number of cyclists at conurbation level.

The related long-term objective is, in fact, to create a new tourist approach for the city.

Implementation

The municipality decided to integrate all cycling-related developments into a strategic development plan and this study was drawn up. The mobility advisory council invited the representatives of cyclists’ civilian organisations to find out about their expectations and opinions of the suitable development.

In 2007, the general assembly of the city validated the overall bicycle network development plan. The plan is adapted to the financial resources of the city, it foresees the creation of 48 km of cycle lanes; in the first phase, before the end of 2010, the city will create around 10 to 12 km of them.

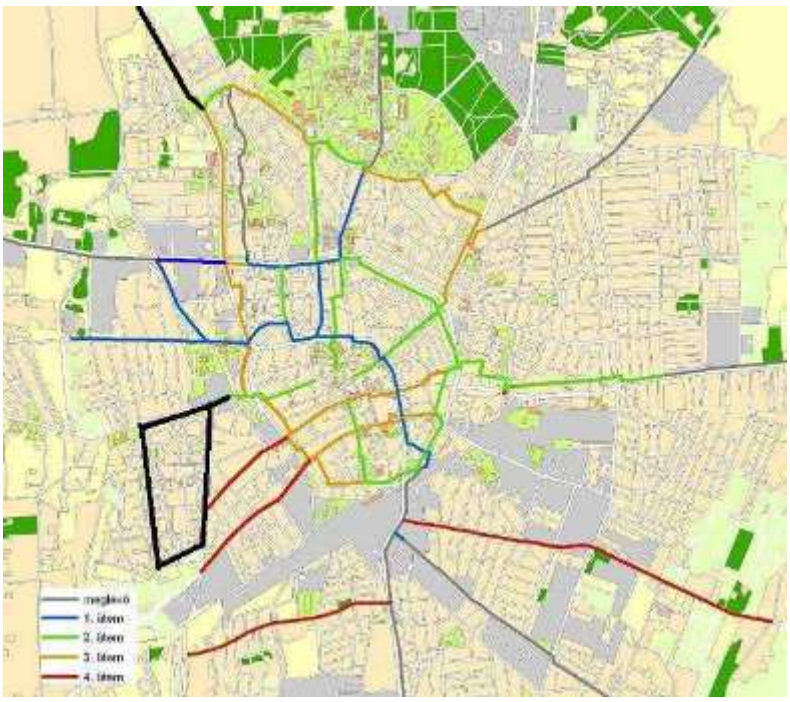


Figure 23: Future cycling network in Debrecen

In accordance with the development plan requirements, the city has installed 51 secured bicycle racks at 33 different locations of the city and created approximately 4 km cycle lanes in two different areas of the city, on the existing pavements and service roads in order to avoid expensive infrastructure constructions.

Results

The Department of Sociology and Social Policy of the University of Debrecen has held an on-street survey to assess the citizens' satisfaction of the new bicycle racks.

In terms of key results, for 85% of people surveyed, the bicycle is the basic means of transport in the city. 53% of respondents were very critical of the cycling conditions: they consider that cycling accessibility to public institutions, except educational ones, is very bad. More than 60% of the surveyed cyclists are satisfied with the new bicycle racks, which offer more security and whose design is adapted to the new bicycles. They use them more than the old ones. It has not yet been possible to assess the impact of the new cycle lanes, since the variations in the number of cyclists are not yet significant.

The new racks and the extension of the cycle lanes are a response to a concrete need that had already become apparent.

Lessons learned and recommendations

There are two barriers to this measure. Firstly, the city infrastructure is not really suitable for creating a citywide cycling network, since the roads are too narrow, in a number of cases, to appoint a specific cycle lane. Secondly, suitable cycling infrastructure could not be built in time to keep up with the increased popularity, which resulted in a sort of an opposition between cyclists' representatives and the municipality. There were three positive features, however. Firstly, the establishment of the Urban Mobility Working Group (see Measure 11.5D) helped to reduce this opposition, so that public acceptability of the development steps was ensured. Secondly, the installation of the secured racks greatly eased cyclists' peace of mind. And thirdly, the experts paid special attention to the needs of modern bikes by choosing a type in which bikes with a wider telescope can also be stored.

When designing a long-term bicycle development plan, we recommend collecting all the information about the needs of citizens, infrastructural barriers and positive features, and available financial resources. This information is crucial to achieving any development in a structured and systematic way.

Measure 12.4: Tramway public transport priority scheme and real-time passenger information system

Introduction

The tram provides the north-south axis of the city's public transport grid. It also provides a direct link between the university and the central train station, where an intermodal junction is also planned in the near future.

The implementation of the pedestrian zone in the city centre has disrupted the major individual traffic routes, especially in the north – south direction. Journey time has increased on the longer and more congested alternative routes.

Objectives

This measure aimed to:

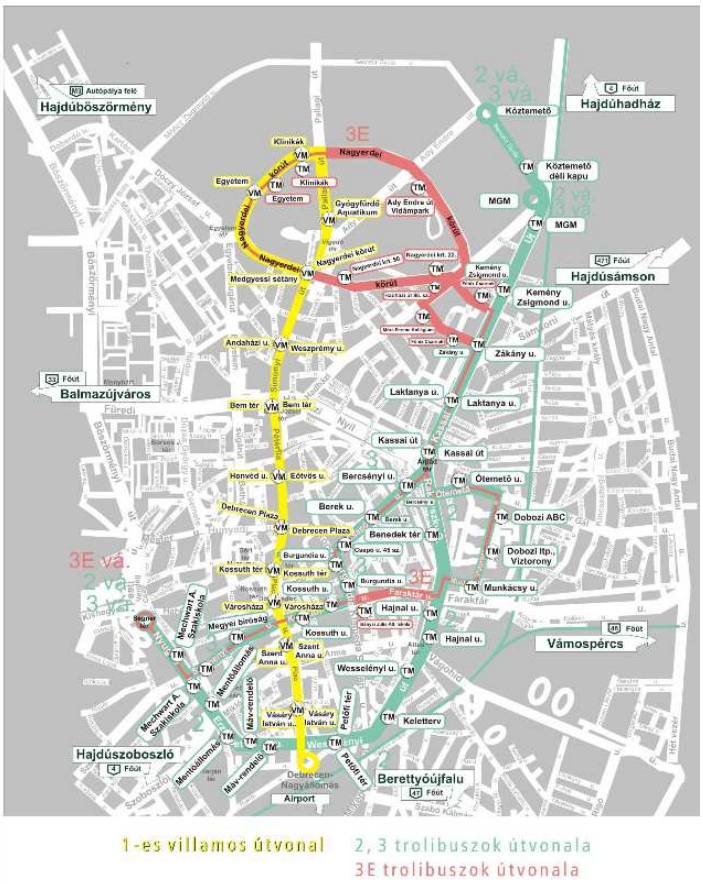
- Improve the public transport service with the real-time public transport passenger information system at 23 tram stops and to significantly reduce tram travel time with tram priority at traffic lights (within MOBILIS, at 1 selected traffic junction);
- Improve operational efficiency with the AVL system on 18 tram vehicles and 31 trolley buses;
- Improve the effectiveness of the traffic control centre by providing data for fleet management and other operational services;
- Divert heavy traffic from the city centre and reduce pollution.

This would be achieved by providing an excellent quality of service on the tramline, obtaining higher passenger satisfaction and higher usage of the tram and trolley line on the north-south axis.

Implementation

Therefore, DKV planned to install a passenger information system in all vehicles (onboard) of the tram and the trolley bus fleet and at each tram stops to announce the time remaining until the next vehicle arrival. To cut travel time even further on this axis, the crucial traffic junctions were identified and PT priority introduced for the trams. The numbers from 1 to 6 show the identified sites.

Figure 24: The tramline of Debrecen, and the major crossed junctions



Since August 2006, all the trams and trolley buses have been equipped with an on-board computer system for vehicle location and twenty-three tram stops with an electronic LCD information display system. On the new trolley buses, passenger information has already been solved. After studying the priority system, the authorities decided to implement it at two junctions to begin with. The vehicles are able to adopt the system at all junctions, but the decision of further extension depends on several circumstances.

Results

Since the measure has only been implemented recently, it has not been possible to assess the impact on the expected modal shift (passenger numbers). The evaluation therefore focused on the effectiveness of the new display system in providing people with real-time information about the next vehicles to come, as well as about any modifications concerning the tramline. The key results of this measure concern its acceptance. The majority of respondents (more than 50 points) of the survey on citizens' satisfaction consider that this system helps to inform citizens either by providing up-to-date information, or by informing them about any changes on the tramway. One third of tram-users (32%) look at the digital passenger information system every time, while one quarter (26%) check it often. Less than one quarter of the sample (23%) rarely look at the display system and only 17% never check it.

Lessons learned and recommendations

The extension of the tram priority system met technical difficulties in its development to other crossroads. It should have caused traffic constraints to other vehicles.

The cooperation of the public transport operator with the traffic control department that has updated the traffic light plan helped to implement the tram priority system.

The lesson learned from this measure is the necessary coordinated involvement of all political and technical stakeholders to prevent considerable delays in the development and implementation of the system. The implementation of a centralised priority at traffic lights also needs to evaluate a priori the impacts on all traffic.

This measure is considered to be easy to transfer to other cities.

3.5 City 3 : LJUBLJANA

With 270,000 inhabitants and a total surface area of 271.67 km², Ljubljana is situated at a European crossroads of transport links and influences. Considered to be among the smaller European cities, Ljubljana is regarded as the cultural, scientific, economic, political and administrative centre of Slovenia, independent since 1991. Ljubljana is the largest city and capital of the Republic of Slovenia, and is strategically located in political, cultural, and economic terms, with one third of all capital and about 25 per cent of employed people in Slovenia. It creates over a third of all trade. As a regional centre, Ljubljana's population rises to over 500,000.

The core of the city is the old centre with narrow streets and castle hill. Urban density is very high in the old city, where there are 960 people/ km2. Modal breakdown is 80:20 in favour of private vehicles. Airport Brnik is situated about 25 km from the city. Ljubljana has a negative net migration (cca 300 per/year), while in the surrounding municipalities the net migration is positive.

Lying at the main transport crossroads in Slovenia, Ljubljana is facing steady traffic growth and increasing numbers of daily commuters.

Ljubljana Description: MOBILIS in Ljubljana

The demonstration measures for the MOBILIS project in the City of Ljubljana are closely related to the aims and objectives described in national and local laws, plans and strategies.

Within these contexts, the selection and design of the concrete measures in MOBILIS have been chosen to promote environmentally friendly transport through a combination of:

- a reduced negative impact of traffic, especially as regards emissions
- raised awareness among people and promotion of environmental friendly vehicles
- active participation by all sorts of people through different channels of dissemination
- an example of good practice for large-scale clean vehicle implementation at national level.

Due to its size, compared to other EU countries, and diversified geography with predominantly hilly and mountainous relief, Slovenia has limited possibilities of field products, which also implies to raw material for its own biofuel production.

In the framework of the MOBILIS project, Ljubljana set itself the task of implementing state-of-the-art clean fuel - biodiesel production in the city, which will replace the existing chemical industry.

Ljubljana's expectations of the MOBILIS project were relatively high as regards the positive impacts of the demonstration of the most important goal in the CIVITAS II initiative – implementation of environmental friendly vehicle use, i.e. vehicles on biofuels.

Although it was expected that the measures within the MOBILIS project, especially in its initial phase, would bring relatively small effects in the context of the overall traffic system in Ljubljana and Slovenia, it was expected that good practice and suitable promotion would gradually exceed the idea of demonstration and become a model for successful implementation of environmental and human friendly modes of mobility.

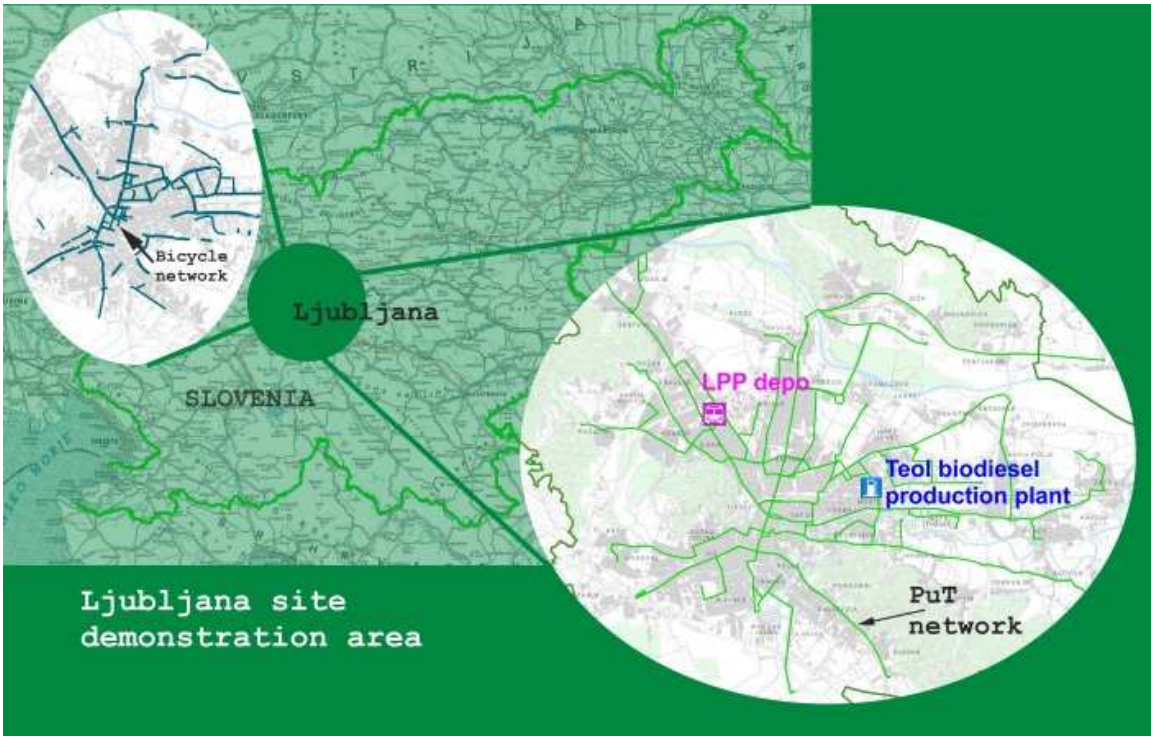
Main Demonstration sites in Ljubljana

The main demonstration sites in relation to the individual measures are indicated in the map below.

The map on the right indicates the public transport network in Ljubljana, with a depot and biodiesel production plant. Cleaner vehicles will be in operation on the whole bus network.

The map on the left shows the City bicycle network as the basis for installing a large number of shelters for cyclists with future connection of missing links in the network.

Figure 25: Public transport network and bicycle network in the City of Ljubljana



Integration concept in Ljubljana

The integration concept of the Ljubljana measures was quite complex. They are related in many ways. The main integration concept was as follows: research – production – distribution – usage – promotion of clean fuels in Ljubljana.

The integration of activities has included partners directly involved in the activity, as well as other local partners active on individual measures.

Measure integration has been carried out mainly at the level of dissemination, which has involved all information regarding measure activities being disseminated to the public at large.

The City of Ljubljana has been a local project initiator of measures regarding the CIVITAS II initiative. It has therefore been the first Slovenian city on the European map of future clean cities. All local partners have contributed their share towards the successful implementation and dissemination of good practices outside the MOBILIS project as well, at local and national level.

The policies of the Environment and Research Ministries have had a positive influence on stimulating and involving Slovenian institutions and organisations in European projects. They also promoted the CIVITAS initiative. During the MOBILIS project, the cooperation and support of national institutions and ministries have improved and deepened.

Activity	Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana	Participatory mobility planning of sustainable transport promotion in Ljubljana and promotion of safe and increased bicycle use in Ljubljana	Set-up of information points and campaigning on clean vehicles and alternative fuels in Ljubljana
Firm/ institution	Ljubljana[22] LPP, TEOL, SAVA, FME, AIS, REC CEE, Petrol – the biggest energy distributor in Slovenia, City Public service companies,	Ljubljana[23], Council for traffic safety and security , REC CEE, Ljubljana Regional Development Agency - RRALUR, Ljubljana cyclist network	Ljubljana[24], REC CEE, LPP, Petrol

Cooperation of main partners in Ljubljana to achieve MOBILIS goals

	5.4.L	***11.7.L***	***11.8.L***
Ljubljana	XX	XXX	XX
LPP	XXX	XX	XX
~~Teol~~	XX		XX
~~SAVA~~	XX		XX
REC CEE	XX	XX	XXX
AIS	XX		XX
FME	XXX		XX
PINUS	XX		XX

Degree of cooperation	***indication***
Lead partner	XXX
Close cooperation	XX

[22] *International Relations Office, Department for public services and transport*

[23] *International Relations Office, Department for public services and transport, Department for local Self-government*

[24] *International Relations Office, Department for public services and transport, Council for safety in road traffic*

Positive impact from less formalised involvement			X
REC CEE	XX	XX	XXX
AIS	XX		XX
FME	XXX		XX
PINUS	XX		XX

Degree of cooperation	***indication***
Lead partner	XXX
Close cooperation	XX
Positive impact from less formalised involvement	X

Measures implemented:

Table 16; Overview of MOBILIS measures in Ljubljana

Measure	Title	Lead partner
5.4.L	Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana	LPP
11.7.L	Participatory planning and promotion of sustainable mobility in Ljubljana with emphasis on safe and increased bicycle use	Ljubljana
11.8.L	Set-up of information points and campaign on clean vehicles and alternative fuels in Ljubljana	REC CEE

Ljubljana; Objectives and Targets

The measures implemented in Ljubljana aimed to promote environmentally friendly transport through a combination of:

- a reduced negative impact of traffic, especially as regards emissions
- raised awareness among people and promotion of environmental friendly vehicles
- active participation by all sorts of people through different channels of dissemination
- an example of good practice for large-scale clean vehicle implementation at national level

The targets to obtain at city level were:

- to reduce air pollution due to vehicle emissions
- to favour a modal shift from car use, specifically to cycling
- to improve the safety and awareness of citizens

3.6 Summary of Measure Results for the City of Ljubljana

Measure 5.4: Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana

Introduction

This measure aimed to develop bio fuel full process, from production to use. Therefore it comprised three main actions:

a) A large-scale deployment of pure (100 °/°) biodiesel in the LPP bus (EURO 0) fleet in Ljubljana.

b) The improvement of the quality of biodiesel produced at Pinus by reducing the content of water, free fatty acids and phosphorus in the raw material. The first partners (Teol and Sava) withdrew from the MOBILIS project in 2007 (no biodiesel production in Ljubljana is to be established). Pinus joined the project instead of Teol and Sava, as production of biodiesel is already available at this company (it lies approx. 100 km NE of Ljubljana);

c) The testing on two locations in Slovenia for production of rapeseeds. Usage of biodiesel produced from rapeseeds at small farms in order to provide additional income to farmers. This required the development of appropriate efficient equipment for farmers to press the oil rape to produce crude oil.

Objectives

The primary objectives of this measure were:

- to reduce emissions from the LPP bus fleet and improve environmental (air) quality in Ljubljana
- to improve bus fleet energy efficiency in Ljubljana;
- to establish cost-effective production and use of biodiesel at small farms in Slovenia through the economic analysis of the whole chain from production to use.

The implementation of these three actions obtained the following assessment:

Pure biodiesel use

Implementation -1

Instability of B20 (20% biodiesel) was recognised as a technical barrier for implementation of the measure as initially planned. By August 2006 eighteen additional buses have been prepared for testing B100. During wintertime when temperature was expected to drop below –7 °C testing of these 18 buses was not performed. Namely, the Ljubljana public transpot operator (LPP) could not take a risk of inoperability of this number of buses since it would cause strong criticism of the public transport users. Therefore, during wintertime only two buses have been tested on B100.

Their performances were compared with two buses running on D2. An additional 18 buses were tested for crystallisation problems, except at wintertime. The data collected gave poor operational results and higher financial demands than initially expected: average servicing costs for a bus running on B100

during the test period were around 3,900 Euro, while for a reference bus (using D2), they were around 3,400 Euro, taking into account operating hours and actual mileage of the buses. Note that the servicing frequency for buses using B100 doubled. Finally, the LPP decided not to use biodiesel in 100 existing (old) buses but rather to extend testing of 20 buses and to perform additional measurements of pollutant emissions. After performing additional measurements, LPP expects to have a clearer idea of which buses to purchase in the future and how to make up the PT fleet in Ljubljana. Justification could be based also on cost and environmental arguments. Existing 100 Euro 0 buses are to be replaced by new Euro 4 buses. About 30 will run on D2 while the others will partly run on biodiesel, partly on CNG, and a small part will be hybrid.

Results-1

LPP could not afford deployment of B100 on 100 buses due to the high costs of preparing and maintaining the fleet; doubled frequency servicing was equired. Concerning the use of biodiesel in a bus fleet, it is clear that this is not recommendable for old buses Euro 0 (). Also, paraffin crystallisation in biodiesel in winter time (below -7 °C) may be problematic in terms of causing non-operability of buses due to. Additional tests on biodiesel use in PT buses were realised for more accurate specifications of the environmental benefits for the city of Ljubljana. After having performed additional measurements, LPP has clearer idea of which buses to purchase in the future and how to make up the PT fleet in Ljubljana. Justification could be based also on cost and environmental arguments. Existing 100 Euro 0 buses will be replaced by new Euro 4 buses. About 30 will run on D2 while the others will partly run on biodiesel, partly on CNG, and a small part will be hybrid. Otherwise, surveys indicate that awareness about biofuels is generally increasing; bus drivers and PT users generally accept their use.

Lessons learned-1

Testing has been successful, however results are rather different than expected: biodiesel is not going to be implemented in a large-scale leve: biodiesel in Euro 0 buses costs more than classical D2; so it is not economically justifiable.

Laboratory testing of engine performance at different conditions as well as systematic recording of relevant parameters during testing, e.g. fuel consumption, helped to clarify feasibility of biodiesel use in Euro 0 buses, maintenance costs of the buses, and environmental benefits in terms of emission of pollutants. On-street measurements performed at the end of the project contributed to additional clarification on buses/engine performance in real situation.

Sharing knowledge among partners was motivating and it has been a strong driver for the project.

Strategic environmental assessment (SEA) of a measure is helpful in following up changes on a more general/strategic level than the first direct objective. For the production of biodiesel, initially planned in the city centre, SEA showed both inadequacy of the site (due to planned long-term urban changes in that part of the city), and existing inoperability of the industrial infrastructure at the site which would require additional investments.

Biodiesel improvement

Implementation-2

Initially, this action foresaw to convert a chemical factory, which previously was producing ethylene oxide to biodiesel producer. The aim was to produce 50 000 tonnes of biodiesel yearly. This firm is situated in an industrial-commercial zone close to the city centre of Ljubljana; the zone is surrounded by commercial and residential areas and environmental study highlighted that biodiesel production in Ljubljana suburb was not appropriate due to the occupation of industrial zones and expected urban changes in the city.

However, Pinus Company, that was already producing biodiesel, joined the consortium and involved its staff in biodiesel improvement to meet the high-quality standards. The separator started up in April 2007 to optimise glycerol and lecithin quality and the two-step de-gumming process in order to obtain oil with 15 ppm phosphorus content, reduction in FFA (free fatty acids), oils, optimised parameters for washing of oil with glycerol, etc.

Results -2

The measurement results performed at the FME (Faculty of Mechanical Engineering, University of Maribor) laboratory show that the emission indicators of HC, CO and smoke are consistently higher for D2 at higher engine speed and load. Pinus succeeded in lowering water content and phosphorus in raw material by improving the process. This has been achieved through intensive testing after numerous changes of process parameters. The testing lasted for about two years; performed adaptations of the process parameters did not require increase in maintenance costs since the changes were relatively quick (a couple of weeks or a month each). Training on this subject was successfully administered.

Figure 26: testing bench in Maribor

Lessons learned-2

The training of biodiesel provider (Pinus) staff wad crucial to get it able to perform analytical control of the quality of raw material and biodiesel.

The motivation, dedication, good management, as well as technical competence of the Pinus staff has facilitated the success of the quality improvement of biodiesel production.

• **Cost-effective production of biodiesel at small farms**

Implementation -3

During MOBILIS time, project partners developed equipment for efficient pressing of rapeseeds by farmers to support decentralised production and provide additional income for the farmers. The experiment checked pressing efficiency in terms of oil and cake ratio (production of crude oil and cake per tonne of pressed seed), testing eighteen types of rape seed in terms of annual yield at the same weather and soil conditions. The quality of both oil and cake were measured regularly, as well as the quality of biodiesel produced from the oil.

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Results-3

Financial problems limited the number of chemical analyses of biodiesel produced at small farms. Although biodiesel produced was analysed several times during the project, this did not allow continuous and prompt information about the quality of the product. However, the quality analyses revealed that:

- the biodiesel produced only has an 8.5% lower energy value than conventional diesel on average
- it is better to carry out etherification of crude oil elsewhere, i.e. at industrial plants.

Lessons learned-3

This type of local production is feasible and cost effective, but it is better to plan improvement of crude oil at industrial level than at farm one. It is important to pay attention to research financial needs at planning stage of the measure.

Lessons learned at measure level

The measure has improved knowledge in biofuel use and production and therfore it has been valuable to disseminate the results between national experts, to Slovenian students and to other potential users of biodiesel fuel in Slovenia. Transfer of knowledge with other partners involved in biofuel use or production has been very interesting and helpful.
The measure was rather complex as it was composed of unrelated components. Nine legal entities were involved in the definition, development, implementation and promotion of the measure (AIS, CoL, FME, LPP, Petrol, Pinus, REC, Sava, Teol) and particular activities in the measure have their specific goals and targets. Such a situation caused numerous organisational and management problems, including difficulties in coordination, reporting, and evaluation: each component of the measure needed to be evaluated separately. This made the coordination of the work and summary of the results rather difficult. It would have been better to have three or four separate measures instead of a single one. Biodiesel production and quality improvement, at Pinus and at small farms, have an upscaling potential.

Recommendations

- At the start of a project it is crucial to check whether measure goals contribute to the implementation of the business policy of a partner involved in the project. Partners should have some experience on the subject of the measure. Sharing different forms of knowledge among partners is a distinct advantage for the project.
- Research activities in the project (creating new knowledge) help to identify the parties involved in the project, its goals and expected benefits. Improvements, which are a result of the measure being implemented, contribute to positive identification of the parties involved.
- Strategic environmental assessment (SEA) of a measure is helpful in following up changes on a more general/strategic level than the first direct objective, considering and explaining strong and

weak points of the measures and their impact at a higher (e.g., city or urban transport policy) level. For example, if implementation of the measure were to cause a certain urban change or impact on land-use at city level, then SEA could show which alternative to implementing the measure seems the best, i.e. most cost-effective and environmentally beneficial, including the alternative of not implementing the change.For the planned production of biodiesel in the city centre, SEA reavaled both inadequacy of the site (due to planned long-term urban changes in that part of the city), and existing inoperability of the industrial infrastructure at the site which would require additional investments if biodiesel production is to be established. Managers of Teol considered these issues to be financial/environmental/spatial/urban obstacles to implementing the project.

- Introduction of biodiesel is environmentally beneficial and, to prove this benefit, we recommend data collection on emissions and bus operation in real life, i.e. consideration of the specific features of the PT network, occupation of buses, weather conditions, etc.

Measure 11.7: Participatory planning and promotion of sustainable mobility in Ljubljana with emphasis on safe and increased bicycle use

Introduction

Before 2005, participatory methods and tools were used sporadically in different policy fields in Ljubljana, but no regulation required public participation in decision-making procedures. Mobility campaigning usually focused on activities regarding European Mobility week and special events in nurseries and primary schools, but no initiative was put forward for providing Ljubljana citizens with information on clean vehicles and alternative fuels or for raising awareness of clean vehicle fleets.

Around 7,000 cyclists were travelling daily on 124.4 km of cycle lanes, 27.9 km were painted red for better cyclist safety. 2,490 bicycle racks were at their disposal in public spaces. The municipality owned 40 bicycles, at the disposal of city employees for work purposes.

Objectives

The objectives of this measure were:

1. to develop the active participation of civil society in mobility planning and implementation, by testing and using innovative involvement methods;
2. to introduce change in citizens' behaviour towards alternative modes of mobility by:
    - promoting cleaner vehicles and alternative fuels and issues of sustainable mobility, specifically new infrastructures for cyclists
    - improving the safety of cycling infrastructure to motivate and stimulate the citizens to use bicycles, even in bad weather conditions, by installing additional covered bike shelters. Previously, the measure included only the instalment of three additional covered bike shelters as cycling infrastructure improvement.

The expects results were as follows:

- An increase in the level of civil society information
- An active participation of civil society in the consultations organised in district councils
- An increase in bicycle equipment use in the city and more generally in cycling.

Implementation

The development of the public participation model was based on the analytical decision-making process scheme and on the experience gained from the spatial planning procedures developed at local level. The district councils and the Office for citizens' initiative (OfC) were identified as the appropriate partners for including civil society complaints and ideas in mobility project elaboration.. The participation model was then tested at the first workshop (February 2006), at which participants identified several main obstacles for the development of cycling in Ljubljana. All of them mentioned insufficient safety for cyclists, due to a lack of cycling coordinator on the city level, steady police control and fines for offenders. They also pointed out the lack of cycle racks in two areas located out the city centre, weak access restrictions to the inner city and not enough awareness-raising campaigns on safe cycling. Regarding the workshop outcomes, the model was adapted to introduce the concept that public participation may lead authorities to change the initial aim of their projects.

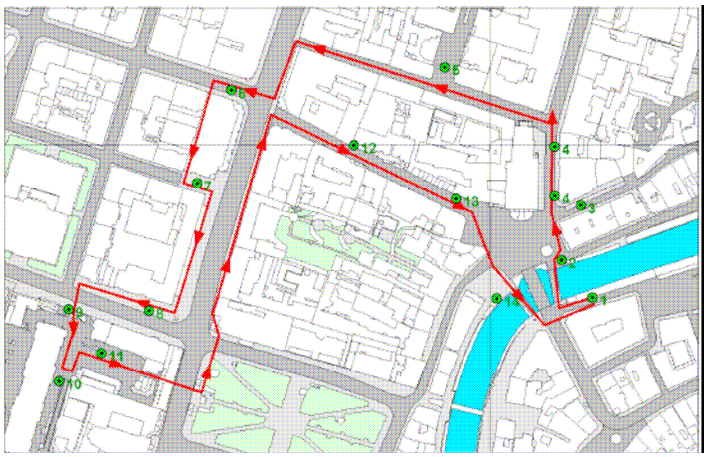


Figure 27: location of the bicycle racks in Ljubljana centre

After an internal discussion, the measure leader decided to reassess the initial goals by taking in account their priorities, identifying one priority issue (free parking lanes) and informing stakeholders of the outcomes. Additional activities for gathering data on cycling safety and security were organised, all bicycle stands in the city centre were checked by visual observation.

In 2008, the city bicycle project introduced 80 bicycles for rent in 8 locations in Ljubljana. 424 new stainless bicycle racks and 46 covered bicycle shelters were set-up in public spaces in Ljubljana. Two additional issues were also addressed: the need for further development of the internal decision-making processes in the City administration and clarification of the legal framework for involvement.

Results

The testing of the model with involvement of the key city officials and other safety institutions (police, safety boards, etc.) enabled them to learn about the benefits of public involvement and to apply it for clean vehicles and other activities regarding creation of a supportive environment as well. It also forged additional links between stakeholders.

Concerning the cycling objectives, another workshop about *"(Un)parking of cars on cycle lanes"* during European mobility week (September 2006) aimed to find proper solutions to the problems. Solutions and approaches from other CIVITAS MOBILIS cities were presented and discussed in working groups.

Automatic counting systems have been installed in recent years for assessing bicycle use in the city. Cycling slightly increased (by 1.127%) during the year after the implementation of the measure. The use of new bicycle racks and shelters has highly increased. The participative process and the first actions satisfied the cyclists 'association.

Awareness of aims and goals concerning clean vehicles was not assessed, as unfortunately no comprehensive public opinion survey regarding the issue was planned. It can nevertheless be assumed, in view of the number of events, information disseminated and number of participants that their awareness and knowledge about clean vehicles and alternative fuels has increased.

Lessons learned and recommendations

This measure brought about considerable change in the understanding of cycling in Ljubljana.

The facilitated stakeholder meetings helped to define the location of the new covered bicycles shelters and the renewal of the existing cycling parking infrastructure in the city.

Some promotional activities such as *Campaign for Cleaner Ljubljana* (March/April 2006), bicycle traffic education and promotion of safe cycling (free bicycle Repairs stand), as well as increased checks of illegally parked cars on cycle lanes supported both actions.

The development of the overall public debate regarding traffic and transport issues in the City of Ljubljana was raising various transport issues, including cycling in the city. The external pressure of civil society organisations (especially the Ljubljana cyclists network) furnished additional support for the measure. This measure identified many needs that need to be met for a really supportive environment for the systematic use of participatory decision-making in the city administration.

Some outcomes of the measure were already incorporated in important strategic decisions of the City of Ljubljana, i.e. establishing a city cycling coordinator as a task to be implemented, identified in the Ljubljana Environmental Action Plan. The measure also provided rich and structured information for updating the Ljubljana Sustainable Transport Plan and made a considerable contribution to the development of some measures for the forthcoming FP7 CIVITAS Initiative project (2008-2012).

The main lesson learned is that providing stakeholders with the opportunity to participate in some decision-making processes means might need to refocus on slightly or very different issues or change the scope of the decision. So, including participation in the earliest phase of the process creates opportunity for more efficient uses of (human and financial) resources.

Measure 11.8: Set-up of information points and campaign on clean vehicles and alternatives fuels in Ljubljana

Introduction

Before MOBILIS, activities associated with mobility, sustainable transportation, clean vehicles, alternative fuels, etc. were rare.

The measure consisted of several, interconnected tasks with the common goal of increasing awareness and knowledge among various stakeholders, from the public to decision-makers.

Objectives

The objectives can be grouped into two clusters:

a) setting up of two info-points on clean vehicles and alternative fuel use and

b) raising awareness and promoting use of innovative technologies, systems, services and policies on clean vehicles and alternative fuels.

Implementation

However, the common idea was to have a set of events and materials providing information for various stakeholders on sustainable mobility, clean vehicles and alternative fuels in the city and at project level and that, to use results from measures 5.4 and 11.7 to convey the main messages of the measure, clean vehicles and alternative fuels are real solutions to city transport issues.

After preliminary discussion at city level, two Info-Points for Clean fuels and Vehicles and sustainable mobility were identified and established by the end of 2007. Local information contact point, run by a local information officer has been employed for local/national/European dissemination operations.

These three info points were established and equipped regularly with updated materials from MOBILIS activities (leaflets, brochures, etc.).. The info point personnel were trained on MOBILIS issues with specific focus on clean vehicles and alternative fuels.

Results

The main assessment method was based on counting events (meetings, workshops, training of info-point staff), materials produced (leaflets, info-sheets, bulletins, brochures, newsletters), web statistics, and the surveys about change in awareness: regular surveys in the form of questionnaires and/or interviews at info-points were planned to assess the effectiveness and impact of the measure.

A lack of resources prevented more comprehensive opinion polls that would provide quantitative insight into the impacts of the measure.

Globally, this measure has increased:

- knowledge among the public of MOBILIS ongoing developments and results.
- awareness of sustainable mobility, alternative energy use in public transports and biodiesel usage and
- knowledge among decision makers of MOBILIS ongoing developments and results and their awareness of the aims and goals of clean fuels and vehicles and sustainable mobility..

It has also helped to identify alternative bio-diesel usage possibilities identified.

Lessons learned and recommendations

At the end of the MOBILIS project, the city of Ljubljana noticed that:

- establishing info-points at the existing information offices, basically targeting tourists, was a good move from the point of view of resources. Info-point personnel have a very good connection with city transport providers (yellow (hybrid) and classic taxis, Ljubljana Public Transport company, Railway and Bus Station, City Bike). They provide (in addition to MOBILIS materials) information on timetables, prices and road closures.
- However, due to the specific scope of information requests at such a location, its role as an info point on MOBILIS issues is somehow doubtful. Indeed, it implies that tourist info points should not be used as info points for MOBILIS any longer; rather specific info points should be established.

- the information flow as a result of measures 11.7 and 5.4, concerning clean vehicles and alternative fuels, was not so intensive, and concentrated more on activities around annual European Mobility Week. Dissemination activities in the campaign were too spaced out (gaps between information) and too long somehow – a campaign involving an action or series of actions energetically run to accomplish a purpose should not last as long as four years.

Nevertheless, the lack of some quantified goals that would indicate the expected rate of change among the Ljubljana citizens on the set-up of information points and campaigning on clean vehicles and alternative fuels in Ljubljana was a barrier in the implementation of the measure. This is why the city of Ljubljana suggests that in the future, all measure activities shall have quantitative targets supported by proper monitoring actions and evaluation methodologies.

3.7 City 5: ODENSE

The city of **Odense** is the third largest city in Denmark. It had 158,163 inhabitants as of 1st January 2008 and is the main city on the island of Funen. The city is primarily known as the birth city of the great writer of fairytales, Hans Christian Andersen. It is the seat of the Odense Municipality and was the seat of Odense County until 1970, and Funen County from 1970 until 1st January 2007 when the county became part of the Region Syddanmark.

Odense is located centrally in the middle of Denmark, lies close to Odense Fjord on the Odense River (*Odense Å*). and is a major traffic terminal for road, rail and bus traffic. Over 26,000 commuters travel to Odense every day. Its railway station lies on the road between Copenhagen and Jutland, the peninsular mainland. A 7.5 metre (25 ft) deep canal, dug from 1796 to 1806, gives access to the town from the fjord.

Accessibility to Odense was greatly increased when the ferry service between the two main Danish islands, Zealand and Funen, was replaced by the Great Belt Bridge - opened in 1997 for rail traffic and 1998 for road traffic. Its construction greatly cut travel time between Odense and the Danish capital, Copenhagen that can now be reached by train in 1 hour and 15 minutes.

The city is one of the largest university towns with over 17,000 students enrolled at academic level and some 13,000 students on other courses and also boasts the largest single university hospital unit in Denmark with approx. 8,000 employees.

Odense is a relatively low-rise city with a low urban density and ideal topographical conditions for cycling. Once a heavy industrial city, Odense has now developed into a centre for small and medium-sized firms with a wide range of supporting service companies. The largest shipbuilding yard in Denmark, owned by Mærsk Ltd, is located just 13 kms from the city. Odense is also the most important market gardening centre in Denmark with exports of greenhouse-grown garden produce to the rest of Scandinavia and Europe.

Odense Description: MOBILIS in Odense

Main demonstration sites in Odense

The main demonstration sites in relation to the individual measures are indicated in the maps below. The geographically based “priority zones” are part of a future vision in Odense City Council’s traffic and environmental plans. They represent pilot areas for implementing a concept for the whole of the City of Odense as an environmental zone. In MOBILIS the selected zones will be used to foster this vision by:

- Testing and comparing solutions in different area types.
- Concentrating innovative demonstration activities at suitable pilot sites.
- Demonstrating the relevance/impacts of activities for the city generally and for a wide range of different stakeholders specifically.
- Offering comparison with equivalent zones in other MOBILIS cities.

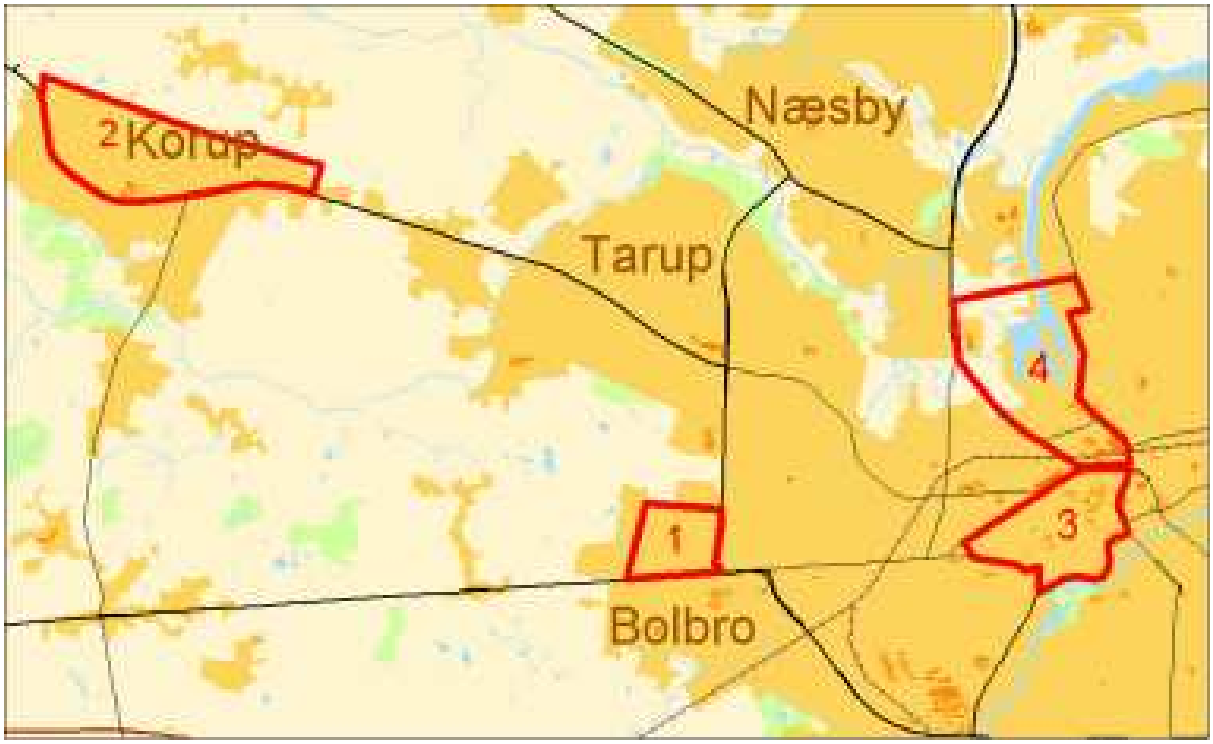


Figure 28: 1+2 Environmental housing areas, 3 Environmental city zone, 4 Odense Harbour

Measures designed to support changes in transport mode and to influence habits and traditions are not geographically based as such but are an integrated part of the Odense strategy to enable modal shift generally and to demonstrate this in the 4 selected priority zones in particular.

Integration concept

Integration of the City of Odense measures has been developed on the basis of the idea that successful modal shift (change) requires a 3-dimensional understanding of the nature of promoting change in the physical environment. These 3 dimensions are:

- Transport site (Spatial and infrastructural) – understanding of the significance of change for areas and/or specific localities and the physical infrastructure in and between localities (including factors like quality of life, safety, beauty, health, etc.).
- Transport form (modes) - understanding of the significance of transport form on 1.above in relation to opportunities for promoting change.
- Transport users (interpersonal) – understanding of the significance of culture (habits, traditions, status, etc.) and relationships (personal, organisational, institutional, professional, political, etc.) on opportunities for promoting change.

The following matrices illustrate how Odense's measures were integrated into a single project in MOBILIS.

Connection between space, transport mode and transport users

The table illustrates how sites, transport forms and users fit together to target change at both zone and city level.

	6.10.O	8.7.O	9.5.O	11.10.O	11.11.O	11.12.O
Transport site	X	X				(X)
Transport form	X	X	X	X	X	X
Transport users	X	X	X	X	X	X

(X) County, city and zone level

Connection between target groups and measures

In order to create as much public and stakeholder interest in MOBILIS as possible, different demographic and social groups were targeted as follows:

	6.10.O	8.7.O	9.5.O	11.10.O	11.11.O	11.12.O
Target group	Residents	Economically hrad-up citizens	Families	Children	Families	Everyone

Connection between plan types and measures

Within the fields of transport and traffic planning, many specialised plans often operated independently. Odense's MOBILIS project ensured that all relevant plan types were brought together within the project.

	6.10.O	8.7.O	9.5.O	11.10.O	11.11.O	11.12.O
Plan type	Speed Reduction Plan, Road Safety Plan, Town Centre Plan, Traffic and Safety Plan for Odense City Centre	Public Transport Plan, City Design Manual (bus stops)	Public Transport Plan	Road Safety Plan, Plan for Safe Routes to School	Public Transport Plan, Cycle Plan	Regional Plan for Funen, Municipal Plan for Odense, Public Transport Plan, Harbour Development Plan. Plan for Ring Road 3

Cooperation between private and public transport firms and institutions

The success of Odense's MOBILIS project depended upon cooperation between firms and institutions responsible for the provision of transport in Odense.

	6.10.O	8.7.O	9.5.O	11.10.O	11.11.O	11.12.O
Firm/institution	Odense City Council, Copenhagen City Council,	Odense City Council, Funen County Council,	Odense City Council, Taxi companies, Car sharing	Odense City Council (Technical Dept. + Schools	Odense City Council, Car sharing companies, Route	Odense City Council, Funen County Council,

	Haulage firms,	Private bus companies, Taxi companies, car sharing companies	companies, Cycle manufacturers	Dept), MOBILIS partners	planning web sites	Danish State Railways

Measures implemented:

Table 17: Overview table: MOBILIS measures in Odense

Measure	Title	Lead partner
6.10.O	Implementation of environmental zones in Odense	Odense
8.7.O	Integration and quality improvements of sustainable modes in Odense	Odense
9.5.O	Creating alternative mobility options for owners of old cars in Odense	Odense
11.10.O	Interactive traffic training for children in Odense	Odense
11.11.O	Personal transport choice marketing in Odense	Odense
11.12.O	Mobility management service for Odense Harbour	Odense

Odense: Objectives and Targets

The demonstration measures selected by the City of Odense in the MOBILIS project were directly related to aims and objectives described in national, regional and local laws, plans and strategies.

Within these contexts, the selection and design of the concrete measures in MOBILIS had been strategically chosen to foster environmentally friendly transport through a combination of:

- Reduction or limitation of barriers hindering transport choice (technical, spatial and organisational measures),
- Targeted efforts to motivate changes in traffic/transport choice behaviour (social and cultural measures),
- Demonstration of value of 1. + 2. on different area types (priority zones) as pilots for a city-wide zone strategy (psychological and communicative measures)

Seen as a whole, the package of initiatives is intended to demonstrate not only that a further modal shift can be achieved but that the viability of this shift is dependent on regulation and intervention as well as a broad understanding of the significance of mobility choice for the environment, public health, minority rights, etc.

Despite significant changes in modal shift to more environmentally sound transport forms in Odense, at a local level, the number of cars, car trips and traffic density on roads is still increasing on the adjacent east-west going motorway and larger transit roads. The roads with the highest traffic densities either run directly through or close to the city centre. The detrimental effect on the living environment and for mobility from city area to city area has long been an Odense problem. The opening of the Great Belt Bridge 10 years ago may have placed Odense at the centre of the Danish national road network but it has also highlighted the conflict between transit traffic and the environmental and

health interests of city users. The increased pressure on transit roads has led to the execution of joint national, regional and local agreements on plans for construction of a new motorway between Odense and Svendborg, extension of the existing motorway with an extra carriageway in each direction, construction of a ring road from North to south on the eastern side of Odense and construction of a bridge over Odense Canal. The ring road and bridge will complete the outer ring road around Odense and now offer Odense City Council the opportunity of:

- moving transit car and lorry traffic away from the city centre
- fostering further local modal shift
- improving the quality of the physical environment
- improving traffic safety
- improving conditions for public transport services

The combination of measures within MOBILIS would help to achieve the Odense objectives, building primarily upon this unique opportunity to reduce the historic conflict between transit traffic and city interests whilst fostering a modal shift at the same time.

The targets of the MOBILIS measure results were to support transport mode changes, to enable modal shift generally and to demonstrate this in the 4 selected priority zones in particular.

3.8 Summary of Measure Results for City of Odense

Measure 6.10: Environmental zones

Introduction

Before CIVITAS/ MOBILIS, environmental zones have traditionally been established through the use of special speed regulations and access restrictions. Public awareness about the quality of life in cities has resulted in often dramatic changes in the physical fabric of city centres: pedestrian streets, cycle lanes, access restrictions, parking restrictions, exhaust filters, etc.

Objectives

The objectives of this measure were to draw up a strategy involving citizens for environmental zones for all housing areas in the Odense Municipality, to establish environmental zones for Odense City Centre within ring road 1 and for 2 selected housing areas in Odense Municipality, to increase the quality of life for city centre residents and users, to reduce the negative impacts of motor vehicles on residential environments by introducing measures to limit or restrict vehicle access, noise and speed (by 25%) and change road space and geometry, and finally to execute necessary marketing campaigns and negotiations for change with involved stakeholders to foster success for quite different types of environmental zones.

By reducing the impact of motor vehicles, the public road can be used for social interaction in residential areas. In the city centre, special initiatives can motivate road users to cycle and walk more often.

Implementation

The measure was implemented in two stages.

1. To ease soft mobility in the city centre zones, between 2005 and 2007, the city of Odense has put up countdown signals, which indicate the time until next traffic light green cycle, set up interactive information system providing information for pedestrians and cyclists about cycle lanes, cultural information and safety recommendations, and lastly implemented 4 cycle scanners at four different spots along inner city cycle lanes. Scanners aim to encourage and reward cyclists; they detect a bicycle placed in front of it through an under earth coil. Cyclists can stop; scan their social security card (once every hour) to earn a point and thereby join a lottery. The lottery concept intended to encourage cycling and healthy living, in particular among elderly people. Several lotteries were successfully held.

2. To implement environmental zones, the city has selected, in 2005, two housing zones (an older: Bolbro and a newer: Korup); they were ordinary ones according to Danish standards, where traffic was a safety problem for children and soft mode users due to average car speed; in housing area.

   The city has involved all stakeholders (resident and housing associations, public transport operator, cyclist federation, public services, including police) in working groups and meetings to define the design and regulations of these environmental zones. The work prescriptions were to establish a limited 30 km/h zone and respect budget limits. Finally, it was decided to use street humps, access restrictions by street closing in Bolbro but not in Korup, signage and road narrowing. Establishing 30/km zones required justice ministry exemptions, which have been long to obtain; the investment cost turned out to be higher than expected.

   The communication actions were important. The city developed a web page (www.levendeveje.dk), distributed flyers to residents of both areas, put up posters in visible places with information about the project and involved the local press to relay the information during project duration.

Results

The evaluation of the measure focused on the environmental zone impacts.

The overall effect is larger in Bolbro than in Korup, due to the closing of streets, which reduced through traffic.

- In terms of economy, the measure could not be evaluated: the drop in number of accidents 3 years after implementation was not a statistical significant result. Nevertheless, the expected result is a reduction by around 10 accidents per year for the two pilot areas, which represents for the society a value of 3,900,000 (euro) per year.

- In terms of energy and environment, there have not been any exact calculations in relation to energy savings and to the environmental benefits respectively, due to the pilot areas.

- In terms of transport, the volume of car traffic in the two pilot areas increased by 6% in Korup and decreased by 35% in Bolbro, while usual car traffic at the two control points decreased by 12%. The average speed in the two pilot areas decreased by 12% in Korup and 22% in Bolbro while the usual car speed at the two control points increased by 1.1%. Cycling has increased by 62% in Korup but the number of cyclists remains unchanged as well as the number of pedestrians.

The achievement of a quantifiable target has been obtained in the decline of the average speed by 25% in Bolbro and 20% reduction in through traffic. But, the 25% increase in pedestrians and the decline in average speed by 25% in Korup have not been achieved.

- In terms of society, 15% of the total residents participated in the Internet-based survey before and after the implementation of the 30 km/h speed zones. Before the project started, only 24% thought that the possibility of crossing the road was good or very good. This share has increased to 61% in 2008.

  The number of residents speaking to each other every day has increased from 22% to 28%. The interactive information system has 608 users on average per month. This shows that information on traffic, culture; etc, is useful for the public.

Lessons learned and recommendations

The implementation of this measure met two obstacles. Firstly, the Road Directorate decided to have a distance of 150 metres between the physical measures, the 85% percentile should not exceed 36 km/hr. Unfortunately, this was not possible to implement. Secondly, The Road Directorate took 6 months to approve the project. The residents lost interest in the project and became unsure about its future because of this long intermission.

But there are also two positive features. Firstly, the process involving the local residents was very positive and gave local ownership and support. Secondly, the website was very useful for getting basic information for a larger share of the residents and for use as a platform for communication with the residents. The active participation of stakeholders such as local residents and the Road Directorate have helped to.

Green waves for cyclists, interactive information, countdown signals and cycle lotteries are useful for promoting cycling and walking in the city centre.

Projects like Living Streets are very popular and improve traffic safety and increase cycling in general. To implement similar measure, it is recommended to involve and inform citizens. To ensure an optimum reduction in speed level, the distance between the physical measures should be reduced to less than the 150 metres applied in the two pilot zones. The Danish Road Directorate particularly recommends a distance of 75 metres.

Measure 8.7. O: Integration and quality improvements of sustainable modes in Odense.

Introduction

Turning the current trend of increasing car transport in Denmark in favour of public transport use is one of the greatest challenges for mobility planning. By removing the barriers against the positive choice of public transport options, it is hoped that Odense can contribute to this shift by focusing on the qualities of public transport through advertising and marketing activities.

Up until the end of 2006, bus services in Odense were provided by a council-run bus company (Odense Bybusser), which, until the MOBILIS project application, had little or no tradition for cooperation with the transport operators. Before CIVITAS, there had been little or no cooperation between motorised public transport modes and cycles to remove barriers for mobility choice, and to

improve the match between supply and demand for public transport, cooperative systems, inter modal exchange, information and timetables must be brought into place.

Objectives

The main objectives were to increase the quality, attractiveness and accessibility of alternative transport modes and to carry out interrelated innovative activities to promote the use of the new integrated service, including marketing and media campaigns.

Implementation

The measure was first implemented through a marketing campaign-image, which took place from January 2006 to October 2006. It was launched to raise the awareness of PT in Odense and to create a better image. 5,000 umbrellas and water bottles with promotion of the new website were handed out in the city.

A bus from FynBus was parked at the square in front of the city hall in Copenhagen and broadcasted at the webcam of the national newspaper, Poltiken.

The city then introduced bus priority system at road junctions and electronic information system; it placed 5 interactive information points with wireless Internet giving real time information and 2 electronic signs giving information about the next buses.

Real time information is offered on SMS and customers can use WAP to download the actual timetables. They also can buy

bus trip ticket by SMS.The WAP application for downloading timetables has been up and running for 2 years, the SMS information system 2 months longer. Logo of the SMS-ticket.

Results

The economical and environmental impacts of this measures have not be assessed. Nevertheless:

- public transport in Denmark is usually supported by approximately 50% of local municipalities and in Odense this is equivalent to more than 10 million euros a year. If some new customers use the existing bus capacity, the economic results would be improved.
- every trip converted from car into a local bus reduces the CO2 emission by 51% on average and this can be brought to 100% with clean vehicles.

In two years, 10,052 users have been registered in the WAP application, the equivalent of 419 monthly users. A survey from 2006 showed that 87% of the users of the website were happy about accessibility, and 17% are regular users of local buses, while 27% never use them.

Tickets sold by SMS now cover 4-5% of total sales.

The bus priority system has increased travel speed by 3% in the evening and 1% during the day due to traffic congestion.

Quantifiable targets, such as higher awareness of public transport, high use of new services, and high use of the SMS tickets, were achieved in full.

Lessons learned and recommendations

The measure revealed that:to improve bus travel time, bus priority systems are not enough; it is necessary to create segregated bus lanes where congestion level is high .

There are also two positive features.

The creative use of mobile phones for ticket sales and to provide relevant information is very much in step with the image of the younger generation. Furthermore it is a very cost-effective way of using people’s existing equipment in new ways.

The participation of stakeholders, such as politicians, has largely supported the initiatives in relation to the press. Gimmicks have really motivated public transport users.

Public transport and buses especially needed better promotion, not only to attract new customers but also to improve the perceived image for present users. It is recommended to repeat information and marketing campaigns constantly, even though the budgets do not permit this. Gimmicks like handing out umbrellas and bottles with drinking water is a very good way to motivate public transport users.

Private cars get all kinds of new technologies to catch up with this trend; electronics can be used in many new services for public transport to heighten the impression of being a modern public transport user.

Measure 9.5. O: Creating alternative mobility options for owners of old cars in Odense

Introduction

The mobility choice measure for marginal car owners and users provides a unique opportunity to demonstrate that personal mobility management together with integrated public transport services and use of services such as taxis and car sharing (car clubs) can remove older, polluting cars from the roads. Families in Odense will test the new means of transport.

Due to high vehicle taxation in Denmark (180%), the average age of motorcars is higher than the rest of Europe. These older cars polluted more and used more energy than newer ones. The oldest cars are often owned by lower income families or are used as a second car in better off families. They are, therefore, typically underused, often on a seasonal basis with a low annual mileage. In optimal circumstances where mobility alternatives exist, these car owner/user types might be persuaded to choose an alternative mobility pattern.

Objectives

The main objectives were to reduce the number of old, polluting and energy inefficient motorcars in Odense and to transfer marginal car owners/users to more environmentally friendly transport modes by

- establishing a viable, alternative mobility programme for marginal car owners/users and lastly,
- designing and implementing necessary campaigns and personal contacts for the targeted car owner/user group to foster a modal shift.

Implementation

The measure was targeting a minor group of private families to demonstrate how people easily can live depending less on the private car as a means of transport. It was implemented in three stages. Firstly, the marketing campaign was carried out to attract target groups relevant for this measure by putting up large posters, TV-coverage, press release and articles for different websites. Then, as some 160 families[25] joined the campaign, they received a package consisting of free travel on local city buses for 1 month, membership of Odense's car sharing club, access to taxis paid in arrears on a monthly basis without interest, 5% rebate on the purchase of a bicycle for personal use and a journal to register daily trips. The appointment with the local television was crucial to get a broad dissemination of the participants daily lives. At the end of the campaign, families sent the journals and data has been collected and prepared for evaluation.

- [25] The original plan was to have 100 families each year in 4 years. The size of the target group has been reduced to 163 families, to make good use of extensive free TV-coverage of this measure.

Results

The economical and environmental impacts of the measure were not assessed exactly, but in comparison to the first 2 months the families travelled 2,367 km less by car in the autumn. This represents 426 kg CO2 and for a whole year this would be a reduction of 2,556 kg CO2. In terms of economy, every car trip saved provided economical benefits for the families. Energy consumption has slightly reduced but not been calculated exactly.

In terms of transport, 163 families signed up to the project, the equivalent of 452 people. Later on, 132 of these families continued as participants, the equivalent of 370 people. 6,602 trips covering 145,275 km were registered in May and June while 6,628 trips covering 150,705 km were registered in September and October.

The travel diary analysis revealed that Public local transport use increased both in number and in distance while car use only increased in number

	May + June		September + October	
	% of trips	% of distance	% of trips	% of distance
Car	30,7	54,6	31,8	51,1
Cycle	57,1	17,0	56,4	16,9
Regional bus	2,1	3,4	1,4	1,9
Car Club	1,1	2,1	1,2	0,9
Train	3,4	20,2	4,0	26,3
Local bus	0,5	0,1	5,2	3,0
Taxi	5,1	2,5	0,1	0,0

The Body Mass Index of the participants before and after the experiment was reduced from 24.18 to 23.80 and the trend was equal to men and women. According to their own opinion, the participant well being had improved by 9% on a scale from 1 to 5.

Even if the transfer of 400 families, marginal car owners/users, to more environmentally friendly transport modes was not achieved, 25 families continue as members' of the car club after the measure finished.

Lessons learned and recommendations

There are two barriers identified for the measure.

- The project was marketed and published as 'Car Free Families'. But this was not to be understood in the sense that people should live without cars, only use them less. This could be misunderstood by some and perhaps keep them from wanting to join the project.
- The real results may not come until several years after the measure has ended because it is a matter of changing your personal views on transport choices.

The positive features were that many citizens found the measure to be a successful initiative because people themselves should be the driving force to change the city qualities and that the local television gave a very informative and personal description of the initiative and how this could be relevant for all of us. Lastly, all stakeholders supported the measure as planned, which provided an impressive offer for the participants.

The project can easily be repeated in Odense and in many other cities in the EU. Close cooperation with the local media is highly recommended and crucial for success. If people can easily choose to lock their car keys away for a few days this could make the media interest higher. Another possibility is to reward the participants if they reduce their car use by 30% for example.

Measure 11.10.0: Interactive traffic training for children in Odense

Introduction

For over 25 years, 80 % of the school children walk or cycle to school by them selves in Odense. The percentage of cycling children is on the rise because of their inactivity, which is increasingly prevalent in Denmark. Though many parents appreciate that their children can cycle by themselves, behavioural traffic training is still necessary as part of everyday learning. The city and the police have the obligation to secure children in traffic. Otherwise the city has to pay for transportation of the children as long as they are not safe walking or cycling to school.

25 years of experience have already proved that behavioural traffic training can reduce traffic accidents and thus improve mobility choice for children. There is a need, however, for new innovative tools to support and improve behaviour-based training programmes[26] and to bring the value of traffic training for children to the attention of politicians and the public.

Objectives

The main objectives of this measure were to:

- develop and produce an Internet-based behavioural traffic training programme for children.
- demonstrate and document that the use of behavioural training can improve traffic safety for children and thus foster greater mobility choice for this category of weaker road users and improve child health through exercise, targeting 4,000 school children at 40 schools in the city of Odense.
- provide unique traffic training as a best practice example in Europe.
- carry out training programmes on how to use the tool.

Implementation

In order to achieve the above objectives, the city of Odense has launched, for the first time in Denmark an interactive traffic programme. The main idea was to develop a computer game that imitates reality as closely as possible.

At first from spring 2005 to summer 2005, the city developed a marketing plan and the drawing concept in cooperation with a Public Relation Agency, Clockwork, and the School Department. The project manager was a former teacher and head master who had good knowledge on education and school resource planning. The working group has researched how pupils can learn through computer games, what type of traffic accidents cycling children are involved in and how children develop motor, hearing, sight, coordination functions and reactivity. The conclusion was to target pupils between eleven and twelve years old. The end concept of the computer game, called B-game, is based on daily

[26] The need for traffic training received European Union funding for a project called SAFEWAY, but the technology did not exist to produce a reliable and internet based-tool at that time (1995).

cycling situations with 11-12 years old actors. Then during the summer of 2005, the game situations were filmed in Odense.

In the game, missions give a range of different challenges to the children: the player has to ride his/her bicycle trough Odense traffic and remember to sign, look over, break, turn and click on different potential situations. The success rate can indicate the level of children's abilities in traffic as a cyclist: if the most important dangers are overlooked, the player has to redo the sequence, when not, an angel appears with crash sound affects.

The interactive game has been tested on a focus group that found it very interesting and entertaining.

Finally the launching of B-Game took place in May 2006.All schools in Odense were invited to use B-Game. One teacher of each school was trained in game use, a teacher's guide was drawn up and a hot line established to help teachers regarding B-game difficulties.

However only 12 out of 53 schools did it. This means that 3 out of 4 schools were not volunteers to integrate B-Game as part of the education, despite the project manager encouragement and the training scheme of the safety officials.

Results

The results of the measure are difficult to define precisely, because the impacts are mainly long term ones.

B-Game has been played 1,694 times in total in the 12 secondary schools. Girls played 50.4% of the games. Boys succeeded in all 11 missions for 86.5% of games played, while girls succeeded in 84.1% of them. This reveals that the pupils kept playing until most of them succeeded all 11 missions and that the difference between the boys and the girls is almost none existing in this field.

In economic terms, the more children can cycle, the more parents will be able to save money from buses and taxis. If, thanks to this type of measure, a family can save a private car – often the second car in the household – this is the equivalent of a yearly expense of €5 - 10,000.

Energy consumption is not directly affected by the measure, however it allows children to cycle more independently in daily traffic.

Concerning the environment, bicycle use consolidated by the B-Game can, in the long run, reduce fuel emissions in the city.

Lessons learned and recommendations

With the Mobilis measure, B-Game, the municipality wanted to invite the children to learn through playing a computer game. The interactive aspect of B-Game can be seen as a fun way for children to improve cycling abilities and learn about dangerous situation in the traffic.It teaches children about distances, speed and motion traffic through a number of planned and structured video sequences which make the situation as real as possible.

While implementing this measure, the city of Odense came up against three main barriers. The first was due to the many external training and educational programmes planned and related to drugs, alcohol and health, which explains why the involvement of schools was different in spite of the well planned project. The second barrier concerned the teachers: most of whom did not even try out the programme themselves. The third was that the city did not manage to attract the attention and participation of the National Safety Council because they were busy with their own measures.

The positive features, however, were:

- the management of the educational part of the project by a school consultant gave a high quality level for the system.
- a special bicycle was used for the filming in a realistic way and tested on a selected focus group of children to monitor the effect and to see if it was attractive and exciting for children.

The measure impacts should have been more efficient if schools and teachers had been more committed to the B-Game project, as the project demands such a large budget and so much manpower, and a dedicated project manager could have set up the scheme to get their attention.

Measure 11.11.0: Personal transport choice marketing in Odense

Introduction

Though the city of Odense has had positive experience from the personal marketing and implementing of business transportation plans for firms and public institutions, before CIVITAS, no direct marketing in a transport mode context had been tested in the city or elsewhere in Denmark.

Objectives

The main objectives of this project were defined in 5 points:

- To implement a programme of direct personal marketing on environmentally friendly mobility modes among 5,000 to 8,000 households.
- To increase the number of individuals and families who choose environmentally friendly traffic modes.
- To remove physical and psychological barriers that limit mobility choice.
- To establish an Internet sustainable transport portal.

Implementation

The city of Odense organised the necessary events and marketing activities based on raising the awareness of citizens in Odense (distribution of portfolio with brochures promoting soft modes of transport), carried out by a group of trained students (It was originally planned to hire unemployed

people, as part of a training scheme, to carry out the house visits and interviews. Due to the very low unemployment rate in Denmark this was not possible). Between May and October 2006**,** 8 students visited some 5,000 households and called 10% of the households to repeat questions concerning transport habits. 2,000 of the visited households were asked the same questions three months later to collect data for the evaluation. Aalborg University has produced an English report on best practice for Travel Smart and the city of Odense has published and distributed a mobility magazine for every household in Odense. The city has also involved other stakeholders like Fyn Bus, Odense Taxi and Odense Mini Taxi, Hertz Delebiler and childcare institutions. Finally in 2007, a demonstration activity was added, promoting the use of cycle trailers in childcare institutions (promoting cycling with cycle trailers as an alternative to car use for shopping, etc.). The city has launched a cycle trailer campaign in 16 childcare institutions.

At the same time, in 2006, the city developed the transport budget site http://www.cykelby.dk/budget/index.asp - where citizens can calculate their transport budget and the results concerning time, economy, environment and health.

Results

In terms of results, the impacts of the measure are not easy to define.

The results of the survey showed that car trips dropped by 9%, bus trips increased by 58% and train trips increased by 54% in the families targeted by the marketing campaign.

Walking and cycling trips did not feature in the survey because the respondent had to answer on behalf of the whole household. Walking and cycle trips are often quite short and this could result in quite irregular answers.

The online transport budget portal had 1,546 different people using the calculations – 64 of them even used the calculations several times. The numbers cover the period from spring 2006 until the summer of 2008. More than 5% of participants who could visit the website to see the results of their possible impact on the energy or environment consumption have changed from car use to a more sustainable transport mode.

15 cycle trailers were donated to 13 childcare institutions. 840 flyers were distributed among the parents and 74 families in total tested the trailers on average for 2½ weeks each.

In relation to the cycle to work campaign, 15 persons employed by the city administration received a cycle trailer each for testing in May 2008. Every trailer was used for 72 km on average and the purpose of the trips was: for 26% a trip to school, for 45% to work, for 10% to go shopping and for 19% for leisure.

Each family can benefit economically from reducing car use.

The measure implementation, only based on student salaries, was quite cost-effective.

Lessons learned and recommendations

While implementing this project in Odense, the city came up against two main difficulties. It was originally planned to hire unemployed people, as part of a training scheme, to carry out the house visits and interviews, but the very low unemployment rate in Denmark makes it hard to hire unemployed staff for this activity. The weather conditions and the heavy rain over the summer made it hard to work outdoors with personal marketing. Regarding positive features, as the marketing was voluntary and without any commercial pressure, students worked well while questioning citizens and can use these experiences in the future in their professional career. Brochures, websites and so on could participate more easily in an efficient way to contact citizens. The participation of families has helped to promote cycling trailers

Direct marketing on transportation, which has been very suitable for Odense, is recommended for many cities in Northern Europe because citizens will be able to play as active a part as their local authorities in significantly changing the overall mobility of their city.

Measure 11.12.0: Mobility management services for Odense harbour

Introduction

Before CIVITAS, Odense harbour had no connection with the city centre. Being an isolated area, the harbour was not included in the traffic plan of Odense.

The former industrial area has now been reconverted for more recreational use where new apartments are being built and many new light businesses have set up in the district. As polluting industries are moving out of the area, the harbour will over the coming years be connected to the city centre.

To better consolidate this vision, Odense needed integrated mobility management which includes all modes of transport and a planning strategy where architecture and traffic planning are fully integrated.

Objectives

The different objectives of this measure were to:

- demonstrate the benefits of integrated mobility management services for a better connection of Odense harbour and the Odense city centre.
- involve private firms and the public in the preparation of mobility management services.
- integrate all sustainable transport modes into existing traditional traffic and transport prognosis models in order to improve the planning of new services and their evaluation.
- disseminate mobility management service experiences through training programmes for professional traffic planners.

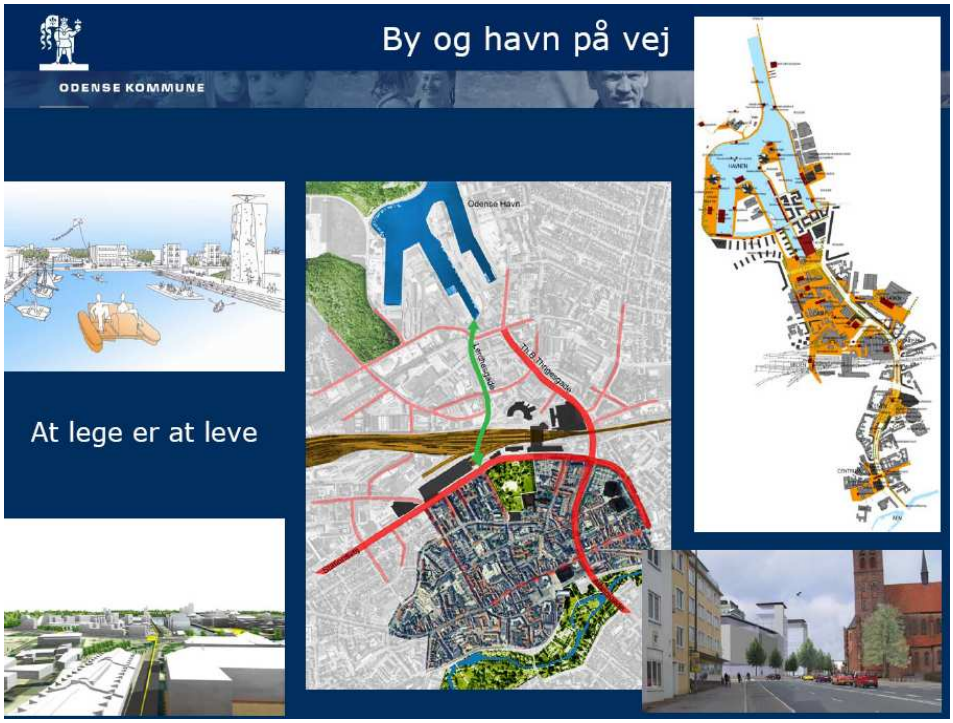
Implementation

The initial idea about drawing up and implementing environmentally friendly mobility management plans for private companies and residents in the harbour area has been abandoned, due to a change in the target group caused by a rapid urban development in the harbour area.

The measure was implemented through 2007. Just before the traffic and mobility plan was set in motion, the urban planning department published a local plan for selected areas in the city centre, that positively affected public opinion. The plan is very ambitious and includes all modes of transport and both soft and hard measures. Quality of life – a city for people – is very much viewed as one of the main criteria. Urban life is seen as an integrated issue, as are traffic volumes and the speed of traffic. Most car parking will be placed in underground facilities.

The working group, which includes the traffic department, the city planning department, the urban planning department, the public transport company and external consultants, has published a report on the different possible tools to be used. These help to give an overview of the actual possibilities and the expected outcomes. Stakeholders and citizens can connect through the toolbox published by the working group in order to get information on different options. In May 2008 meetings were organised with local authorities and the Odense City Council approved the implementation of the first railway system and the building of the missing link in the ring road system: a bridge across the Odense Canal.

In connection to this, the main street running form the city centre to the harbour (Thomas B. Thriges Gade) will be completely closed to traffic so that 35,000 cars daily will have to drive around the city centre and no longer straight through. A local city bus, probably run by electric power, is planned on the ring road to create a stronger connection between the harbour area and the city centre. The bus might become a free service to increase the number of users and to promote public transport in general.



From the presentation at a stakeholder meeting – about connecting the city and the harbour area

A special website was set up to collect basic information on cyclists' preferred routes. 3,000 cycle trips were drawn on the screen. 6 new cycle pumps have been placed on the ring road to provide services for cyclists and to increase cycling in general.

The traffic model, which fully integrates car traffic, public transport and cycle traffic, should enable the impacts of the changes in modal shift to be assessed to highlight the benefits of different scenarios. Due to the massive amount of work, this modelling has been heavily delayed.

Odense is going to become the first city with a fully functioning traffic model covering cars, public transport and cyclists. With this tool Odense can predict the impact of major infrastructure projects and try to avoid negative changes in modal shift. This gives much better chances to improve the city's image as one of the best cycling cities in Europe.

The implementation of the plan for traffic and mobility is the most ambitious initiative in Odense ever. The project will lift Odense to a situation where cars should be placed in the outskirts and where cycling, walking and public transport will get a very high priority. This is going to influence the image of Odense to become a much more attractive city to live and to work in.

Results

The impacts of the traffic plan can only be estimated, as it has not been implemented in MOBILIS time.

In terms of economy, the total costs for implementing the traffic and mobility plan exceeded €100,000,000. It will led to a number of different benefits, such as a reduction in the number of accidents, less environmental impact, an improvement in quality of life and a higher attractiveness for new settlements, which have not been estimated in terms of economy but the political support indicates that the total benefits will outweigh the costs in the long term. More developers are expected to come to Odense to invest in business and culture, and Odense will become much more attractive to especially younger people and families – groups which are essentially for the tax revenue on the long term.

In terms of energy and environment, the traffic model contains all of the information concerning each car trip and this will be used to calculate total energy consumption and CO2 emissions (which has not yet been done).

In terms of transport, the traffic and the mobility plans should force car traffic out of the city centre and favour cycling and public transport. In terms of society, surveys have revealed that the new traffic and mobility plan and reduced car traffic and speeds should make the city centre more attractive to cyclists and pedestrians.

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The city of Odense notes that the cycle traffic model, which is a very new concept, and the plan for traffic and mobility are very complicated to develop. They needed to involve the expertise of specialists from technical universities. The process is highly linked up to the political decision level and therefore it is difficult to control how it will progress.

Lessons learned and recommendations

The project has been successful thanks to the sale of an energy company, which enabled a very ambitious plan for investments to be set up in the city centre and politicians to give their agreement on some very essential principles for the main traffic corridors in Odense. The city of Odense could be one of the best cities for cycling in Europe and could predict the impact of major infrastructure projects and try to avoid negative changes in modal shift. Its image will be more attractive, especially to younger people and families as cars and public transport should be diverted to the outskirts and cycling, walking and public transport will be given very high priority.

To implement a similar measure, cities must be aware that:

- the citizens and the stakeholders should be able to fully see how things are developing through the planning process and to support the initiative after further involvement throughout the ongoing planning of the project.
- the cycle traffic models need to be initiated from the very beginning of the project, as it always take longer than planned.

3.9 City 4: VENICE

The City of Venice is unusual, as it is actually made up of two parts, mainland Venice and Island Venice, each of them very well defined and with different needs in terms of transport. A bridge for trains, buses and cars connects the two parts of the city.

Venice is one of the most famous cities in the world, strategically located in relation to both Italy and Europe. It is the capital of the Veneto Region, which has become one of the strongest economic regions in Europe.

The town of Venice lying in the middle of a brackish lagoon, with a surface area of around 550 km² and is one of the largest wetland of the Mediterranean basin. The city includes the historical centre (Venice), the Lido and Pellestrina islands, the islands of the Lagoon (Murano, Burano and the other minor islands), as well as the mainland urban areas of Mestre and Marghera.. Venice has a population of 271,000 people and every day 47,000 workers and 16,000 students commute in and out of the old city.

Tourism is the mainstay of Venice's economy: it has a large and motivated workforce of over 124,000 people and boasts more than 21,000 business units. But tourism is not the only relevant economic activity. The port of the city, for example, is one of the largest in Italy, employing some 18,000 people. The presence of more than fifteen major highly specialised research centres as well as the Vega Science and Technology Park and excellent education and training facilities in all fields have resulted in diverse specialist and rare expertise.

Quality of life is one of Venice's main goals: today it is emerging as a modern city that combines vibrant cultural and leisure opportunities with a safe and quiet lifestyle. In addition, the city is strongly committed to enhancing the welfare of its inhabitants. The Social Affairs Department is renowned as one of the most efficient in Italy and runs a wide range of social services.

The architectural heritage set in the charming lagoon environment and its seaside resorts attract 3.4 million leisure day visitors and 12.1 million overnight visitors per year.

It is a city rich in cultural opportunities and facilities and is home to people from 122 different countries. Several religious communities have been in Venice for centuries, and different organisations, which promote inter-religious dialogue, are also based in the city.

With regards to Mobility, according to forecasts made by the Council Energy Plan and the Town Mobility Plan, in a business as usual scenario the spontaneous trend for mobility over the next few years is estimated at about a 4% increase in the use of private cars, and consequent increase in energy consumption. The package of CIVITAS MOBILIS measures to be implemented aim to tackle this trend.

Venice Description: MOBILIS in Venice

Mobility in Venice has two dimensions; that of a typical medium-sized urban area on the mainland, and the waterborne traffic in the lagoon and canals of island Venice. The challenges for sustainable mobility are therefore various.

The measures chosen to be developed in the MOBILIS project were mostly actions that are already having or are targeting a strong impact in modal shift and the sustainable development of mobility between Mainland and the Lagoon.

Concerns were similar to other cities in the Mainland, with a high use of private vehicles and the need to improve and promote public transport and alternative mobility modes. In the Lagoon, except the bridge that connects Venice with the Mainland, the use of boats must be rationalised and supported with technological instruments and the pollution generated by marine-engines in public and private transport must be reduced.

The key policy fields where the city has been active:

- Introduction of natural gas in the public transport bus fleet both through acquisition of CNG buses and also in waterborne transport, particularly through the promotion of GPL as fuel for private recreational craft in the Venice lagoon.

- Strengthening of the car sharing scheme both among private users and among companies with the aim of reducing the need and the number of private vehicles in circulation.
- Modification of restricted access systems for tourist buses in the Mainland, in order to render the schemes more sensitive to the energy efficiency of the vehicles being used through the application of differentiated tariffs according to the "polluter pay principle".
- Strengthening of waterborne traffic satellite control and cooperation between institutions involved in satellite control *harmonisation* of 2 global positioning systems in Venice.
- New parking management strategies supported by the use of instruments, a combination of differentiation of tariffs, marketing and real-time information to facilitate and encourage a correct use of car parks around the mainland.
- An innovative parking strategy in the canals of island Venice (temporary parking booking web interface, etc) that aimed to improve traffic conditions on island Venice.
- Increasing modal shift through a series of activities aimed at promoting and facilitating the use of bicycles on the mainland.
- Establishment of an innovative control system for boats entering the Grand Canal, the main artery for traffic in the historical city of Venice.
- Introduction of waterbuses with a lower environmental impact, which are accessible to disabled users.
- Development of a waterborne traffic management decision support system.

The main demonstration sites in Venice

The measures concern both mainland and Venice islands areas.

Mainland (Mestre and Marghera)

- Interchange car parks around the city and central car parks
- Urban bus routes on the mainland and across to Piazzale Roma
- The LTZ (Limited Traffic Zones) access point on the mainland before the bridge over to island Venice
- Introduction of safe bicycle parks in strategic locations around Mestre

Venice Island

- Canals of island Venice
- The lagoon
- The Piazzale Roma-Murano waterbus route
- Grand Canal

Figure 29: Image of the whole area of impact: Venice Lagoon (measures 5.5.V, 6.8.V, 8.8.V, 12.5.V) and the Mainland (6.7.V, .6.9.V, 10.2.V).

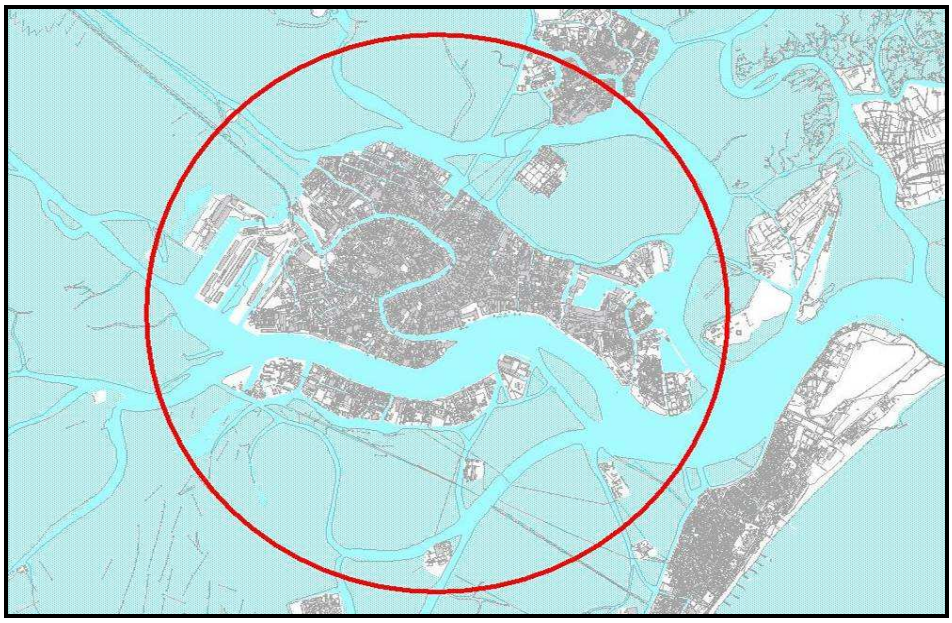


Figure 30: VENICE CITY CENTRE: AREA OF DEVELOPMENT FOR MEASURES (12.6.V).

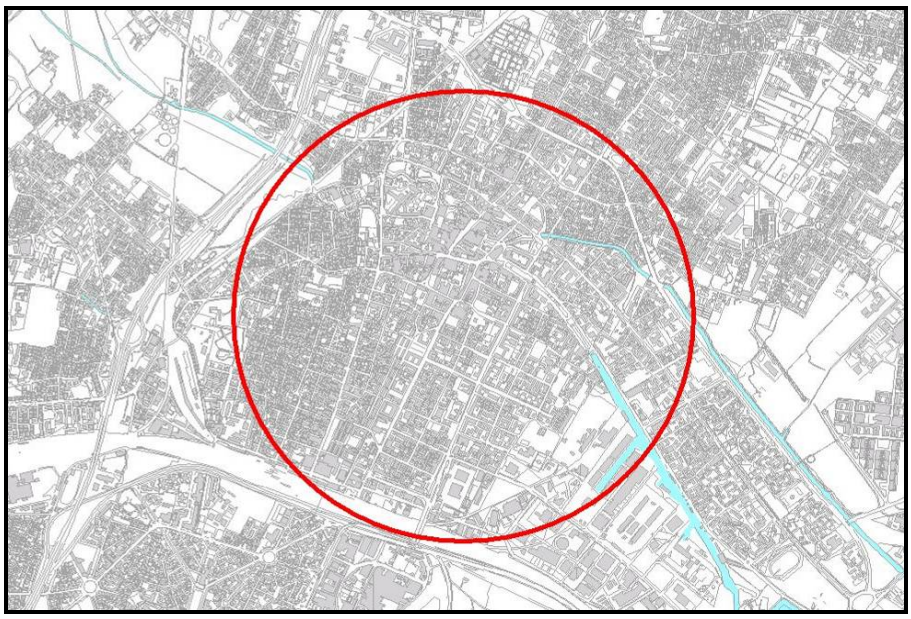


Figure 31: MESTRE CENTRE (MAINLAND): AREA OF DEVELOPMENT FOR MEASURES (6.7.V, 6.9.V, 10.2.V).

Integration concept in Venice

Offering alternatives to private car users with the aim of increasing modal shift, recognising that there are different types of users and therefore the alternatives must appeal to their individual needs, i.e the car sharing scheme no longer sought to appeal only to Venetian residents and those who have to make short personal journeys in the area (also to increase in size), but also to offer an alternative to companies in the place of company cars. The new bicycle services which were developed also sought to target different groups and reduce the number of private cars circulating into the city, appealing to residents but also to tourists and commuters.

The city has also been working on increasing the quality of life through the introduction of cleaner fuels across the board: in buses in the mainland, in the car sharing fleets and in the privately owned recreation craft in the lagoon.

Table 6: Geographical integration of measures in Venice

Measure	*Title*	*Main impact*
5.5.V-A	Deployment of LPG boats in Venice	Venice Lagoon
5.5.V-B	Deployment of CNG buses in Venice	Venice Mainland
6.7.V	Parking management strategies for Mestre (Venice mainland)	Mestre Centre
6.9.V	Electronic control of the Mestre restricted access Zone	Mestre Centre
6.8.V	Access management for the city centre	Venice Mainland
6.11.V	Access and traffic management in the Grand Canal through ARGOS (Automatic Remote Grand Canal Observation System)	Grand Canal
8.8.V	Introducing low impact, access for all waterbuses	Venice Lagoon

9.4.V	Expansion and diversification of the car-sharing scheme in Venice	Whole Mainland
10.2.V	Clean urban logistics	Venice Canals
11.9.V	Promotion of safe and increased bicycle use	Whole Mainland
12.5.V	Satellite Control (GPS-GPRS) for water PT services	Venice Lagoon
12.6.V	Management decision support system for water borne traffic	Venice Lagoon

The measures were based on sound financial integration. The CNG bus measure provided for the construction of a refuelling station with national funds and CIVITAS funding for the extension of the gas network and the purchase of 35 new CNG buses and 5 CNG minibuses.

Table 6: Measure integration

	5.5.V-A	5.5.V-B	6.7.V	6.8.V	7.2.V	8.8.V	9.4.V	10.2.V	11.9.V	12.5.V	12.6.V
5.5.V-A											X
5.5.V-B											
6.7.V					X		X				
6.8.V			X								
6.9.V			X				X				
8.8.V										X	X
9.4.V			X		X						
10.2.V					X						
11.9.V			X		X						
12.5.V											X
12.6.V										X	

In CIVITAS, Venice has also looked for opportunities for using economic instruments, which can encourage the use of more energy-efficient and less polluting vehicles. The city already has access charges for tourist coaches. With CIVITAS, an appropriate differentiation of tariffs will be applied in accordance with the level of the standards met by the vehicles: lower tariffs will be applied to more efficient vehicles, thereby motivating the use of low or zero emission vehicles for the transport of tourists.

In measure 12.5.V, the Municipal Police Control Centre and ACTV's public transport control centre are integrated in order to combine the system for all boat flows.

A single project partner carries out few measures. Measure 6.7.V on parking strategies for the mainland and measure 6.9.V on the electronic control of the Mestre restricted access Zone are carried

out jointly by the City of Venice and ASM Spa, the City of Venice Company that has the management of mobility services in its charter. The City in partnership with a private firm, FormaUrbis carries out the measure on temporary parking in canals. FormaUrbis also works with the City of Venice in the implementation of measure 12.6.V on the creation of a decision support system on canal traffic circulation. The local consortium has also formed a partnership for close coordination with FIAB, an association of bicycle users.

Measures implemented:

Table 18: Overview of MOBILIS measures

Measure	*Title*	*Lead Partner*
5.5.V-A	Deployment of LPG boats in Venice	Agire
5.5.V-B	Deployment of CNG buses in Venice	ACTV
6.7.V	Parking management strategies for Mestre (Venice mainland)	City of Venice
6.8.V	Access management for the city centre	ASM
6.9.V	Electronic control of the Mestre restricted access Zone	City of Venice
6.11.V	Access and traffic management in the Grand Canal through ARGOS (Automatic Remote Grand Canal Observation System)	City of Venice
8.8.V	Introducing low impact, access for all waterbuses	ACTV
9.4.V	Expansion and diversification of the car-sharing scheme in Venice	ASM
10.2.V	Clean urban logistics	City of Venice
11.9.V	Promotion of safe and increased bicycle use	City of Venice
12.5.V	Satellite Control (GPS-GPRS) for water PT services	ACTV / City of Venice
12.6.V	Management decision support system for water borne traffic	City of Venice / Forma Urbis

Venice: Objectives and Targets

As part of the MOBILIS project, the city of Venice sought to develop solutions for the key traffic, and therefore environmental, problems identified on the Mainland and in the lagoon. On the Mainland, traffic congestion is a result of the traffic linked to tourist activity and the high rate of car use, even for short journeys. In the lagoon, the waterborne traffic faced congestion, parking difficulties and negative environmental impacts.

The objectives of the measure were

- On the Mainland,

- To limit tourist bus access
- To foster modal shift through new car parking management and the promotion of alternative modes to the private car.

- In the lagoon,
  - To regulate the waterborne traffic through the development of new tools and the implementation of new regulations
  - To increase waterbus accessibility to disabled users.
- In both regards, to introduce public transport modes with a lower environmental impact

The main targets were:

- A reduction in fuel consumption,
- A reduction in car and boat traffic congestion,
- An increase in modal shift from car use to alternative mobility modes,
- A reduction in vehicle emissions and boat environmental impacts,
- An increase in public awareness of sustainable mobility.

3.10 Summary of Measure Results for City of Venice:

Measure 5.5- A: Deployment of LPG Boats in Venice

Introduction

This measure focused on introducing Liquefied Petroleum Gas – LPG in private boats in the Venice lagoon.

Due to the geographical context of the city of Venice, boats are a unique transportation system and the primary means of vehicular transportation. There are more than 33,500 vessels continuously cruising within the lagoon, plus more than 5,000 ships per year coming from outside for trade or tourism. This results in an additional, major, source of pollution. Leisure crafts circulating in the Venice lagoon are estimated to exceed 30,000[27]. Considering the strong orientation of CIVITAS II projects towards new solutions for sustainable mobility, AGIRE, the city of Venice Energy Agency decided to promote the Liquefied Petroleum Gas or LPGas a substitute for petrol (in both outboard and inboard motors) for private pleasure crafts. LPG appeared to be the most technologically mature, reliable and cost effective solution. Legislation regarding filling stations and conversion of gasoil engines to LPG fuel were not in force, but it was expected that it would be for MOBILIS start.

Objectives

The objectives of the measure were:

[27] ARPAV – Veneto Environmental Agency, 2006

- to introduce the deployment of LPG in the fleet of pleasure crafts used by private citizens in Venice historical city centre and the surrounding lagoon. LPG testing on a **pilot fleet sample of 10 boats** has been the start of an integrated action.
- to perform a complete and detailed study of **the state of the art and of the market** and benchmarking at the European level to demonstrate that LPG is the most feasible alternative to gasoline for pleasure crafts and bring about a reduction in air and water pollutant (particularly HC, VOC, PAH) emissions, as well as water pollution (due to petrol spilling),
- to stimulate the market, standards bodies and decision makers, through an awareness raising campaign at the local level and the preparation of a **Local Action Plan** so that the innovative experience in Venice will be the basis for the development of the use of LPG in boats firstly in Venice and then across Europe.

Implementation

In 2005, on-the-spot surveys for possible locations of LPG-dedicated re-fuelling stations were carried out. Three demonstration boats with new bi-fuel LPG outboard engines were purchased and tested. They could not be fully used under standard conditions of use as they could not be refuelled easily and as current legislation does not permit running on LPG, except in test conditions; petrol-to-LPG retrofit conversion kits cannot currently be used due to a lack of standards. The authorisation of the first filling station was signed and the location of the four filling stations was identified. However the procedures for the first filling station were carried out in derogation of the law, due to the absence of rules, after ad-hoc involvement of the fire department.

Due to these barriers and in agreement with the Commission during the site audit in October 2007, AGIRE reformulated the measure in order to bring it in line with the context in Venice. The new measure planned to:

- purchase and field-test 10 pilot boats, aiming at a full demonstration of the reliability of LPG as a nautical fuel under standard conditions of use. The ten demonstration boats had to be fitted with new bi-fuel LPG outboard motors.
- implement a complete study on the use of LPG in boats, both with new factory-made engines and conversion kits.
- Carry out an awareness raising campaign, addressing potential customers, policy makers and engine installers.
- Draw up a Local Action Plan for the promotion of LPG in boats, addressing decision makers and possible local stakeholders, giving specific roles and responsibilities to each, and thus coordinating activities with the same common objective.

In January 2008, the remaining 7 pilot boats were purchased and the company Gibellato converted two more engines.

The complete study on LPG was finalised in August 2008. It covers both solutions of new bi-fuel engines and conversion kits. During the Venice Floating Shows, the most relevant market players were contacted to start the market study.

The Local Action Plan for the promotion of LPG in boats has been delivered in December 2008 and addressed decision makers and possible local stakeholders, giving to each one specific roles and responsibilities, and thus co-ordinating activities with the same common objective.

Results

The environmental advantages of LPG are indisputable. LPG is particularly advantageous in urban areas as exhaust fumes and smoke are practically eliminated and noxious gases are nearly eliminated as a result of the improved combustion of LPG. The use of LPG dramatically reduces the emission and dissemination of a series of pollutants that have an adverse effect on human health. In particular thanks to the low carbon content of LPG in comparison with most of the other fossil fuels, LPG has a substantially lower GHG impact and emits 9%-12% less CO2 than diesel fuel through the "Tank-toWheel" cycle.

Focusing in particular on the marine applications, the highest emissions of SOx are typically associated with the large diesel engines of commercial or heavy boats, but the leisure boats are important sources of HC, NOx and CO. The final results comparing 50HP 4-strokes gasoline/LPG engine (Mercury, model 50EFI, out-board) reported that LPG generates from 48.4 to 57.9% less HC (respectively at idle and at max power), from 37.5% to 48.4% less NOx and from 8.7% to 51.6% less CO.

In terms of economy, for the usual outboard engines, the extra cost associated with the purchase of an OEM bi-fuel engine instead of a standard single-fuel is in the range of €500-1,000 (VAT included) depending on the manufacturer and engine power output. For an inboard engine, the overall conversion cost can be estimated as €500-2,000 respectively for 40-115 hp engines. The fuel cost for LPG is €0.65-0.67/litre in comparison with €1.45-1.50 litre for gasoline. The total operating costs of the boat can be assumed to be 30% to 50% lower when running on LPG, resulting in very short payback times.

The City of Venice periodically monitor the fuel consumption of various sectors of activity. Based on the historical data on the sales of gasoline for boats, the trend over the 2003-2007 period is relatively stable (a part from a low decrease from 2003 to 2005) and assuming that the gasoline is used by leisure boats only, these account for an annual consumption of about 4'500'000 litres per year and an average estimate of 150 litres per boat.

Thanks to the local action plan and to the awareness raising campaign, a positive local context on the LPG marine applications has been developed along with a more prepared the market both from the end users side and the technology providers' side

Lessons learned and recommendations

The city of Venice carried out an "In-depth process evaluation" of the measure (annex C-5-1).

Concerning LPG equipment in boats, Italy decided to wait for the issuing of the European standards. The national and international legal context and the complete absence of a specific legislation for either LPG use in a marine engine or for opening a marine filling station, whether installed on hearth or floating works, are challenging barriers.

The close cooperation with the Commission and site auditors enabled the measure to be reformulated in order to take account of the context in which the measure was evolving.

ASSOGASLIQUIDI (Italian LPG Association) has been strongly involved in order to lobby the national authorities to speed-up the regulations approval process. AGIRE has contributed greatly to technical committees and lobbying activities in the framework of the European and national legislation on marine use of LPG. The strong local political commitment for the project by the City of Venice has also been very important in terms of stakeholder participation. . AGIRE has raised citizens' awareness in the Venice Floating Shows over the years of the project in order to sustain demand for LPG engines when their use finally becomes possible.

If, as in the case of LPG in Venice, the legislative context does not yet favour the introduction of a sustainable mobility measure, then practitioners can work on understanding the market and promotion

activities in order to stimulate demand, thus facilitating rapid market uptake once the measure has the conditions which allow for its implementation.

As a general rule, if a measure is reliant on a legislative framework, it is better not to presume that laws will be approved within a given timeframe but rather to embark on the measure only once the laws are in place. Member States that have a significant concentration of boats and could therefore benefit from the introduction of a viable, more sustainable alternative to petrol, but are without the necessary legal framework, should start lobbying and working with technical committees now. A cross-European effort for the promotion of LPG, perhaps from the Commission itself, may help speed up legislative processes in countries where LPG could well substitute petrol for boats and thus reduce environmental impact.

Measure 5.5 -B: Deployment of CNG buses in Venice

Introduction

This measure focused on increasing the number of CNG – Compressed Natural Gas buses in the public transport fleet in Venice.

Venice is a city generally characterised by a good public transport supply and a high rate of public transport use. ACTV is the public transport operator.

The ACTV bus urban network[28], with 39 buses, covers more than 265.5 km on the Venice mainland and the Lido with about 2,212 daily routes for an annual mileage of some 15 million km. In 2004, the ACTV bus fleet transported around 70 million people (including sub-urban trips) and the modal share of public transport has been estimated to reach nearly 15% on working days. At the beginning of MOBILIS, ACTV had 294 buses running in the urban public transport network of the City of Venice (264 on the mainland and 30 on the Lido). Around 55 are GECAM – white diesel-powered. All the rest are diesel-powered, and most of the buses meet lower standards than Euro III. At the time there were no minibuses in the bus fleet.

Objectives

The objective of the measure was to increase the number of clean energy-efficient vehicles that run on natural gas in the public transport bus fleet, in order to increase the attractiveness of public transport and reduce polluting emissions.

Originally MOBILIS planned to convert 30 buses from conventional fuel to dual fuel (diesel and natural gas).

Implementation

The measure was implemented in three stages.

From May to July 2005, ACTV transformed 2 Euro 0 engine buses, using conventional fuel into buses using dual fuel (diesel and natural gas) in order to empirically verify their functioning and highlight any potential problems. After the conversion and testing of two prototypes, although the foreseen results were partially attained, this intervention underlined some signs of weakness. Specifically, the dual fuel system installed in Euro 0 buses did not have the same emission advantages of the CNG system in Euro 4 buses. ACTV decided

[28] Excluding the sub-urban network

that this choice was not economically viable and that it would be better to concentrate resources on purchasing 35 new CNG buses, co-financed by MOBILIS. They have been in operation since February 2006.

ACTV had planned to build a filling station in the ACTV depot in order to satisfy the refuelling needs of the growing CNG fleet more efficiently and faster, and also to guarantee refuelling at night. Construction of the filling station was financed with national funds. The contract between the City of Venice and ITALGAS for the extension of the natural gas pipeline was signed in January 2006 and the preliminary study for the connection to the ITALGAS natural distribution network was completed in July 2006. The CNG filling station was completed in March 2007. The contract between ITALGAS and the company, which is laying down the pipeline, was signed in October 2007 and all necessary authorisations (a total of 22) were obtained in March 2008. The gas pipeline works started in March 2008, but the company, laying the pipeline, found contaminated soil that had to undergo in-depth analysis in order to identify the scope of the problem. The results of the analysis showed some contaminated material that was then sent to Germany to be reclaimed. Now the works are almost completed.

At the time of the evaluation, an external filling station was being used 9 kilometres from the depot so the CNG buses can circulate. The filling time in this station (25 minutes per bus) is much longer than in the new station (12 minutes per bus).

Finally, the first call for tender to provide five natural gas minibuses for park & ride services was unsuccessfully closed in September 2006 and repeated in March 2007. Since December 2007, five minibuses have been in operation to connect the park & ride car parks with Mestre city centre.

Results

The evaluation of impacts has mainly been based on the analysis of the reduction of pollutant emissions in comparison to standard bus emissions and on the variation in public transport use after the increase of fleet quality (number of passengers, mileage, emissions, etc).

With 2 converted natural gas buses and 35 new CNG buses in circulation, the share of bus fleet using CNG fuels rose from 0 percent in 2005 to 12.15% in 2007. The CNG bus rate increased considerably with nearly 2 million km covered in 2007. Over the 2005-2007 period, the average CNG bus mileage increased considerably from 4.065 km in 2005 to more than 50,000 km covered in 2007. The CNG bus mileage became similar to that of the total fleet mileage in 2007 and even exceeded the average fleet in 2008.

The introduction of the 35 new methane-powered buses reduced pollutant emissions by 16.3 T for CO, 509 kg for HC, 75T for NOx and 3.5 T for PM10 over the 2005-2008 period.

The opening of the refuelling station will have the immediate benefit of reducing the bus fleet mileage. In terms of emission reductions, using the same methodology as with indicator 5, the benefit can be quantified at about 580 kg of CO, 128 kg of HC, 232 kg of NOx and 3.9 kg of PM_{10} per year. The filling time in the external station is much longer than in the new station and each refuelling requires around 45 minutes (travel and refuelling). Considering the 35 CNG bus fleet with the opening of the new station, the time saved can be estimated at around 2,797 hours a year and a related annual saving of extra work hour costs corresponding to 2,797 hours.

Regarding the number of passengers on the ACTV bus urban network, the trend over the 2005-2007 period is positive with a global increase exceeding 1.8 million passengers, i.e. an annual increase of 1.25%. The annual passenger-bus ratio is also positive over 2005-2007 with an increase of 5.3%. The annual passenger-bus ratio on the urban network decreased slightly in 2006 and increased afterwards by 7% in 2007, exceeding 271,000 passengers per bus. Over the same period, the annual passenger per km ratio remains somewhat stable with an average of 5 passengers per km. But, the introduction of the new CNG buses did not have a relevant effect on customer perception of the quality of the company's transport services.

Lessons learned and recommendations

These delays have held up the laying of the pipeline to connect the new refuelling station to the ITALGAS natural gas network:

- Delay in the renewal of the contract between the City of Venice and ITALGAS, that was finally signed in January 2006: the contract did not lay down a clear date for the conclusion of works.
- The time needed to collect 22 authorisations from different authorities before starting work.
- The contaminated soil found in San Giuliano Park, which brought works to a halt.

This being said, the commitment on the part of the City of Venice and ACTV to invest in CNG buses during fleet expansion and renewal has been instrumental in the success of this measure.

As in the case of Venice, it may be more cost-effective to buy new vehicles rather than convert older buses in the fleet. Most public transport fleets are partly funded by the State, so they are allowed to request that fleet expansion will be based on the purchase of CNG powered buses. The purchase of CNG powered buses needs to be accompanied by appropriate supply. National government, such as in the case of the Italian government, could facilitate fleet expansion with CNG buses by contributing to the construction of CNG filling stations for public transport fleets.

Measure 6.7: Parking management strategies for Mestre

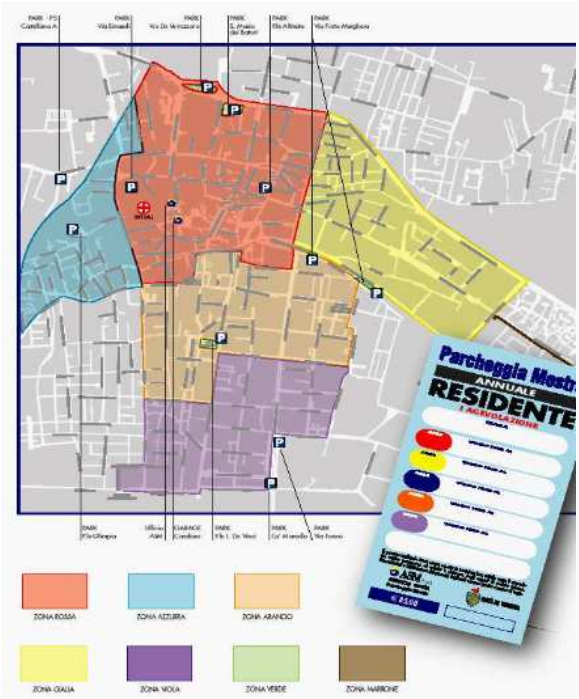
Introduction

Growing car use in and around Venice mainland cities has led to increased accessibility problems, reflected in traffic jams and parking congestion issues. In particular a high percentage of short-term parking (0-4 hours) has contributed greatly to parking problems in the centre of Mestre. In order to alleviate these problems, park and ride facilities on the outskirts of cities, where car drivers may switch to connecting public transport, have been set up in the city of Mestre (main city of the Venice mainland).
The City of Venice has sought to modify the parking habits of citizens and city users through a real-time information and sign strategy indicating where parking is available in the park and ride car parks, and through the use of differentiated parking prices which aim to create disincentives for parking in the centre and favour parking on the outskirts.

Before the MOBILIS project, two park and ride car parks were located at the access points for the mainland urban area. Experience showed that an integrated set of instruments was needed in order to modify the behaviour of car drivers and thus encourage demand for the parking facilities available at city level.

In addition, surveys carried out between 2002 and 2003 highlighted that appropriate regulation of the parking system could facilitate the management of vehicles circulating in the city by decreasing the impact of rush hour flows and facilitate pedestrian and cyclist circulation. Based on these surveys, it was decided that the new pricing policy should find a balance between parking demand and supply.

The City of Venice intended to modify the on-street Mestre parking (called "blue lanes") tariff system by introducing three levels of parking charges, which decrease in price with distance from the central areas of the city and in terms of attractiveness of particular surroundings.



Objectives

The measure objectives were:

- to define and implement a parking management strategy involving differentiated parking pricing, parking marketing and restriction enforcement;
- to modify private car user parking habits in the mainland in order to reduce congestion and air pollution.

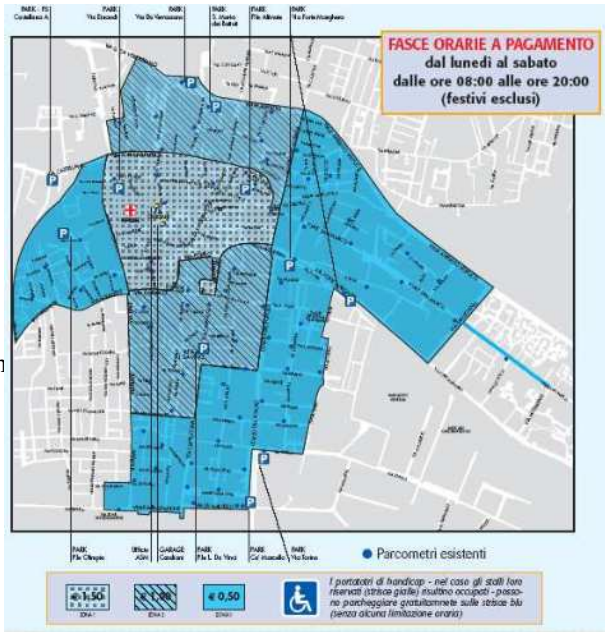
Implementation

In 2005, the public traffic offices monitored the use of different types of parking spaces, in the city centre and in the suburbs on the basis of a survey on traffic flows searching for parking in the most attractive areas and average turnover time per area. The results were used to draw a map of parking supply and demand in the mainland Venice urban area and set the new parking price strategy for mainland Venice.

It identified suitable differentiated tariffs and the areas where the "blue lanes" pricing system should be applied to encourage use of remote parking facilities. The free parking facility which applied during lunchtime, was abolished and tariffs were also raised in the Candiani underground car park located in the city centre to encourage use of free park and ride parking. Since 1st February 2006, the three level tariffs have been applied in the "blue lanes" areas to optimise the use of parking availability.

Local shopkeepers in the city centre of Mestre, concerned by various mobility related initiatives in this area, slowed down the city council decision-making process. However, the City Council approved the application of the tariffs and the parking regulation in May 2007. In addition, the Municipal Police and the officers of mobility service company[29], ASM, have enforced control of parking infringements.

Between the end of 2004 and 2007, the supply of parking areas around the centre significantly increased: eight new park and ride car parks opened, offering a total of 2,124 parking spaces for the whole scheme; other park and ride car parks are in progress and 2 of them will open by the end of 2008, providing 500 additional parking spaces. Frequent public transport services or minibus services link all these car parks to the city centre and the transport planning offices are working to improve connections with car parks.



Venice Local Authority carried out an information campaign to inform citizens and commuters of the possibility of park and ride and the position of the

[29] The Mobility Agency (ASM Spa) is responsible for the m
car parks at the city level

interchange parking. The Mobility agency (ASM) promoted alternative mobility activities in particular through a map of interchange car parks and alternative mobility possibilities available (car sharing, electric vehicles and bicycle hire) in Mestre and Marghera areas.

ASM first set up four experimental electronic variable information panels on sites chosen on the basis of the parking survey. The resistance to atmospheric agents of these experimental panels turned out to be poor. The complementary call for tender carried out in June 2007 requested different characteristics. ASM chose 14 LED information panels with GPRS system for the data transmission; 3 of them are solar energy supplied. The panel indicates interchange car park names and directions and the number of spaces available. Technical issues and in particular the introduction of some solar electric panels caused delays and these were only set up in September 2008.

Results and lessons learned

Over the period 2004-2008, the use of park & ride car parks in the Venice mainland shot up; the overall number of parked vehicles in the whole park & ride system increased by around 309%: from 51,990 in 2004 to 212,979 at the end of 2007. In 2007 the overall number of parked vehicles in the P&R system increased by more than 57%. The same trend is observed for the average number of vehicles per day; the increase is particularly relevant for the best located car parks and those with the best public transport access.

The analysis of traffic flows revealed that, between 2005 and 2008, traffic flows in the Mestre centre decreased by about 10% during peak hours especially in the afternoon.

At the same time a relevant increase of the modal quota of non motorized transports in Venice mainland has been reported as well as a light but significant decrease of car modal share from 43,9% in 2006 to 41,9% in 2008;

The extension of the paying in-street parking area favoured the parking turnover with great advantages for business activities in the central city areas. Higher prices prompt short-stay vehicles, commuters and visitors to use the surrounding P&R car parks and limit long stay parking access to the centre.

As a result of the strengthening of parking control and the communication campaign to inform citizens, the initial sharp increase in the number of fines related to on-street parking infractions reported in 2005 has been followed by a decrease of about 10% in 2006 that exceed 41,3% decrease in 2007. The positive trend is confirmed in 2008.

It is not yet possible to assess the impacts of the information panels set on P&R parking use due to the delay in setting them up.

The implementation of the parking strategy has highlighted five main points:

- The introduction of new tariffs and high parking fees in the inner city zones (“blue lanes”, the so-called on-street park pricing system in the centre of Mestre) has not been easily accepted, in particular by shopkeepers. However, the city of Venice decided to apply the new regulation in May 2007.
- Technical difficulties, in particular regarding data transmission by using UMTS data transfer technology, delayed the installation of information display panels for park users. In the future, ASM plans to use fibre optics transmission.
- The existence of good public transport systems and bus networks across the city centre (39 bus lines covering more than 265.5 km) was a prerequisite for the success of the measure.
- The collaboration between the City of Venice and ASM S.p.A. was key to the measure’s success. Transfer of activities to ASM enabled a more efficient overall implementation of the measure and faster procedures related to calls for tenders.
- The promotional campaign informed citizens and commuters about park & ride possibilities and the geographical position of the interchange car parks, with specific attention to commercial

activities in the inner centre in order to gain community acceptance. The City and ASM thus worked on communicating the benefits of the new parking pricing strategy to local shopkeepers, ensuring that the issue was not confused with others, such as the tram works.

From the Venice experience, it emerged that park & ride related measures are a relevant instrument to encourage a shift from the use of personal vehicle to other transport modes, if appropriately planned and integrated into a comprehensive transportation system. The existence of appropriate public transport systems and bus networks across the city centre (high frequency, large network, easy transfer) is a prerequisite to its implementation. However, further data and surveys are necessary to carefully evaluate and quantify this potential and the park & ride scheme efficiency.

When a set of various mobility related initiatives all concern a single city centre area, it is crucial to avoid local public opposition by developing appropriate public communication campaigns targeting all groups involved (citizens, local shopkeepers, associations) to inform them about the initiatives, the related benefits and the possible traffic problems caused by the works.

Measure 6.8: Access management for the city centre in Venice-LTZ buses

Introduction

The Venice City administration wanted to introduce a new access tariff system to encourage a more balanced influx of tourist coaches and the use of cleaner coaches in Venice through a differentiated tariff scheme favouring the use of coaches with class Euro IV standard exhaust emissions.

In the last thirty years, Venice has faced serious problems due to the tremendous volume of tourists each year. The average number of tourists visiting Venice each year is estimated to exceed 18 million. Approximately 3 million are "leisure day visitors" who get to Venice by tourist coach. The difficulties in getting to Venice by car are a factor favouring tour bus transportation. Venice City has controlled the access of tourist buses to its territory by setting up the Bus Limited Traffic Zone (Bus LTZ), so that the heavy traffic flow does not disturb the everyday life of the inhabitants. Since 25th March 2002, tourist buses must obtain a "special pass" to enter the bus LTZ. Before the beginning of MOBILIS, more than 62,000 coaches, coming from various countries, arrived in Venice. This number has shot up and during 2006 more than 75,000 coaches arrived in Venice. Before MOBILIS, VESTA S.p.A managed the system for gaining access to the Limited Traffic Zone (LTZ) for coaches, through three check-in points. The regulated buses are divided into two categories: those with more than 16 passengers plus the driver, and "Minibuses" carrying more than 8 passengers up to a maximum of 16, plus the driver. Passes are issued in four check-in areas: "Bazzera", "Panorama", "Fusina" and "Petroli". There are three paying bus parks for a total capacity of 1,200 coaches, which are Tronchetto, San Guiliano and Fusina. The first complete framework for the entrance charging system including tariff and exception systems was set up by the Town Council resolution no. 175 on 11 March 2004.

Objectives

The main objectives of the measure were to encourage the use of cleaner coaches in Venice through the design and implementation of differentiated access tariffs and to promote the use of coaches with class Euro IV standard exhaust emissions.

The innovative aspect was to encourage tourist coach operators to invest in clean and sustainable fleets.

Implementation

First of all, VESTA S.p.A. led a study to identify the new access pass rates for tour coaches in Venice, and to define the economic benefits for Euro IV buses. It then set up a working group (*Gruppo di lavoro ZTL-GAT*) for the coordination and improvement of the tourist pass systems in Venice.

After negotiation, the City of Venice officially approved the new tariff system in December 2006. It also decided to transfer the competence for LTZ Bus management from VESTA S.p.A. to Mobility Service Agency (ASM S.p.A), the public company that deals with the mobility services in Venice. Since March 2007, the coach LTZ has been entirely managed by the ASM S.p.A.

The costs of the pass vary according to the final destination of the coaches, type of bus (Euro 4 or non Euro 4) or season, with reductions for longer stay-purchases and booking and discounts on the multi-day stays and EU school groups. Special rates are offered for buses that carry passengers staying in the hotels within the LTZ ("hotel buses" category). The hotel passes are issued exclusively at the check-in on presentation of relevant documents confirming hotel booking. The passes are valid for 24 hours from entry into the BUS LTZ, except for the exception passes which are valid for the time required for the transfer, within a maximum of 3 hours, and the hotel passes which are valid until 7pm on the day after the last night's stay in the case of a several-day stay. For buses going to the centre of Venice, there is a special rate for groups which can show, when paying the ticket, that they will use public transport packages or hire waterborne services for vehicles with drivers which are authorised by Venice Council. Within the differentiated tariff, the reduction rate for Euro IV buses ranges from 9% to 33%, depending on the categories and the period.

Between November 2007 and April 2008, a European communication campaign targeted "tourist operators and international travel agencies" for raising awareness and promoting the use of tour coaches with the Euro IV standard motors, using the evocative image of Venice as a symbol and the bus drivers as promoters. Moreover, the communication campaign "Schools meet in Venice" was carried out in Venice to raise young people's awareness of environmental issues and sustainable mobility.

It has been necessary to train the check-in personnel for the correct recognition of coaches (EURO IV or not) on the basis of vehicle identification documents. In January 2007 VESTA S.p.A. completed the first phase of training on the new system for the personnel working in the LTZ bus check-in points. An effective training programme was prepared for the operators that issue the LTZ Bus Pass. In November 2007, the training activities were completed by ASM.

The course included both classroom training and simulation at the check-in.

From June 2008 the Ticket pass may be bought on-line from the website in two languages dedicated to the Venice bus LTZ. The server provides an easy-to-use online fee calculator to assess how much will be paid for the coach.

Results

The measure implementation has resulted in an increase in the proportion of coaches with class EURO IV exhaust emission standards accessing Venice from less than 0.5% at the beginning of the project to about 5.4% in June 2008. The introduction of the new tariffs provided incentives for the substitution of the old and high-polluting coaches with EURO IV coaches with lower environmental impact. The results exceeded the expected results, but it has not been possible, due to the lack of data, to analyse the effect of the increase in Euro 4 compliant coaches on pollutant emissions. As the advantages of this action will not cease once the MOBILIS project is over, EURO IV coaches proportion will further probably increase due to the combination of the tariff scheme impact and the regular renewal in the tourist coach fleets.

The press releases produced, for the Italian and foreign press in this sector, the articles published on four websites and the dispatch sent via mail to 3,991 Italian primary and secondary schools have presented the economic and, above all, environmental advantages of less polluting buses.

Lessons learned and recommendations

It has been quite difficult to establish the tariffs: Venice’s Municipal Executive Committee introduced several changes to the fee system already in place for tour buses entering the LTZ, triggering a debate on admission ticket issues for tour buses entering art cities. In particular the tariff increase and discounted rates for hotel buses have been the subject of stakeholder opposition. Political approval and application of the new tariffs for tourist coaches was delayed due to the opposition of the hoteliers. However no opposition on Euro 4 differentiation has been experienced.

The implementation of the information campaign in spring allowed the distribution of the dissemination material during the most important national event in the tourist sector: BIT (Borsa Italiana del Turismo).

The parallel implementation of the "Parking management strategies for Mestre" and "Electronic control of the Mestre restricted access zone" has contributed, with the differentiated price schemes, to the city's overall access management strategy.

To implement such a measure, it is necessary to keep stakeholders and all counterparts informed daily and in time, to foster debate and avoid opposition, to involve all counterparts in the planning process

at all stages of the process and to integrate the tariff scheme within a general regional bus entry charging strategy in collaboration with the tourist industry, including neighbouring municipalities.

Measure 6.9: Electronic control of the Mestre restricted access Zone

Introduction

This measure focuses on mitigating traffic through access control in Mestre, thus contributing to a reduction in atmospheric and noise pollution.

Before CIVITAS/MOBILIS, the heavy vehicular traffic in the Venice mainland, and in Mestre in particular, was one of the main urban transportation issues. The increase in traffic had brought about an increase in environmental pollution as well as congestion problems.

ARPAV[30] data indicates the necessity to undertake urgent initiatives for the reduction of atmospheric pollution, and the City of Venice is in the regional list of A zone cities - the critical zones. In 2003, the atmospheric pollution limit values were exceeded on 111 days and the trend continued in 2004: at the beginning of the year the limit values had already been exceeded 49 times. The demand for access to the city area remained very high; the volume of traffic had increased by 8-13% between 2000 and 2004. Forecasts were an 11% increase for inter-regional traffic and a 16-20% increase for traffic in the mainland area in ten years. The city had already applied traffic regulation measures such as “Alternate licence plates” (traffic rationing schemes based on licence plates), ecological Sundays (car-free Sundays initiative) and the “Blue Sticker” scheme regarding exhaust emission control, but no automatic system made it possible to control the "alternate" licence plate regulations. In addition, the city/mainland area of Venice had previously never applied road-pricing initiatives such as congestion charging.

Objectives

The overall objectives of the City of Venice were to mitigate negative effects generated by private vehicles in the city in terms of congestion and air quality through the installation of an electronic access control system and to analyse the feasibility of introducing a congestion charge in the city.

Implementation

The measure was planned in distinct phases:

- A complete project of the system to find the best locations for the necessary number of electronic access control points;
- Installation and test of telecameras and other technologies to monitor compliance with the control access regulation;
- A feasibility study to analyse the possibility of the introduction of a congestion charge. One of the planned objectives of the measure is to “prepare the field” for a future implementation of congestion charging in the Venice mainland urban centre.

Many surveys along Mestre roads and additional on-site inspections identified the best locations for the necessary number of electronic access control points for the whole of Mestre centre. After the installation of the data transmission network and of twelve telecameras,

[30] Regional agency for the environment

the software was modified such that the Venice Local Authority could use the data in the context of the "alternate number plates" initiative.

The City of Venice and ASM[31] developed the web interface for the telecamera alternate licence plates. This allows the automatic registration of drivers in order to obtain special passes giving them authorization to travel in Mestre (eg doctors, public transport, car sharing cars, emergency services).

The authorisation of the Ministry was compulsory in order to use telecamera data for administrative fines. Since the beginning of June 2008, six telecameras have been used for fining. In optimum conditions, the system accuracy in terms of vehicle identification and licence plate detection reaches 90%. However, when the system cannot automatically read the licence plate, an operator controls the system on a photo-by-photo basis.

The city led an information campaign by giving out booklets to inform citizens about the installation of the telecameras and about the traffic restrictions: the booklet shows the possible alternatives such as the interchange car parks, car sharing, rent a bike, etc. in order to encourage behaviours which reduce traffic and favour sustainable mobility systems. Moreover, the City of Venice and ASM participated in different events to promote alternative mobility.

The Mobility Department of the City of Venice delivered the feasibility study on congestion charging in April 2008. The document explores how a potential road pricing policy for Mestre could be developed and the effects that it could have. The City of Venice organised the international meeting "Road & Pricing".

Results

Venice city has strengthened the access restrictions system to the inner city area. The major achievements of the projects include the installation of all telecameras scheduled and the feasibility study on congestion charging in Mestre.

Concerning the achievement of quantifiable targets, the 10% reduction in the number of cars entering the city by 2008 is fully achieved. Between 2005 and 2008, after the installation of telecamera control, a relevant decrease is noticed in every interval of peak load hour. The decrease is higher in the afternoon peak hours. In the morning, the decrease is about 7.5% between 7 and 8 am and 8.1% between 8 and 9 am; in the afternoon the decrease is about 11% between 5 and 6 pm and over 13.5 % between 6 and 7 pm. Considering the four time periods between 2005 and 2008, the total vehicular volume decrease is 9.88%. In a couple of years the new system has also introduced a 45% decrease in fines related to traffic infractions in the LTZ.

No improvement in air pollution has been reported yet and despite effort to reduce vehicular traffic, still high PM10 levels are measured in the Mestre inner centre in the cold season.

Lessons learned and recommendations

The installation of the first set of cameras (12 cameras) was slightly delayed, in particular during testing time, due to technical problems linked to the connection of the telephone lines. It affected the complete installation and the feasibility study of congestion charging. Furthermore, some electronic interference was detected for some cameras with the operational equipment used for the new Mestre tramway lines.

[31] ASM is responsible for the management of all urban mobility services and of all car parks at the city level.

The political commitment to implementing an automatic system for access control and raising awareness on possible economic, social and environmental benefits of a congestion-charging scheme, such as the collaboration between the City of Venice and ASM S.p.A., are keys to the measure's success. Transfer of activity management from the city to ASM enabled a more efficient overall implementation of the measure and faster procedures for call for tenders and engagement of subcontractors.

The car sharing schemes, mobility management and the Limited Transport Zone (LTZ) bus scheme are further relevant initiatives, which contribute to improving the congestion and air pollution situation.

Access restriction is an effective individual measure to reduce traffic volumes in urban areas, when applied within a coherent policy package including the promotion and improvement of public transport, parking diversification strategies, the promotion of alternative transport modes and improvement of cycling and walking facilities. It is important to guarantee good accessibility to the areas in question by public transport and alternative mobility modes (cycling, car sharing). Special attention should be paid to residents and people with reduced mobility to gain public support for the mitigating traffic measures. Communication is of critical importance because the introduction of such a measure can give rise to opposition: in the short term, groups of citizens may get upset if their travel times or costs increase; the number of formal resources and attempts may rise in a significant manner to cancel the fines.

Measure 6.11: Access and traffic management in the Grand Canal through ARGOS

Introduction

This measure focuses on establishing an innovative control system for boats entering the Grand Canal, the main artery for traffic in the historical city of Venice. It represents 67-68% of total boat traffic in Venice. The proposed action is part of a large-scale initiative launched by the City of Venice to reinforce existing regulations, provide continuous monitoring of waterborne traffic density and flows and contribute to the development of new traffic management policies.

The main means of transport in Venice (historical centre and the lagoon islands) is boats. Among the 150 canals of the city, the Grand Canal (3,800 metres long and 30 to 70 metres wide) represents the largest waterborne traffic artery and divides the city centre into two distinct parts. 30,000 boats travel daily in the Venice Lagoon and 4,000-5,000 in the Grand Canal. The City centre manages the Venice historical centre of Murano and Lido islands, whereas the Venice Water Authority manages the Lagoon Canals[32].

Like other major cities, Venice has to face up to difficulties relating to noise, pollution and congestion, but must also tackle wake pollution caused by boat traffic, so called *Moto Odonso*. With the increase in boat mass and speed as a result of the use of large diesel engines, wave motion has become one of the major causes of damage to the basement structures of historical buildings in Venice since the early 1960s.

In order to deal with these phenomena, the City of Venice had drawn up and implemented some concrete actions like the “Regulation for waterborne transport circulation” enacted by the City in

[32] *“Magistrate alle Acque”, a national body.*

1997, as well as the appointment of the CDG TALV[33] from December 2001 to December 2006 by the national government for all waterborne traffic and navigation management activities in the Venice city and its Lagoon[34]. Municipal police officers were appointed to enforce the system and in 1986, COSES[35] was delegated by the City to survey the waterborne traffic, and then in 2000, to collect data with the set up of Waterborne Traffic Observatory.

Objectives

The main objective of the measure was to implement an automatic control and data management system (***A**utomatic **R**emote **G**rand- **C**anal **O**bservation **S**ystem*: ARGOS) along Grand Canal to back up the reinforcement of existing regulations and provide continuous monitoring and data. This will help to develop new traffic management policies.

The goals of this ARGOS project were:

- to reinforce existing city regulations regarding access and speed limits in the Grand Canal limited zone,
- to enforce city regulations on other traffic management issues in the Grand Canal limited traffic zone (parking, timetable, wrong way circulation, etc.),
- to provide accurate, systematic and continuous measurement of traffic density and flow. The system provides information on the exact number, type and speed of boats navigating in the Grand Canal.

Implementation

The measure has been implemented in different phases.

Concept design review: A thorough review of the available image analysis software algorithms and techniques was carried out in collaboration with an outstanding scientific partner (University of Rome *"La Sapienza"*, Dept. of Information Science and Technology). Sets of candidate image analysis techniques were identified (Automated Vision techniques for Robot autonomous action). The ARGOS system is based on automatic vision technologies and processing of digital images collected by a group of IR/VIS sensors: Survey Cells, each using special cameras. The fields of view of all the cameras are joined together in a single real-time picture of the whole waterway. A series of preliminary tests was carried out on real images of the Grand Canal.

ARGOS Prototype System Release: An exhaustive survey was carried out in order to select the most appropriate locations to install the Survey Cells. A preliminary optical coverage map was drawn up in order to define the minimum number of Survey Cells to be installed.

The 14 Survey Cells were installed just below the roof of several buildings leaning over the Grand Canal at the determined locations along Venice Grand Canal. The Bureau for the preservation of Historical Architecture Heritage approved the design and authorised the installation phase. The city of Venice and ACTV, in collaboration with the university, have defined final analysis software algorithms and image analysis techniques.

ARGOS System implementation: The control centre was installed and is fully operative and the testing of the system was completed in November 2007. The 14 locations are interconnected in a network structure converging in the Local Police Operative Centre, where the information received is coherently managed and integrated with the navigation control systems already

[33] *Commissario del Governo Delegato al Traffico Acqueo nella Laguna di Venezia.*

[34] *The city of Venice competences on the canals have been extended to the whole lagoon to better manage the "emergency".*

[35] *Consorzio per la Ricerca e la Formazione.*

installed in the Centre. The system provides a real-time picture of the type and position of each boat circulating in the Grand canal. Boats entering or exiting the waterway system are detected and their travel is analysed along the whole waterway network. The relevant extracted information can be divided into two groups: statistics measures and event detection.

Police officers are equipped with handheld computers. When an offence occurs, the operations centre automatically communicates this to the handheld computers. At the moment, the police cannot use ARGOS images as evidence to prove that an offence has been committed, but they can be used as proof of violations when police officers intercept boats. After approval of the system by the Ministry of Infrastructure and Transport, automatic emission of fines should be possible.

The training activities of the City Planning Officers and Public Security Officers for the optimum use of ARGOS functionalities were concluded in March 2008. In 2007, several dissemination activities were set up around the system.

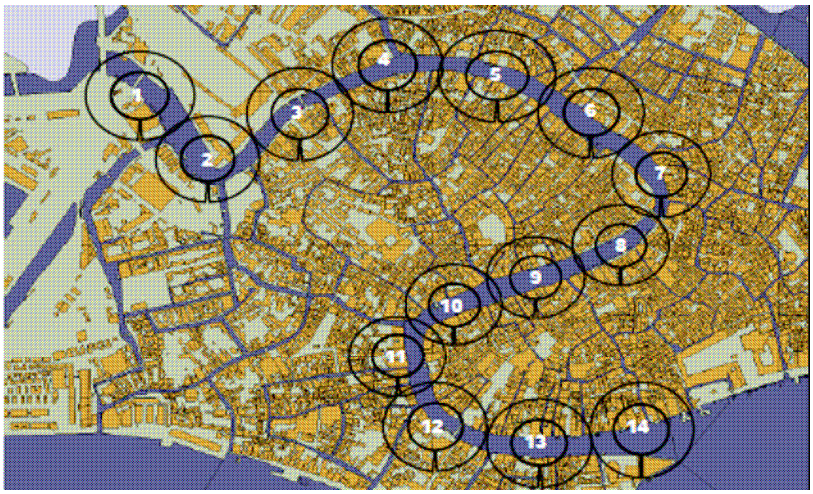


Figure 32: Survey cell location in Grand Canal

Results

The evaluation focused on impacts in terms of traffic management including the variation of traffic flows (ex ante and ex post) and the analysis of traffic offence (fines) trends in the Grand Canal.

ARGOS *(Automatic & Remote GrandCanal Observation System)* is an innovative water traffic navigation control system on the Grand Canal able to support the municipal police in the reinforcement and implementation of the regulations, traffic schemes and restrictions for the boats navigating in the limited access zone in Grand Canal.

The positive effect over time of the ARGOS control system on the global volume of boats transiting in the Grand Canal has not yet been perceived. Total traffic flows in the Grand Canal over the years show a sharply increasing trend, linked to the development of water taxis circulating in the Grand Canal. The 2008 data report a particularly high traffic increase by +27% in comparison to 2005. This increase far exceeds the 2004-2001 growth rate. A longer period of evaluation would be necessary to see a reduction trend in the global boat volume and in the water-taxi flows, particularly in the critical peak hours.

The strengthening of traffic control (+ 267% increase of telelaser controls since 2004 and 2005) led firstly to an increase in traffic sanctions followed by a gradual decrease since August 2008. The reported trends in the monthly number of traffic offences in 2007 and 2008 show similar patterns that follow boat traffic seasonal patterns; the high traffic offence period corresponds to the busy tourist

season from May to October. However, a slight decrease in the number of traffic fines is reported from August and September 2008 in comparison to 2007 with a drop of around 28%. By the end of the year, the total number of reported fines for 2008 will surely be lower than the 2007 level, confirming this positive trend;

In the Grand Canal, the number of fines amounts to 1,745 in 2007 and 1,372 for the first nine months of 2008 and represents about 24.5 % and 22% respectively of the total fines for all Venice Limited Traffic Zones (LTZ).

This measure has helped to improve traffic management policy. It is tightly bound to the water traffic management -modelling tool (measure 12.6), and other traffic management instruments (measure 12.5 “Satellite control (GPS-GPRS) for water PT services in Venice”).

Lessons learned and recommendations

The implementation of this measure has not come up against any barriers. The strong political support, the validation of the survey cells design and implementation by the Bureau for the preservation of Historical Architecture Heritage all helped to achieve this measure. Stakeholders like the Municipal Police, the city of Venice; ECOTEMA SPA and ARCHEMEDES have played a part in the measure’s success.

Various City Boards are interested in innovative ways of dealing with security issues. ARGOS is an application of advanced navigation and information processing technologies designed to improve the performance of the existing transport control system. Intensive surveillance and data collection concerns the privacy of travellers and the public in general. To avoid this concern, it is important to invest in communication and information diffusion through local media that are generally very sensitive to new technology. It may nevertheless encounter some legal barriers in other countries.

Measure 8.6: Introduction of low impact, access for all waterbuses in Venice

Introduction

Throughout Venice’s history, waterborne transportation has been a critical and integral part of the city's transportation system, as the primary means of vehicular transportation is boats. The city has one main road point of access, Piazzale Roma, from Mestre and the mainland. Two rings, an outer ring and an inner ring (including the Grand Canal), represent the most important waterborne traffic arteries in Venice.

The city now faces a great deal of problems, such as traffic-related noise, pollution and congestion and also a peculiar aspect of transport called “moto ondoso”, which is the wake motion or wake pollution directly due to boat traffic.

ACTV is the Venice public transport company working on both mainland and water. Technically, there are three main types of public transport boats, the "vaporetto", the "motoscafo" and the "motonave", all registered with RINA[36]. The so-called “around the city” ACTV[37] lines are strategic circular "*motoscafo*" routes that connect strategic points of the outer perimeter of Venice’s islands.

[36] Italian register for navigation testing

[37] The Venice public transport company

Objectives

The main objective of the measure was to differentiate public waterborne transport both in terms of environmental impact and access for all users.

The Piazzale Roma/Murano "around the city" route was, prior to MOBILIS, served directly by "motoscafi": smaller waterbuses suited to the route in terms of size (capacity of 154 people), but did not have the necessary facilities to enable access and comfortable travel for people with disabilities. Passengers with disabilities travelling from Piazzale Roma to the Civil hospital and to Murano Island therefore had to take a boat to reach San Marco square, in the opposite direction, and change for a larger boat (*motonave*) to Murano Island.

Within the MOBILIS project, 18 new waterbuses (motoscafi) with a lower environmental impact have been set up to improve and strengthen strategic waterborne public transport lines that circumnavigate the Venice city island. The new waterbuses are accessible to disabled users on a direct waterbus route previously inaccessible to this type of user, allowing them to travel faster and in safer conditions.

Implementation

The measure was implemented between February 2005 and April 2007 in the following phases:

After the detailed design and approval of the new waterbus, ACTV launched a tendering procedure that permitted the construction and testing of waterbuses. The construction of each waterbus was supervised at the shipyards and the RINA official tests were carried out.

Then, the new waterbuses were introduced into the ACTV fleet and training was aimed at both onboard personnel and maintenance personnel. It sought to:

- verify the manoeuvrability of the new vehicles given their bigger size and the specific characteristics of the routes they will be used on;
- for both onboard and maintenance personnel, accustom personnel to the new onboard equipment such as the GPS system and system for the transport of disabled passengers;
- maintain the waterbuses' new engines and other machinery in the preparation and final stages.

The design of the new waterbuses has been improved with optimisation of both hull fluid dynamics and the spaces onboard and fitting out. They are longer and wider, equipped with acoustic signal and information panels. All 18 planned new waterbuses have been in operation since 2007.
The "around the city" circular routes now allow resident and tourist passengers to easily reach the Lido and Murano islands and the Venice civil hospital using an urban route without any architectonic barrier.

Results

With these 18 new waterbuses, the ACTV has further increased the fleet capacity to transport users with reduced mobility. The proportion of motoscafi allowing safe transport of disabled users reached 27% at the end of 2006 and 32% at the end of 2007. With 72% of the whole fleet (including motostafi and vaoporetti boat type) adapted to the transport of disabled people, ATCV is a disabled-friendly waterborne transport company that covers all the strategic points of the city and has improved the waterborne transportation services for passengers with disabilities in terms of travel time, accessibility and safety:

- The new boats provide boarding facilities for users offering larger boarding space for wheelchairs, and lower vertical height difference between the docks and the boarding area.

The maximum height between the pontoon and the boat boarding area even during particularly high tides is around 15cm, and that is a relevant result as the height difference with the older mostoscafi can reach 35cm in bad weather conditions. These technical improvements offer a better accessibility for persons with disabilities and safer and more comfortable travel conditions.

- Disabled users may now save more than 2 hours in winter and nearly 1 hour in summer time, from the bus terminal Piazzale Roma to Murano. The rate of the new boat use reached 16.2% of the fleet in 2007.

In addition, the city of Venice, which has a special dedicated web page for the accessibility of Venice to people with reduced mobility, has created the Infomahandicap service and set up a transport service reserved for the disabled to help them get around in the city and surrounding areas. It is currently estimated that almost 70% of the historic city centre is accessible to people with reduced mobility.

These new waterbuses reduce the environmental damage risks. The research performed by the ACTV technical office with the collaboration of the University of Trieste (Department of Naval engineering, of the sea and of the environment) has improved the shapes of hulls and the hydrodynamic performances with a reduction in motion resistance of about 23% (at 20 km standard speed) and consequently a lower wave resistance. The noise reduction with the new motoscafi is considerable. In most points of the passenger compartment of the boat, the reduction exceeds 10 db, i.e. it is perceived by the passenger that the intensity has been reduced by more than half.

The customer opinion of ACTV navigation services specifically regarding the environment and facilities for disabled people was overall positive.

Lessons learned and recommendations

No relevant barrier has been reported. However access to disabled data and reliable statistics at the local (city and regional) level could be improved. The implementation of the measure has been facilitated by the good collaboration between the City of Venice, ACTV central office and ACTV technical offices, but also by the efficient collaboration between ACTV technical office and the shipyard companies for boat executive design: "Cantiere di Pesaro" and "Cantieri de Poli"and by the good collaboration with the local disabled people's association. The press conference organised by ACTV in June 2005 and in August 2005 allowed the relevant user to get the appropriate information.

The improved accessibility to waterborne public transport facilities for disabled users is an important step in integrating disabled people's needs into public transport policies and planning.

The recommendations for this measure are to identify the travel patterns of disabled people and gain an understanding of key transport issues facing them early on in the design process, and to carry out a communication campaign dedicated to customers in order to highlight the new transport facilities and the better environmental performance of the new craft in order to improve user perception of the quality of the transport services.

Measure 9.4: Expansion and diversification of the car-sharing scheme in Venice

Introduction

This measure aimed to expand the car sharing scheme and differentiate the services offered, including corporate car sharing and the introduction of vehicles suitable for customers with disabilities.

Venice's peculiarities in the transportation field stem from the juxtaposition of two parts, each of them very well defined and with different needs: the mainland with high vehicular traffic density and Island Venice characterised by waterborne transport and also by the strong attractiveness of the historical island in terms of tourist activities and commuter movement.

Car-sharing experiences in Italy started with a limited number of demonstrative experiments in different cities. The advantages of car-sharing services in Venice are quite evident, especially in the mainland where vehicles are few and parking facilities scarce and expensive. In Venice the car-sharing project was started in 1998 with ASMS.p.A[38]. The project was initially limited to 8 vehicles, all electrically powered and used in Venice Lido. The vehicles could be collected and left in an automated fashion at 5 strategically distributed points around the island.

Thanks to this first experiment, the necessary skills were acquired for developing a more complex system on the Venetian mainland, where the car-sharing project was started up in 2000. In 2002 it became part of ICS, the national coordination structure. The car-sharing fleet at the beginning of MOBILIS was composed of 22 vehicles – 5 of which run on natural gas. Before MOBILIS, not even the taxis were able to transport the wheelchairs and not all the public buses.

Objectives

The objectives of this measure were to:

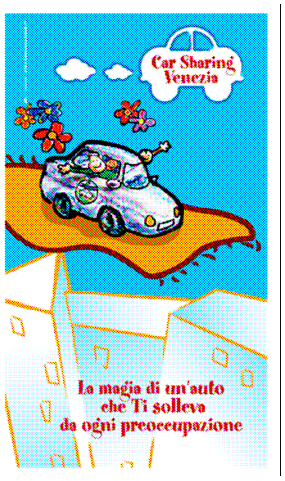
1. expand the existing car-sharing fleet by 30%,
2. diversify the supply through a sustainable purchasing policy to reach a 50% fleet proportion running on alternative fuels;
3. cater to more users by introducing in the car-sharing fleet vehicles suitable for the transport of disabled people; have 1,000 users of the car-sharing scheme by the end of 2006 and permit people with disabilities to be customers of this service.
4. reduce the number of private cars in the city by designing and demonstrating a corporate car-sharing scheme by signing agreements with 10 companies for approximately 15 cars (minimum Euro IV) by the end of 2005 and the same number of firms for the same number of cars in 2006.

Implementation

The measure implementation can be divided into two main sets of activities: the expansion of the existing car-sharing fleet and the development of the corporate car-sharing scheme.

1. In order to ensure ongoing high-quality customer service, the expansion of the car-sharing scheme has been guided by the consultation of the current pool of customers for feedback on preferences and performance. The results of several studies, which have defined the vehicles suitable for installing the car-sharing onboard computer system, alternative fuels available and their related performance and identified the most suitable vehicles to be adapted to disabled customers' needs, have guided the purchasing policy. 2 Fiat Doblo 1.4 active vehicles, modified for transport of disabled persons, were introduced into the fleet in January 2006. Thanks to MOBILIS co-financing, 20 cars, including 8 CNG powered vehicles, were purchased ready equipped with the onboard computer, and two onboard computers for two hybrid vehicles were purchased without MOBILIS co-financing. In four years the car-sharing fleet increased by 135%; from 22 vehicles before MOBILIS to 56 at the end of the project. 68 car park spaces are now available and 8 new car-sharing pickup and collection points have been added during the project for a total of 19 car parks.

[38] Azienda Servizi Mobilità – www.asmvenezia.it/



2. At the same time, the activities regarding the corporate car-sharing scheme have included, between February 2005 and January 2006, the refining of the business concept for the corporate car-sharing scheme on the basis of a demand analysis of local company needs, definition of a new architecture for the car-sharing management system, the further development of the scheme's current car-sharing software and onboard computer technology to allow company and local authority reservation, customer recognition, monitoring of movements (particularly for the commuter car-sharing facility) and customised accounting. The ASM car-sharing technological system is composed of a central system, the onboard computer and the call centre (car reservation is made through a 24-hour call centre and users must specify when and where the car will be picked up and returned afterwards). The corporate car sharing and business/home car-sharing software was tested in May 2006.

   The study of fiscal issues and definition of the tariff system making car sharing convenient for business purposes completed the process.

   At the beginning of CIVITAS, fees were based on travel distance and time, and covered maintenance, insurance, registration and fuel. The financial conditions changed in 2008: an annual association fee of €50 was introduced and the cost of the service is currently calculated on the basis of the following parameters: €2.50 VAT included/hour; €0.35 VAT included per km travelled.

ASM set up different training sessions regarding the new system for call centre employees, for employees in charge of administrative work linked to the corporate car-sharing scheme and for local authorities and private companies to promote the opportunities given by the car-sharing service.

In autumn 2008, ASM carried out a questionnaire-based survey in order to improve the service and to promote its use in an appropriate manner. By questioning potential users (people not yet customers), it would also be possible to estimate the level of interest in car sharing and potential growth at the local and regional level. Regarding the impact on user mobility behaviour, in the future it might be worth exploring the proportion of customers who give up owning their own car to join the car-sharing scheme in Venice. A specific website could be dedicated to the Venice car-sharing system[39] to better inform current and potential customers.

Results

The measure has surpassed its expected results with around 4,600 users (valid member cards) in June 2008 and 494 firms having signed up for a regular car-sharing service. 1,864 contracts are in force.

[39] Currently only some webpages in the ASM website are dedicated to the car-sharing scheme

With the two new vehicles for the transport of disabled passengers, the car-sharing scheme represents a valuable opportunity for improving transport accessibility for them. The service has had significant success with an annual mileage per car in 2006 of about 9,500 km.

The environmental estimated results reveal that this measure has reduced emissions by about 79t/y of CO2, 218 kg/y of CO, 19 kg/y of NOx and 18.8 kg/y of HC. Further study would be necessary to explore the influence of the car-sharing scheme on users' lifestyle and mobility habits and the environmental benefits in terms of lower traffic and parking congestion.

The results of the users' survey have revealed that, among car sharing member motivations for using the scheme; economic reasons (44.3% of respondents) prevail over environmental reasons. (27.2%). Reduced cost in contrast to the expense of a traditional corporate fleet is the main motivation for companies.

The decrease in car space use and lower number of cars circulating in the city area represent other wider benefits.

Lessons learned and recommendations

At the city level, car sharing emerged as a niche transport alternative, which complements an efficient public transport system and other measures to bring about modal shift.

The main barrier encountered when implementing this measure was the recurrent reluctance of companies to convert their current business fleet into a shared-use vehicle system. The weak commitment of national natural gas distributors (in particular ENICHEM) was a significant barrier to completing the measure on time.

During peak times, the number of available car-sharing vehicles with respect to the number of customers is now limiting the ability of the service to meet demand.

Regarding the corporate car sharing scheme, there is also a psychological barrier for employees that fear being controlled through the car-sharing data system.

One of the factors of success in Venice was the appropriate integration of car sharing in local traffic planning thanks to close cooperation with the public traffic managers, which has helped to develop parking facilities (park & ride car park) and car-sharing platforms at local level.

ASM committed itself to organising many promotional activities for the car-sharing service. It also offered financial incentives for those using CNG vehicles.

National policy addressing car-sharing issues (in particular the decree law of 27th March 1998 on sustainable mobility in urban areas) facilitated promotion for the cities and integration of the car-sharing scheme within the public transport planning. Financial aids during the start-up period, and incentives in favour of car sharing, have been key to the success of car sharing.

One of the factors of success in Venice was the appropriate integration of car sharing in local traffic planning thanks to close cooperation with the public traffic managers, which has helped to develop parking facilities (park & ride car park) and car-sharing platforms at local level.

ASM has a proactive approach in responding to demand (increasing the number of cars available) and to preferences (new cars co-financed by MOBILIS were bought on the basis of indications emerging from focus groups held with users). ASM also committed itself to organising many promotional activities for the car-sharing service and offered financial incentives for those using CNG vehicles.

To successfully develop car sharing at city level, it is important to integrate car sharing into local traffic plans as much as possible and collaborate with representatives of public traffic and mobility services, provide financial-based incentives for car owners who scrap their car in favour of car sharing, develop intensive information and awareness-rising campaigns towards the public, advertise

to potential users and in particular firm mobility managers and provide further analysis of any obstacle.

Measure 10.2: Clean urban logistics in Venice

Introduction

This measure focuses on the creation of a web-enabled information system for the management of temporary and permanent parking spaces along the inner canals in Venice.

In the last decade, traffic congestion has become the main problem for waterborne traffic of Venice, specifically in inner canals with the interference between daily waterborne traffic, local deliveries and the presence of parked boats along the docks.

From the 50 questionnaires handed out in 2001 to the cargo workers of the *Consorzio Trasportatori Veneziani Uniti*[40,] it became clear that, for most of them, boat traffic was a problem in the city and that docks equipped with unloading equipments would greatly help to speed up deliveries. The lack of space was the main concern for boat parking. In spite of the current system of allocating parking spaces in the City of Venice and the regulations to govern boat parking along the canals, enforcement of current parking laws was difficult due to the lack of updated and on-time data on parking. Two different water space permits exist: one for citizens and one for transport companies. The administrative procedure in order to obtain a permanent water space could take more than 8 months and the authorisations were given based on a water mobility officer's experience and not on a traffic map. Permanent permits were renewed on a yearly basis. However, if a space was known to be vacant for a period of 6 months, the permit was annulled to ensure that parking spaces will not go unused. As the cost per square meter is €48 per year for a permanent permit and temporary parking permits are free, applicants could abuse the system by continually applying for new temporary permits.

[40] *Consorzio Trasportatori Veneziani Riuniti(CTVR) comprises approximately 70 percent of the cargo deliverymen in Venice and gathers the most important company of the sector in the City of Venice (http://www.cvtr.it updated on 10/01/08)*

Objectives

The measure had two main objectives:

- to manage the permanent and temporary boat parking spaces along the inner canals in Venice more effectively, through the creation of a web-enabled information system that integrates day-to-day administrative acts (requests, authorisations, etc.);
- to provide support to decision-makers for the integrated management of boat traffic and circulation, during ordinary and extraordinary situations.

The planned and controlled management of waterborne parking and the use of docks should have a positive impact on traffic congestion as well as on wave motion and noise pollution in Venice canals.

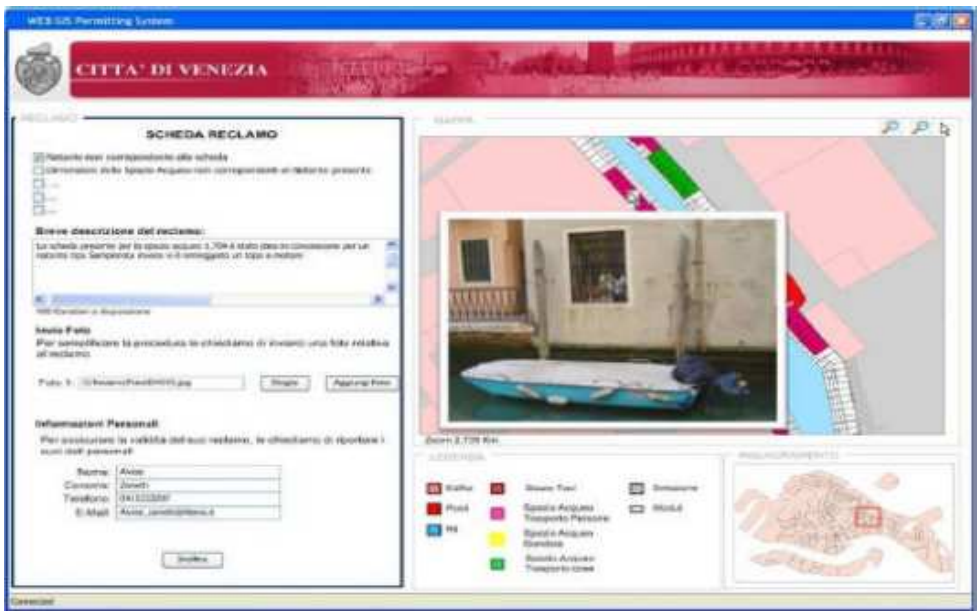
Implementation

The dock use survey in September 2005 identified the actual use of docks, which meant that they could be classified according to their prevailing uses. Given the general standards for the revision of the permitted use of docks by different boat types at different times of day and night, the boat docks to be reserved for the delivery of cargo at set times and those that could be used temporarily could be identified. Thus, with the gathered information collected in the study on the use of inner canal parking spaces and the areas experiencing traffic problems, the Electronic Parking Management system was developed in July 2006, based on an online geographical information system (GIS system).

The system is divided into two main sections: end users mode and administrative mode for both permanent and temporary permit applications. Concerning the end users mode, the designed system is an interactive tool that allows citizens to visualise and select in an efficient manner, the temporary or permanent water parking space that suits their needs. The maps are zoomable down to individual canals in the heart of the historic centre of Venice, and a series of tabs, menus and buttons enable the user to visualize parking-related data both alphanumerically (in tables), graphically (in graphs) and geographically (on maps). The applicant enters all the necessary information for the application into the computer both for temporary and permanent parking and in return the system will give the number of boxes that satisfied the end user request and the annual cost of the permit.

The administrator mode of the system has specific functionalities and access is reserved to *Mobilità Acquea* officers. The permanent water space applications are around 1,245 per year and only 85 will have to be checked by the Water Mobility Officers. Almost 3,000 applied per year for temporary parking. The introduction of a €10 administrative fee could deter unnecessary applications and improve service efficiency.

The designed parking management system has been tested by the Water Mobility Office (*Mobilità Acquea)* staff in order to gather opinions and ideas on the final work and in order to study the functionalities of this new system with the stakeholders.



Results

The expected impacts after the complete operative installation of the system (beyond MOBILIS timeframe) concern the following aspects:

- the optimised use of available water spaces and the reduction of boats competing for the use of the same dock, by reserving docks for certain key activities at certain times of day;
- the reduction by around 8 months in the waiting time to obtain concessions for parking spaces (both permanent and temporary);
- the elimination of the possibility that temporary docking permits may have a negative effect on key services (such as deliveries or emergency services) and obstruct traffic;
- the improved enforcement of regulations
- the provision of reliable information to control boat traffic and reduce wake and noise pollution.

Lessons learned and recommendations

The MOBILIS project has been timely in offering opportunities for modernising and integrating informative procedures linked to the administrative management of temporary and permanent boat parking spaces. Stakeholders like the local authorities, the transport trade associations, Forma Urbis and the Water Mobility staff were actively involved in achieving the measure.

No relevant barriers have been reported in the measure. However, access to information related to user's complaints with the current system could be improved.

There are three main positive features of the measure:

- the combination of long-standing experience in the Venetian local context and the strong expertise in geographical information technologies of Forma Urbis including the *City knowledge* principles developed at the Massachusetts Institute of Technology (MIT);
- the participative management of the activities; the contact established between local authorities and transport trade associations has involved end users and local stakeholders and gained their acceptance of the new water traffic plan.
- the long-standing collaboration between Forma Urbis and the City of Venice, Water Mobility Office has found a solution to the Water Mobility Office’s commitment to using geographical

information systems in order to improve the efficiency and effectiveness of boat parking space management along the inner canals in Venice.

During the first phase of the measure, a handbook was produced in order to standardise the methodology of data collection, the analysis of dock uses and the re-calibration of permitted dock uses in Venice. This methodology of re-calibration could be used in other similar urban contexts in order to decide about parking management in a limited area in a rational and planned way.
For better management of parking spaces in the Venice canals or in other similar contexts, the use of the GIS Grid system permits an accurate visualisation of the parking and dock use and will be more transparent for the citizens and end users. The applicants will be able to choose the parking space only on the pre-determined boxes and the system will avoid applicant errors or uncertainties on the presentation of the water space plan. For each box, new attributes such as accessibility may be introduced.
Lastly, it might be worth studying the acceptability of the introduction of an administrative fee for temporary parking applications.

Measure 11.9: Promotion of safe and increased bicycle use in Venice.

Introduction

A priority objective of the City of Venice administration is to shift part of mobility to modes that lower traffic congestion in the main land and have low environmental impact, specifically because 50% of car journeys cover less than 4 km.

Objectives

The main objectives of the measure were to increase the use of bicycles in Venice by about 18% by the end of 2008, targeting residents by using communication campaigns and infrastructures and to educate school pupils in the use of bicycles and safe routes.

Venice's City has a particular structure as it is divided into two parts, mainland Venice and Island Venice, connected by a bridge used by buses, trains and cars. Due to this particular physical structure, riding bicycles on island Venice is forbidden, but not in mainland Venice and other lagoon islands.

Before CIVITAS MOBILIS, the use of bicycles was not very widespread. Some estimates reported that the bicycle accounted for about 8% of total trips in 2000, although some claimed that this figure was underestimated and not accurate enough. It was in the late ‘90s that the development of cycling facilities became a priority, with the adoption of the "cycling paths plan". There were about seven cycle lanes in Mestre to begin with. In 2002 Venice City created a specific office to promote cycling mobility, called the "Bike office". In its first year, the Bike office produced a map of cycle lanes, organised the cycle lane maintenance and carried out a survey showing that 40% of students cycle everyday to high school. Regarding the cycling infrastructure, the main railway underpass for bicycles and pedestrians was built in 1992: the Ponte San Guiliano, a 120 m bridge connecting the City of Mestre via the S. Marco cycle path with S. Giuliano Park which is on the lagoon.. At the end of 2006, the guarded bicycle park at the Mestre railway was opened and in 2007 two railway crossings were eliminated. According to Modal Shift survey results, conducted in 2006, bicycle use in Mestre reached 16%. It is a means of transport used by people of all ages and in particular by children up to 14 years old and by adults between 65 and 74 years of age.

The innovative aspect of the measure was a new conceptual approach with radical change in the strategies to promote and stimulate bicycle use through a complementary set of actions and by designing and applying new soft strategies targeting specific user groups, particularly primary school pupils.

Implementation

In 2005, the Bike Office analysed central areas of particular interest, both urban and commercial, in strategic places of the city based on the criteria of convenience, attractiveness and proximity to cycle lanes. It then purchased and set up 100 outdoor secure bike racks in Mestre city in July 2007. The "Bike safely to school" project also calls for the implementation of a road and environmental education programme in 3 schools; some maintenance works and safety measures on home-school routes and the setting up of an Officer Scheme to accompany primary school children by volunteers.

Concerning the "Bike Safely to school" project, political agreement has led to a participative project being launched, called "design of safer home-school bicycle routes with local primary schools", from the end of 2006 to the end of June 2007. This participative project has promoted greater road safety and greater independence for school children in the Venice mainland. Critical points of safe home-school bicycle routes were identified along with proposed solutions and a plan of action, based on an educational and participative programme within three schools in Mestre.

Thanks to effective collaboration with the FIAB[41] association, the "communication campaign A.Bi.Ci" led by the Bicycle office in willing schools between February 2008 and May 2008 was successful, and as other schools have expressed interest in the Project, Venice's city and FIAB have decided to include more schools in it.

The first planned "Demonstration pensioner bicycle officer scheme" changed into a demonstration of the BICIBUS ("Biking School Bus"), organised in April 2008 in Mestre with the participation of many groups of children and volunteers, and the necessary equipment.

Furthermore, 10,000 updated maps of cycle lanes and paths of the Venice mainland (3rd edition) were printed and distributed to all primary and secondary schools of the Mestre municipality in September 2007 and the city of Mestre produced horizontal and vertical signs, enhancing the visibility and recognition of cycle lanes, maintenance works and safety improvement works for home-school routes concerning 7 primary and secondary schools.

In addition, other actions were carried out which have also contributed to the success of the measure in the framework of the "Promotion of safe and increased bicycle use in Venice". In 2006, the Bike Office, with the collaboration of Mobility service Agency (Azienda Servizi per la Mobilità -ASM -) and the Italian federation of bicycle associations (FIAB), mainly:

- opened a guarded and covered parking area for bikes at the Mestre train station; the number of secure bike racks installed now exceeds 1,000 throughout Mestre city,
- approved and published the "Bicycle Master plan",
- identified 16 continuous cycling routes,

[41] Friends of the Bike Italian Association - *Federazione Italiana Amici della Bicicletta*

- promoted specific initiatives like "Bimbimbici" for safety on home-school routes and also European Mobility Week, held annually since 2006

The whole measure has been achieved and implemented as originally planned, with only slight delays.

Results

The expected results have been achieved in full. At the end of the MOBILIS project, the cycle lane network had increased by 70% since 2002 and bike racks by about 10% since 2006. Signposting (horizontal and vertical) and maintenance works have been carried out along two strategic bike lanes and along with safety improvement works for home school routes concerning 7 primary and secondary schools.

The results of the 2008 survey suggest that from 2006 to 2008 the modal quota of urban cycling mobility increased from 16 to 19,7 %, in the city of Mestre. The percentage of residents who cycle often has increased from 35% in 2006 to 41% in 2008 and bicycle traffic has increased by 15% and 24% respectively on Mestre's two main bike lanes.

The level of participation in schools has been very high: more than 2,500 children, 130 classes and about 15 volunteers have been involved and more than 90% of the school teachers are satisfied with the communication and the initiatives aiming to promote bicycles. Of course, it is difficult to measure the direct impacts of the activities on the pupils.

Air pollution, global climate change and traffic congestion are all reduced by biking instead of driving, but quantifying the environmental benefits of the modal shift has not been possible as no model or data for calculating them is available yet for the City of Venice.

Lessons learned and recommendations

Concerning possible difficulties, no relevant barriers have been encountered in implementing the measure and in carrying out all the sub-actions.

The main positive feature of the measure in terms of increased bicycle use is the urban planning of the city, which foresees a wider network of bicycle lanes connecting the focus points of the city, such as residential surroundings and the main transport intermodal points, and also challenging measures such as the protected bike park at the Mestre-Venice train station. Other positive features are the local political context which supports bike mobility, the Bike office activities, the effective cooperation with schools and cyclist associations and new leading infrastructure like the cycling/walking bridge (Ponte San Guiliano) and the Bicycle Loan Initiative at five Park and Rides.

It is important to involve school representatives, teachers and families early in participative projects regarding school children cycling. The equipment and the potential need to ride on a road, planning and conducting a biking-to-school bus need more time than walking activities. Before starting the project, it is necessary to provide children with practice and training on bicycle handling and rules of the road. One adult supervisor for six children is recommended.

Of course, to implement such a measure, a city needs to provide high-quality cycling facilities, improve cycling safety in the urban environment and create cycle paths for recreational cycling activities at the weekend.

Measure 12.5: Satellite control (GPS -GPRS) for water PT services in Venice

Introduction

This measure focuses on integrating the ACTV public transport centre with the Municipal Police control centre in order to optimise boat traffic in the Venice lagoon.

The main means of transport in the traffic system in Venice (historical centre and the lagoon islands) is boats. Like other major cities, Venice has to face difficulties like traffic related to noise, pollution, and congestion but must also tackle wake pollution caused by boat traffic, so called *Moto Odonso*. With the increase in boat mass and speed as a result of the use of large diesel engines, wave motion has become one of the major causes of damage to the basement structures of historical buildings in Venice since the early 1960s. Since then, the Venetian Municipal Authorities have defined rules and tradeoffs suitable for the need of mobility of goods, inhabitants and tourists on the one hand, and the need to preserve historical heritage on the other. Measures such as speed limits and strict traffic behaviour rules have only proved to be partly effective however, due to the lack of continuous and autonomous traffic monitoring systems.

ACTV, the Venice public transport company, provides transport services on both the mainland and water. Its fleet is composed of about 152 crafts and approximately a hundred pontoon boarding points. In the 1990s, the public waterbus fleet was equipped with GPS satellite receivers and a first rough speed and trajectory monitoring system was put in place. ACTV has done a lot since to renew its fleet. In 2004-2005, the Waterborne Mobility Office of the city of Venice set a modern wide-range general fleet control system called SALOMON, whose main feature was the ability of the onboard equipment to define an extremely accurate boat position while containing a complete map of the city waterways with their related speed limits. SALOMON system proved to be very effective and precise but concerned only the vessels equipped with GPRS. All of the crafts were equipped with radiophone for communication with the Shipping Operations Centre and the DGPS satellite position-finding system. However, it was necessary for the Municipal Police and ACTV to set up a joint centre to obtain information about the general water traffic situation enable the location of all vessels and provide complete data for simulations and consequent traffic control regulations. They therefore had to carry out an overall control and integrated management of the water transport system.

Just before the start of CIVITAS MOBILIS, the Municipal Police centre was under construction, and the project provided the opportunity of a joint centre between the Municipal Police and ACTV being created in the city of Venice.

Objectives

The main objectives of this strategic measure were to assist transport services and to optimise water traffic in the lagoon through the integration of the ACTV operations centre and the Municipal Police control centre with an "external" system. This provided a key element for the set-up of a waterborne traffic decision support system for the management and control of boat traffic circulation in the Venice lagoon, in both ordinary and extraordinary situations.

Implementation

The city of Venice and ACTV (the Water PT company) technicians met several times before purchasing the hardware for the joint centre, in order to assess the data transfer protocol between the water PT system and Satellite Control system. The "Development of software and related adaptations" was completed in June 2007. In 2006, ACTV carried out the connection to the control centre and only tested 6 onboard GPS and GPRS systems, because installation on metal boats could have introduced disturbances. THETIS provided the appropriate software and adapted the hardware for integrating the ACTV system with the Municipal Police one, even for older waterbuses. It was completed and tested in October 2007 and now, waterbuses can be tracked in both the ACTV and Municipal Police's operational centre; all personnel have been trained. In March 2008, the ACTV produced the manual for the ordinary and extraordinary maintenance of the system.

Results

For this technical measure, focusing on the integration of the ACTV public transport operations centre with the Municipal Police control centre and offering innovative aspects at the city level, the impacts during the MOBILIS project lifetime are particularly hard to interpret quantifiably.

Concerning the results of the actual implementation of the measure, the GPS-GPRS system has been installed in all new waterbuses and older ones have also been replaced. It turned out that all 140 waterbuses were concerned.

The integration of the waterborne public transport GPRS system - for Venice waterbuses - into the municipal police centre - increases the range of application and furthermore, facilitates close cooperation between local stakeholders in lagoon traffic. According to ACTV and the Municipal Police, all ACTV waterbuses circulating and in service in the Venice canals are visible with the AVM system and with the joint Municipal Police control system. With the system, an ACTV officer is able to know the real-time location of all ACTV vessels running and present in the network. The system is able to automatically compare the planned service with the current boat position and inform the officer of any delay. The officer may then decide, according to the data received, to provide additional courses/boats to guarantee a better service and to keep timetables. The system allows a dynamic management of the public boat fleet and improves the management of daily activities and traffic emergencies.

Lessons learned and recommendations

Implementation of the measure came up against two main barriers: administrative and financial ones.

Firstly, the CDG TALV was appointed by governmental decree from the Civil Protection n.3170 of 27th December 2001, integrated by the ordinance n.3196 of 12th April 2002 in order to tackle the "wave action" emergency. The legislation provides that governmental delegation is limited until the state of emergency has been overcome. Therefore, from 1st February 2007, with the formal finalisation of the emergency situation, CDG TALV transferred to the City of Venice all the contracts and commitments, as well as the goods and equipment acquired to deal with the emergency, along with the accounting and administrative documents and the available financial resources. In this context, the activities and the contractual commitments related to the European project "CIVITAS MOBILIS"

were also transferred to the City of Venice with CDG TALV enactment 2\2007, n.365, 31st January 2007.

Secondly, ACTV's budget covered the installation of GPS-GPRS in newer waterbuses, although older waterbuses were still in circulation without the hardware necessary for localisation. As the ACTV software for the monitoring of the public transport fleet could be adapted for the integration of the joint operations centre, the budget had to be moved to the adaptation of the software and the hardware and GPS-GPRS equipment had to be purchased for older waterbuses.

The need for the City of Venice municipal police to set up an operation centre for their fleet at the same time as ACTV intended to extend and improve its fleet localisation and monitoring system greatly facilitated the possibility of creating a joint operation centre.

Competences in the City of Venice have been transferred without problem, except for the time needed for the administrative procedures. The CDG TALV enactment provides that the CDG TALV officials, responsible for the measure, also maintain the responsibility of the planned activities after the end of the emergency situation, as well as City of Venice executives. The positive participation of stakeholders like the City of Venice, ACTV, the Municipal Police, THETIS and ECOTHEMA played a key role in achieving the measure.

No specific recommendations can be retained for this measure.

Measure 12.6 : Management decision support system for water borne traffic in Venice

Introduction

In the last decade waterborne traffic in Venice has increased tremendously, worsening motor boat wake (the so-called "moto ondoso") and traffic congestion problems in the historical centre. The canals of Venice are currently experiencing problems linked to increasing boat traffic levels and to wake motion damage on the city walls. Moreover, the construction/restoration works along the docks create negative impacts on traffic flows.

This measure deals with an important and complex issue related to the management and control of boat traffic circulation in Venice. Because of the deficiencies of current models and the lack of integration between systems at present, the measure was strategic and also ambitious because it aimed to produce a dynamic waterborne traffic management decision support system for the management and control of boat traffic circulation in the Venice lagoon in both ordinary and extraordinary situations.

Objectives

The main measure objective was to produce a waterborne traffic management decision support system for decision makers within the City administration. The DSS will have an interface that permits access in a hierarchical manner. For example, the Municipal Police will have access to all information.

Other targeted users, such as goods transport firms, would therefore have access to useful information for route planning. Statistics concerning boat traffic circulation and its impacts on quality of life and on the physical integrity of city structures will be available to all public users.

Implementation

This measure entailed the following steps:

- Analysis of the needs of potential users and stakeholders and design of an appropriate user interface;
- Standardisation of the typologies and methodology for traffic data collection;
- Collection and parameterisation of the data necessary to estimate the indirect impacts of traffic changes on quality of life and on the physical integrity of the infrastructure of the city, including:
- Noise produced by various boat types at various speeds
- Wake heights and pressures produced by various boat types at various speeds;
- Turbulence produced by various boat types at specific locations in the canal network;
- Deliveries made to each island on typical weekdays;
- Management of permanent and temporary signs and other forms of information display pertaining to permanent or temporary changes to traffic regulations or conditions.

Plan to integrate existing traffic models for both the city and the lagoon into a single system that includes all of the aforementioned links and connections. Creation of the institutional agreements and bureaucratic protocols needed for the integration with administrative systems that manage activities affecting traffic, such as parking permits and special circulation permits (for large cargo, etc.).

Definition of the data exchange formats/standards to connect with various systems that could provide useful inputs to this system, such as the tide gauges, emergency response systems, automatic traffic counters, wake measurement devices, etc.

Results

The measure was innovative and did not offer evaluation aspects in terms of physical impacts during the MOBILIS project lifetime. The evaluation task focused on the system functions (state of the art, technical innovation, data management, user interface) and the expected outcomes (evaluation of the expected impacts).

The measure provides all of the elements for a fully functioning decision support model for waterborne traffic. As traffic management decision support is the essential element of an intelligent transportation system, the dynamic decision-making support model is able to simulate the following situations before making decisions:

- What kind of effect would closure of a lateral canal for dredging work have on waterborne traffic circulation?
- What would happen if a barge was parked on the canal outside a *palazzo* during restoration works?
- What would happen if a certain number of private tour boat operators were allowed to transit?

A standardised methodology for traffic field data collection has been produced along with a data collection form and a specific handbook for field data collectors. It could be interesting for other cities that have to monitor and manage waterborne traffic to use the same methodology.

The proposed decision support system for traffic analysis and planning at the Venice lagoon geographic scale is based on online Geographical Information System interfaces and data integration tools. The system has been designed in such a way as to be updateable in a sustainable and continual fashion through the standardisation of periodic updates and the interception of administrative acts that affect traffic circulation. This prototype is based on the first analysis of the available cartographic layers. Also, in this case the visualisation of the real physical structure of the city element (such as

bridges, public transport bus station, etc) is important in order to carry out a simulation as close as possible to the real situation.

Lessons learned and recommendations

The MOBILIS project is timely in offering important opportunities for modernising and integrating informative procedures linked to the administrative management of temporary and permanent boat parking space concessions. No relevant barriers have been reported in the measure.

The combination of the long-standing collaboration between Forma Urbis and the City of Venice, Water Mobility Office and of the long-standing experience in the Venetian local context and the strong expertise in geographical Information technologies of Forma Urbis have helped to improve the efficiency and effectiveness of boat parking space management along the inner canals in Venice.

- Competences have been transferred to the City of Venice without a hitch, except for the time needed for the administrative procedures. As a matter of fact, since the CDG TALV appointment was an extraordinary measure, its end was expected and its competences and responsibilities were always expected to be transferred to the City of the Venice in a few years.

4 OVERVIEW OF EVALUATION BY CITY

Introduction

The objectives and targets of the cities have been described in chapter 3. We shall give a quick recap of them for each city here, however.

4.1 City 1: Toulouse

At the end of 2004, there was great willingness among the different authorities to promote changes in the behaviour of citizens and to improve the attractiveness of Public Transport and the use of soft modes.

Besides the development of the 2nd underground line, in MOBILIS time, Toulouse has implemented many founding projects, not only in the direct field of Public Transport, but also in the development of complementary mobility services regarding and concerning Urban Planning.

Measure	Title
5.1.T	Large-scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels
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
6.2.T	Public space redesign in Toulouse
6.3.T	Implementation of the Urban Mobility Plan in the Blagnac area
6.4.T	High-quality bus corridors in Toulouse and development of PT segregated and secured lanes in the city centre
7.1.T	Innovative multimodal PT contracts, services and electronic ticketing in Toulouse
8.1.T	Improving quality and structure of PT services in Toulouse
8.2.T	Development of proximity services at important passenger transport hubs
8.3.T	Improving the accessibility of PT services in Toulouse
8.4.T	Integration of the demand responsive transport as a complementary service to PT in Toulouse
9.1.T	Promotion of car-pooling and integration with PT services in Toulouse
9.2.T	Implementation of a new car-sharing service linked to PT services in Toulouse
10.1.T	Clean urban logistics and goods distribution platform in Toulouse
11.1.T	Awareness raising campaign for changing mobility behaviour in Toulouse
11.2.T	Promotion of bicycle use and integration with PT services in Toulouse
11.3.T	Set-up of a mobility agency and customised services in Toulouse
11.4.T	Commuter and school mobility plans in Toulouse
12.1.T	Demonstration of EGNOS/Galileo service use for the PT control and information system of public transport in Toulouse
12.2.T	Implementation of bus priority scheme in Toulouse
12.3.T	Development of an integrated multimodal traveller information system in Toulouse

Key Findings

For the Toulouse conurbation, the main results obtained during the MOBILIS period concern:

1. **the promotion and use of clean vehicles**, in particular in public transport. The objective of the transport public authority (TISSÉO) was to reduce pollutant emissions thanks to a fleet of 100% clean buses, particularly by using new buses running on natural gas and by, in existing diesel buses, using biodiesel and equipping them with the latest-generation of soot filters.

   At the beginning of the project, the fleet of buses consisted of 399 diesel buses and 100 CNG buses. CNG use was rare in France, except in the urban community of Lille, because the use of the methane contained in the biogas as a fuel for buses requires a preliminary purification. The project brought valuable additional information to the existing research on the solubility of minor components. Biodiesel use was not considered to be a priority, rather a means to develop the use of alternative fuels for old buses. The installation of soot filters on the oldest buses of the fleet had to allow the use of diesel by reducing sulphur emissions.

   Two filling stations of natural gas, constructed at the bus depot, mean that CNG buses can fill up there. Nevertheless, the ban to inject biogas in the network of natural gas is a hindrance to the later development of this policy.

   Soot filters reduce by 90.9% the particle emissions of diesel buses. During 2008, the fitting out of 27 buses with these filters prevented 6.6 T of particle emissions in one year. In economic terms, the evaluation reveals that the use of soot filters for diesel buses incurs €0.28/100 km more in costs and the use of biodiesel €2.56/100 km more.For the purchase of new diesel buses, TISSÉO decided to introduce soot filter equipment as a necessary requirement in call for tender specifications.

   The tests revealed that biodiesel buses produce as many NOX and HC as traditional diesel buses, but they emit 20.3% less CO and 19.1% fewer particles than traditional diesel buses. During 2008, 81 biodiesel buses prevented 49.9T of CO and 5.3T of particle emissions in one year.

   At the end of the project, TISSÉO's fleet consists of 135 CNG buses, 80 biodiesel buses of 1st generation (30%), 104 Euro standard 3 and 4 diesel buses equipped with soot filters and 5 electric minibuses. The CNG bus fleet is now one of the largest in France. The particles and CO emmisions of the whole fleet have been reduced by around 90%. The TISSÉO Board of Directors has not decided to extend the use of biodiesel yet, but will continue to use it to promote and participate in research in this domain.

2. **Mobilty changes and urban renewal-** In preparation for the opening of the 2nd underground line, planned for 2007, Toulouse carried out an integrated package of accompanying urban renewal measures and mobility changes in the city centre. These included the implementation of a pay parking scheme for residents in four central sectors, a redesign of the public space in the very centre to improve pedestrian and cyclists areas, and facilitating access to the underground stations and the use of public transport (PT) by developing high-quality public transport corridors in peripheral areas and segregated bus lanes in the city centre. The definition of a new regulation for freight delivery and the creation of special areas for deliveries have completed this public space redesign. By the end of 2007, the second underground line, line B, opened and the bicycle rental system, VélôToulouse, was up and running. These combined measures have limited car traffic in the city centre and changed the use of the public space.

A- To regulate parking in the city centre, the city of Toulouse has created a “Resident” rate with a monthly pass available, in some zones from 6pm to 9am and in others for full day parking, costing around €15 a month. At the same time, it has extended the pay parking time from 9am to 8pm instead of 6pm into areas in which a “Resident” rate has been created and extended.

The city has also established a parking observatory for permanently monitoring the whole of the perimeter, including the systematic reporting of drivers who overstay their allotted time and of the level of acceptance of the resident parking system through yearly satisfaction surveys. The positive reactions observed in the first districts prompted the city to start extending the regulated parking zones. By December 2007, all of the city centre districts had adopted the “Resident” parking regulation. The satisfaction surveys helped to adapt supply to demand. So, in the end, several types of regulations were implemented according to the type and intensity of demand observed; for example, an adaptation of the rates was set up in 2008 with a preferential rate being set up for emergency professionals.

In December 2007, the results were very positive:

- The “Residents’” pass system is a success; the ratio of the number of subscribers to the number of available places throughout the area has been regularly increasing since the introduction of the PLS in 2005 from 20 to almost 50%. The time spent by residents parking has been reduced from 23 to 5 minutes. The resident satisfaction rate is around 78%.
- In September 2005, the number of pay parking spaces was evaluated at 2,158, compared to 9,302 free spaces. At the end of 2007, the number of free parking spaces was reduced by almost 4,700 spaces, whereas there were 6,938 pay spaces. 5,464 of these were “24-hour Resident” and 1,474 were “6pm/9am Resident” spaces. The “rate of free space” (25% on average) enabled the public space to be reorganised, the development of sustainable transport modes (bicycle stations) and professional emergency needs to be taken into account.
- Occupation and capacity rates of parking spaces have dropped significantly, by 17%,
- Rotation rates now vary between 2 and 4% in the main business areas. This now corresponds to the averages observed in other cities. This has improved access to car parking spaces for all users: tourists, businesses and service users and town centre residents with or without "resident status"
- The illegal parking rate has decreased by 2%,
- Compliance rates (number of legally parked vehicles to the number of vehicles parked in pay spaces), varied between 37% and 58% according to the sectors which could prevent the scheme from operating correctly, but the population gradually adapted to this new situation.

B- At the same time, the city administration extended the pedestrian and cycling zones in the very centre of the city. Some parts were closed to car traffic; the direction changed in some streets and wider space was designed for pedestrians and cyclists. The bus lanes along the main axis to the very centre were moved to the surrounding boulevards (Strasbourg, and Carnot). Through traffic is now prompted to avoid the very centre, the remaining road traffic streets are dedicated to residents and delivery traffic, according to the new regulation that limits the tonnage of lorries and the delivery schedule. Special freight delivery areas were defined.

By the end of 2007, the second underground line, line B and the bicycle rental system, VélôToulouse, had rounded off these new developments.

Consequently, car traffic and particularly through traffic has generally decreased. Between 2006 and 2008, car traffic has reduced by 12.5% in morning rush hour and by 17% at off-peak during the morning; through traffic has reduced by 5% in morning rush hour and by 2.5% at off-peak during the morning. Car traffic has decreased significantly along the previous main road axis (Alsace-Lorraine Street), but has increased on the road axis that joins the Boulevards to the main square.

Cyclists' habits and routes have changed. Between 2006 and 2008, bicycle use decreased during the week overall by around 10%, but the increase noted around the main square and Alsace-Lorraine Street shows that the reorganisation of public space favours more environmentally friendly means of transport. The results are much more positive on Saturdays, when bicycle use has risen significantly, by around 40%, specifically on Alsace-Lorraine Street and along the Garonne River.

Pedestrian numbers have decreased overall, with an average reduction of 4.5% during the week. Nevertheless, they have increased by 4% on Saturdays. These variations depend on the very central areas and the new underground station location. Some people who used to walk now travel by underground, but the increase is very positive in the new pedestrian areas.

Discussions between the city, the carriers' and the shopkeepers' representative has allowed a new regulation to be implemented that limits the tonnage for goods delivery lorries and the delivery time during the day in the very centre. A freight delivery quality chart has also been drawn up in favour of clean freight delivery vehicles that involve the different partners, and 175 controlled freight delivery areas have been designed and implemented.

3. **Public transport competitiveness**-While the city of Toulouse has succeeded in reducing car traffic and congestion in the city centre; the public transport authority (Tisséo) has also increased the competitiveness of public transport.

   It has created high-quality bus corridors, equipped with bus priority traffic lights at crossroads, in the east and south-east of the conurbation to join peripheral areas to underground end stations. These new corridors have improved the reliability of travel time during the day. The commercial speed has increased from 10-15 km/hr to 25 km/hr on the east side and to an average of 30 km/hr in the south-east where journeys take longer. Travel times are quite constant and no longer depend on the traffic conditions. Travel timetables are therefore well respected, although park and ride has not been developed much to date.

   The priority system tested at traffic lights reduced the average bus waiting time at traffic lights by 52% (9 seconds). It is specifically efficient at rush hour when the waiting time decreases by 51% (8.8 seconds) at morning rush hour and 59% (11.4 s) at evening rush hour. The reduced speed duration has increased on average by 4% and commercial downtimes are shortened by 15%.

   The creation of dedicated bus lanes on the boulevards of the city centre has reduced average bus travel time, commercial stop time not included, by 12%, and so the average total travel time of buses has been reduced by around 10%. The gap between the intervals of "frequency" buses has been reduced by 5 points. Average private car speed has increased by 14%, and travel time in the area is reduced by 23%.

   The extension of demand-responsive transport offers complementary appropriate public transport services for the low-density areas of the Toulouse conurbation.

   With the opening of the second underground line, the public authority has launched different measures to improve the quality of services on the underground network.

   Since the middle of 2007, the renewal of the ticketing system with a newly developed, rechargeable card (Pastel card) has reduced public transport user waiting time while entering into the underground station. More than 300,000 PT users subscribed to obtain this contactless card

and 1331 in three months to obtain the card dedicated to commuters. It has boosted the appeal of public transport, giving a modern image to the PT network and contributed to users' behavioural change and the development of intermodality.

- Moreover, the system prepares for interoperability with other public transports networks.
- Innovative public transport fares were developed, more adapted to final user need, such as students and pupils.
- Tisséo has developed a new website that is highly appreciated by PT users.
- New information panels announce the timetable of the bus lines connected to the underground stations and the information delivered is considered effective by the whole panel of the survey, except in the critical cases where its adaptation is necessary to reassure and accompany the customers disrupted in such a context.
- Local services are offered at the junction of the two lines, which around 80% of underground users appreciate, even if an adaptation to the real needs would be necessary. These available services are a big step towards a more friendly use of the public transport network.
- Accessibility Master Plan will be implemented; accessibility is a crucial issue for many public transport users

4. **Different private car uses-** Public transport is nevertheless unable to bring a response to every transport need, so the MOBILIS project has made it possible to develop opportunities for using the private car in a different way.

   To develop the car-pooling practice across the Toulouse conurbation and reduce the share of private cars, specifically at rush hour, the public transport authority and another local authority (the south-east city syndicate -SICOVAL) have improved the efficiency and level of service of the existing car-pooling activity run by a non-profit association. Publicity in companies has brought successful results. In December 2007, compared to the business as usual scenario, around 4,000 daily journeys, mostly commuter journeys (80%), have been prevented since February 2005. Sometimes, more than two people travel in the same car. The development of the car-pooling service saved around 52,302.44 L eq. petrol between February 2005 and December 2007, and 340,000 kg eq. CO^2 for the same period. Before, more than 80% of car-poolers were driving and they are still doing so, primarily to go shopping. Carpooling now offers a real alternative to the private car, but this service is yet to offer a real alternative for people without a car. Now, the public authority structure has integrated the non profit association as a dedicated service to manage and promote carpooling at the conurbation level as a complementary service to Public Transport.
   After having conducted a marketing and feasibility study, the public authority also planned to launch the first car-sharing service with 22 stations and 44 cars. The city of Toulouse is working on establishing the adapted contract terms between itself, the public authority and the private car-sharing organisation in accordance with the competition regulation. The final aim is to extend this car-sharing service at conurbation level after the MOBILIS project.

5. **Soft modes and sustainable mobility-**The implementation of the MOBILIS project in Toulouse has been an opportunity to develop soft modes and promote sustainable mobility.

   A -Cycling- As only around 3% of citizens cycle, a working group composed of representatives of Greater Toulouse, the City of Toulouse, the public transport authority, and several other stakeholders has updated knowledge on the "cycle landscape" at Toulouse conurbation level by first reviewing current bicycle use. This identified what cyclists need and want, and the barriers to cycling. From the results, the strategic action plan has been developed in six strategic stages: the definition of a cycling lane, a cycle parking and cycle marking out development scheme, the implementation of a cycling network monitoring system and a cycling observatory in the form of

practical technical index cards for communities that wish to develop such or such a cycling centre within the framework of a policy. The recommendations will also be integrated in the forthcoming Urban Mobility plan and communication campaigns will promote the use of cycles.

Besides the continuing development of the cycling network and the creation of controlled bicycle parking facilities in the park and ride that has been carried out during the MOBILIS period, the successful implementation of the new bicycle rental services in November 2007 can already be seen as a positive outcome of the joint efforts of the cycling workgroup.

B-Sustainable mobility awareness-The public authority has supported the development and implementation of commuter plans for big companies, which have slightly decreased the air pollution at conurbation level during the MOBILIS period, but also increased employee awareness of mobility and helped to develop car-pooling and cycling initiatives. The development of sector commuter plans and of the associated action plans will introduce a positive modal shift after the MOBILIS project.

First, the Sicoval, a local syndicate of towns in the South East area of Toulouse agglomeration, decided to open a local "Mobility House" in its main activity and shopping area. A local association of car-poolers has been involved in running the activity. The Transport Authority, Tisséo SMTC, provided its financial and functional partnership.

The Mobility House opened in September 2005. It offered different kinds of services: mainly information and advice about public transport, cycling, walking and car-pooling, in addition to bicycle rentals and travel ticket sales. The targets groups are individuals, companies' employees and the public through debates, meetings, and public information stands. It also helps firms to implement some of their commuter plan actions. The Mobility House also has its own website to promote all of its activities.

The Public Transport Authority in Toulouse had noticed that the lack of appropriate travel information constituted a barrier for the use of public transport, and sought to create a new website and a mobility agency to be the interface between users and the services available, with a view to better serving their customers and increasing the use of our public transport network in Toulouse. The first local Mobility House opened in September 2005 with the support of the Sicoval, a local syndicate of towns in the South-East area of Toulouse agglomeration, and of the Public Transport Authority, Tisséo, in one of the main activity and shopping areas. It offered different kinds of services, mainly information and advice about public transport, cycling, walking and carpooling, in addition to bicycle rentals and travel ticket sales. The mobility information service met a real public need and the number of visitors has increased threefold since it was launched**.** At the beginning of 2008, TISSÉO chose to create a website dedicated to mobility, a call centre and a mobility agency at conurbation level to develop information and advice services at public but also at company level. The first one in Labège has already been integrated into TISSÉO. The implementation at conurbation level will take place in January 2009. Fruit of the close working partnership with the other members of the partnership SGGD (Global System of Management of the Movements), this multimodal information agency will constitute the backbone of the traveller information system implemented on the scale of the public transport network, Tisséo.

6. Use of new technology- Thanks to the MOBILIS project, the local partners have widen experiences with EGNOS/GALILEO services and implement ITS applications for improving traffic conditions and public transport services quality. The development of automatic measurement and analysis system for route times of PT and of multimodal information system, the implementation of bus priority at crossroads and of contactless ticketing have substantially improve the efficiency and quality of urban transport.

Comparison of results, objectives and targets

Objectives

The three key objectives of the MOBILIS project in Toulouse were to:

- Reorganise the traffic circulation in relation to an urban re-qualification process and the promotion of sustainable mobility;
- Give an innovative and attractive image to the urban PT network, by improving its quality of service;
- Promote the use of alternative mobility solutions and develop intermodal behaviour.

The results, presented above, reveal that these key objectives have been reached.

- In the city centre and in particular in the very centre, car parking and private and freight delivery vehicle traffic has been reorganised and limited. Pedestrians and cyclists have dedicated spaces now that have been freed up by cars. Only the creation of the Urban Delivery Centre has failed, but the idea is still in mind.
- The various measures, such as the renewal and modernisation of the bus fleet, taking environmental impacts into account, the improvement of bus traffic conditions and of the quality of the service offered to public transport users, in particular in the underground, have helped to increase the commercial speed of buses, modernise the ticketing system, facilitate connections between transport modes and adapt the offer to the needs of users, especially certain categories such as students, disabled persons or people living in the suburbs. The combined actions of these various measures, although some have not been achieved within the project deadline, have enhanced the ecological and qualitative image of the public transport services at the conurbation level and increased their attractiveness.
- The definition of political actions in favour of cycling, the setting-up of a cycle rental service and soon of a car-sharing one, the promotion of cycling and car sharing and the implementation of commuter plans in the main business zones and in administrative departments have fostered the use of mobility alternative solutions and the development of intermodal behaviours. The cycle network is now one of the largest in France and the pedestrian space is constantly expanding in the city centre.
- The implementation of the multimodal information centre, which will be up and running at the end of 2009, will improve traveller information.

Moreover, it must be noted that Toulouse took the opportunity of the MOBILIS project to act as a pioneer in the field of Intelligent Transport Systems and Satellite Navigation by developing automatic control system of PT route, multimodal information and implementing bus priority systems and contact less ticketing.

Targets

The targets of the measure results were to:

- create a modal shift from private car use to public transport and soft modes and therefore to reduce congestion levels, specifically at rush hour,
- reduce energy consumption by decreasing the rate of private car use at conurbation level
- reduce air pollution due to private car and public bus gas emissions at conurbation level

- improve the mobility of some dedicated targets groups and transport safety
- increase public awareness of mobility.

These targets were not quantified at conurbation level and no global results are available to confirm that the combined impacts of the measures implemented have succeeded in achieving these targets.

Nevertheless, it must be noted that at the end of the MOBILIS project:

- congestion levels in the city centre have reduced significantly; the car traffic in the city centre has decreased by around 15% at rush hours,
- the development of commuter plans and the promotion of carpooling has reduced the number of private cars used for commuter travels at rush hour and therefore energy consumption and air pollution;
- the modification of the bus fleet of Tisséo has significantly reduced the air pollution due to particles (-84,4%) and gas previously emitted (NoX:- 31,9%, CO: -54,2%, HC: - 42;8%) during 2004-2008 period. The Tisséo CNG bus fleet is one of the largest in France with 128 CNG buses in 2008;
- bicycle use is increasing. The cycle network is now one of the largest in France and the pedestrian space is constantly expanding in the city centre.
- the number of public transport users (bus and underground) has increased by 49.34%
- changes have been or soon will be made to improve the mobility of people living in the suburbs, of students and of disabled persons
- public awareness of mobility has grown through awareness campaigns, but also through the dissemination actions of the local Mobility House and the development of commuter plans.

Furthermore, the significant change in the use of public space accompanying the new underground line has concerned not only physical space sharing but also the introduction of new concepts in the use of the town that have vastly improved the quality of life of cyclists, pedestrians and residents in town centre, as well as public transport users.

Note that the impacts of some measures will only really be visible in the next few years and that some others will go on after the end of the MOBILIS project.

Conclusions and Lessons Learned

The ‘intelligent’ combination of the whole panel of MOBILIS measures and the cooperation between the main measure leaders has stimulated the quality and use of Public Transport and soft modes and improved the mobility of some dedicated targets groups. The implementation of the project in Toulouse has improved the overall quality of life at local level, by reducing the mobility problem and the pollutant emissions.

Toulouse, which has a long tradition of innovation, took the opportunity of the MOBILIS project to act as a pioneer in the field of Intelligent Transport Systems and Satellite Navigation, while confirming its leader role in the field of clean vehicles.

Nevertheless, the project came up against some obstacles. The national regulations hindered the easy use of biogas for buses. The financial and social context of road haulers led to the failure of the freight

delivery centre creation. The complex development of technical tools and political changes have introduced delays for some measures.

The commitment of politicians, the clear support of transport operators and effective cooperation between them have helped to develop clean modes and innovative practices.

Political commitment is a key success factor for the implementation of parking policy traffic reduction and public space redesign.

It is useful to have a pragmatic approach to mobility changes and sustainable mobility, to learn from other cities, check the regulations, test and evaluate new solutions before extending them.

To identify the needs and aims of users or citizens before drawing up solutions, it is necessary to collect information through surveys and/or involve all appropriate stakeholders in working groups. Explanation meetings and well targeted communications actions must be carried out for initiatives introducing constraints for citizens.

4.2 City 2: Debrecen

The City of Debrecen is constantly focused on maintaining the current modal shift and creating a well-organised sustainable mobility framework for all transport modes. Debrecen understood the importance of focusing on environmental and economical, as well as social aspects, as it is necessary to identify, understand and satisfy the specific needs of different social groups during the process.

Iin MOBILIS time, Debrecen has implemented founding projects, in the direct field of Public Transport, but also concerning Urban Planning and the development of complementary mobility services.

Key Findings:

The main goals of the MOBILIS partners in Debrecen were to:

- Create a solid base for producing and using alternative fuels;
- Promote mobility alternatives to the private car;
- Upgrade the public transport services to make them more appealing for all citizens.

1- **Alternative fuels** -The Debrecen's **bio-fuel programme** represents the city's most evident efforts to create a sustainable mobility system through wide integration of waste management, district heating, electricity production and public transport. Besides the fact that part of the measure – concerning biogas use– had to be cancelled, the biodiesel tests and the extension of the CNG bus fleet helped to create a solid basis for producing and using alternative fuels and to reduce air pollution in the long run.

At the beginning of CIVITAS-MOBILIS, the CNG fleet of the company consisted of 19 CNG vehicles and 1 dual fuel vehicle (CNG/diesel). The CNG fleet has been extended by 7 CNG operated vehicles, 4 of which have been transformed from diesel to gas mode and 3 have been purchased new.

A complex feasibility analysis has been drawn up of bio fuel production and use in Debrecen and extended tests with biodiesel mixture have been carried out. The features, emission impacts and operating characteristics of alternative fuels have been measured and compared to the conventional fuels. According to the test results, it is obvious that bio-diesel will not be a real alternative of

traditional fuels, although it can be used to replace a proportion of traditional fuel, if not more than 20-50%.

2- **sustainable mobility -**By paying particular attention to sustainable mobility when drawing up the **transport development plan,** Debrecen came up with a solution for the changes over the last decade. By developing the objectives and targets, a strategy was set up to address these changes. The mobility working group – which was established in the framework of the CIVITAS MOBILIS project – brought together all local stakeholders in the field of city transportation. Perhaps the most significant effect was the introduction of new concepts of sustainability and alternative approaches to the traffic planning culture.

While the cycling culture must also be boosted, it is necessary to provide an adequate infrastructural network for citizens. With the help of the project, Debrecen has made the first and most important efforts to implement a coherent **bicycle road network**, as this is one of the most promising alternative individual traffic modes. , an overall bicycle network development plan was drawn up and accepted by the general assembly of the city in december 2007. The plan can be viewed as an action plan as well, as it defines the necessary development activities step by step for the next few years. The plan is dividing the development into four steps and aims to develop 48 km of cycle lanes. Based on a comprehensive, targeted development study, the plan is network-oriented to ensure the biggest possible gain from "constructing" the new bicycle roads by selecting the link locations that contribute the most to the consistency of the bicycle road network. It also considers the available resources of the city, and deals with alternative development options as well, such as cycle lane detachment from the existing road or pavement or parking lane use as a cycle lane at selected quiet streets, to save valuable investments. Until the end of 2010 the city is planning to accomplish the first development phase by extending the existing road network by approximately 10-12 km.

Based on the network development plan, the city of Debrecen has greatly improved the efficiency of the existing bicycle network by constructing some missing key elements, which allow cyclists to access many more destinations on a separate, dedicated cycle network. Approximately 4 km of cycle lane were also realised in two different areas of the city, on the existing pavement and service road in order to avoid expensive infrastructure constructions.

51 safety bicycle racks, chosen with special awareness of the modern type of bicycles, were installed during the first quarter of 2007 at 33 different locations of the city, based on the guidelines of the bicycle network development plan. These racks are capable of providing a safe storage option for 7-8 bikes each, i.e. 300 in total. The proportion of old to new is now almost the same (53-47%).

Over the past four years, the most spectacular investment in the life of Debrecen was the development of the pedestrian zone in the main street of the city. This was the largest step towards making the city centre more liveable. The other most important parallel development was the construction of Kölcsey Convention Centre, which is one of the largest and most well-equipped buildings of its kind in Eastern Europe. There is a 25,000 square-metre pedestrian zone in the city centre at present, where public transport has exclusive access. With the help of the measure, the final **construction drawing was prepared concerning the extension of the existing section of the pedestrian zone**. The construction will be carried out within the next few years. According to the plan, the new pedestrian area will cover the conference centre and some other attractive areas, which will greatly contribute to the attractiveness of the whole future pedestrian zone. The Convention Centre draws business tourism to Debrecen. By offering a direct connection to the pedestrian zone from the conference centre, it is assumed that participants coming to take part in a 2-3 day event with their own car would rather walk to the city centre - and access the tram from the stops on the main square - for sightseeing than use their own cars. By enlarging the pedestrian space, the number of surface parking spaces will be reduced, but the underground garage of the conference centre will be able to compensate for them. If

the underground car park of the centre can serve as a “park and walk” facility, the foreseeable impact of de-motorisation can go further than the actual pedestrian zone itself.

The **access and parking management** measure has greatly helped to make the city more liveable and to foster the development of the traffic situation of the city centre.

With the help of the project, a study for access restriction and management has been prepared and this working document was the basis for the further developments. Based on the guidelines of the study, a variable message sign has been installed on Road 4 in order to inform the drivers about the P+R possibility, the reorganisation of the signal periods has been accomplished, 50 electronic signal end countdown displays have been procured and installed at 15 traffic junctions. The display system, mounted next to the signal lights, shows the seconds remaining until the next signal (red/green), in digits, for both drivers and passengers. It provides better traffic flow (due to better preparation, more vehicles can use the junction) and improves traffic safety (drivers can brake in advance before the red signal).

Offering alternative transport modes to citizens helps reduce the negative impacts of individual mobility. The Internet-based car pooling system, launched on the city’s webpage, helps to find partners and group people for common journeys. The city drew up a concept and promotion study concerning the system, before its implementation. The system operates like an Internet forum or a message wall. It is quite a simple webpage, based on the city’s own website. Students can log on to the system with a username and password and place ads seeking or offering rides for specific journeys on a kind of electronic bulletin board. The **car pooling** website impact is yet weak due to a lack of adequate promotion at city level. It would hopefully have regional effects as it helps to increase the number of passengers per car and share the resources efficiently, and thus to prevent air and environmental pollution.

The **improvement of service quality on the tram- and trolley bus lines** may further reduce individual traffic flow to the inner city, which in turn will help to protect the city centre from the heavy traffic. The tram serves as the north-south axis of the public transport grid of the city. To achieve a sustainable and clean urban transport system, it was crucial to make use of this transport appealing to the highest possible level.

A system design study for tram priority, AutomaticVehicle Localisation (AVL) and passenger information system and a traffic analysis and design study for extending the traffic control centre were carried out as a basis for further developments. According to the studies’ guidelines, the traffic control centre was developed in order to handle the priority request of the trams at traffic junctions. The tram priority system has been implemented at one selected junction where the system does not have a negative influence on other public transport modes. The vehicle location and priority system is able to fulfil the following functions:

- automatic vehicle location for trams (18 vehicles)
- automatic vehicle location for trolley buses (31 vehicles)
- complete fleet management for trams and trolley buses
- handle priority requests of tram vehicles at selected traffic signals

By implementing the automatic vehicle location – tram priority and the passenger information system, transportation by tram and trolley bus became more appealing, therefore improving the use of public transport.

At 23 tram stops, an electronic information display system has been installed, announcing the time remaining until the next vehicles. Trams and trolley buses have also been equipped with LCD information displays. The system is based on the automatic vehicle location and the electronic schedule system.

Bus driver's safety training -Public transport operators administered **safety training** in order to improve the skills of vehicle drivers. Public transport drivers usually have to participate in several training sessions, although these are mostly for the purposes of confirming their physical competences. The present training, realised in the framework of MOBILIS, focused on teaching about new technologies (ABS, ASR, ESP, ASC), driving methods in special environmental circumstances and on energy-efficient ways of driving vehicles. This training makes public transport safer and more economical

Comparison of results, objectives and targets

The targets were:

- to reduce the air pollution due to vehicles emissions,
- to encourage modal shift from private car to soft transport modes,
- to improve the quality of offered transport services
- to improve the planning culture in the city
- to make the city more 'liveable' by protecting the downtown area from heavy, motorized traffic

The results, presented above, reveal that most of these key objectives have been reached.

- Before the MOBILIS project, sustainability was not taken into consideration when decisions regarding transport were made. The planning was characterised as ad hoc and there was no real political tradition of involving most of the stakeholders and experts during the decision-making process. The project has made a major contribution to the improvement of the city's planning culture through the implementation of the measures.

Conclusions and Lessons Learned

In general, the MOBILIS project in Debrecen was successful. It proved and underlined the commitment of decision makers to the sustainable development of the city, with special attention to mobility issues. By raising the standards of urban mobility in Debrecen, the measures of the CIVITAS MOBILIS project are major contributions to attempts to improve the quality of life of citizens. The smooth cooperation between local stakeholders proved to be a way of creating a well-organised sustainable mobility framework for all transport modes. This is one of the most important local mobility achievements that was facilitated by the MOBILIS project. The politicians and stakeholders understood the importance of involving all the different stakeholders in the process of sustainable development and of being able to address the future transport challenges in Debrecen. The project launched the consequent planning and urban development and the real impact therefore goes further than the timeframe of the project. The city council and the public transport companies have now reliable and objective information about the risks and benefits of biodiesel mixture use and of converting buses into biodiesel mode.

Even though the project is a success story, there were some obstacles along the way. In general, most politicians were sceptical in the beginning concerning the new, innovative approaches identified in the MOBILIS project. As the work progressed they were convinced that it was not just a show trial, but of

course, raising awareness needs more time, not just as regards citizens, but also politicians and decision makers as well. Dissemination activities are necessary to support sustainable mobility practices, as car pooling.

During the implementation of the project measures, there were some other technical rather than conceptual barriers. Unfortunately, due to the lack of supplier, the biogas project had to be cancelled. The wider scale implementation of the tram priority was also limited as the system would have resulted in traffic jams in other parts of the city, which could have been disadvantageous for other means of transport as well, including public transport. These obstacles aside, most of the project measures could be implemented as planned with numerous remarkable results.

Debrecen acknowledged that besides the efforts undertaken for the MOBILIS project, personal effort and commitment are also necessary to achieve the goals described above. The project did, however, enable the city and its local partners to lay the groundwork for future improvements, underlining the commitment and willingness of all stakeholders and decision makers to work out new partnerships and solutions. Therefore, the impact of the project went further than the implementation of the project measures itself. The most important achievement of the project is the institution of a completely new approach concerning decision-making for mobility and transportation of the city.

4.3 City 3: Ljubljana

During the MOBILIS project, Ljubljana worked on the following three measures:

- Measure 5.4.L: Implementation and large-scale deployment of biodiesel and CNG fleets in Ljubljana
- Measure 11.7.L: Participatory planning and promotion of sustainable mobility in Ljubljana with emphasis on safe and increased bicycle use
- Measure 11.8.L: Set-up of information points and campaign on clean vehicles and alternative fuels in Ljubljana

Key Findings:

Alternative fuels

There were three main components to this measure:

a) Large-scale deployment of biodiesel in LPP buses (EURO 0) in Ljubljana. To begin with, two buses were tested from February 2006. 18 additional buses were then tested from August 2006. It was envisaged that biodiesel would be deployed in 100 buses if the results of 20 tested buses were positive. However, due to poor operational results and higher financial demands than initially expected, the LPP decided not to use biodiesel in the 100 existing (old) buses but rather to extend testing of 20 buses and to carry out additional measurements of pollutant emissions.

b) Improvement of the quality of biodiesel produced at Pinus. The target was to reduce content of water, free fatty acids and phosphorus in the raw material.

c) Production of biodiesel at small farms. This concerned demonstrating efficient production of oil rape in tonnes per hectare and year (t/ha*a) at testing sites on two locations in Slovenia. Project partners developed equipment for efficient pressing of rape seeds (production of crude

oil and cake per tonne of seed) by farmers (non-professionals in terms of machinery and engineering) to support decentralised production and provide additional income for the farmers.

The reasons for designing and implementing such a measure were as follows. Generally, there was poor awareness in Slovenia before 2005 about the benefits of biodiesel (alternative fuels) in comparison to mineral diesel (D2); comparative evaluation results were only distributed within an academic/scientific area; the public was not kept well informed of issues even by non-governmental organisations (NGOs). Use of public transport and the quality of PT services were decreasing. Efforts to improve the situation had been made mostly on a political level (after joining the EU), while in day-to-day life citizens were behaving without specific responsibility regarding energy use and transportation-related, environmental, health and other issues. Urban transport and health were not subjects of discussion in terms of modality share, nor of quality of life. Farmers were left to their own devices concerning their own potential for innovation and understanding of energy efficiency, fuel consumption and economy, while small (garage) producers of biodiesel were producing the fuel for themselves only and were not very concerned about its quality.

. Participatory planning

Before 2005, participatory methods and tools were used sporadically in different policy fields in Ljubljana, but no regulation required public participation in decision-making procedures. Mobility campaigning usually focused on activities regarding European Mobility week and special events in nurseries and primary schools, but no initiative was put forward for providing Ljubljana citizens with information on clean vehicles and alternative fuels or for raising awareness of clean vehicle fleets.

Around 7,000 cyclists were travelling daily on 124.4 km of cycle lanes, 27.9 km were painted red for better cyclist safety. 2,490 bicycle racks were at their disposal in public spaces. The municipality owned 40 bicycles, at the disposal of city employees for work purposes.

The development of the public participation model was based on the analytical decision-making process scheme and on the experience gained from the spatial planning procedures developed at local level. The district councils and the Office for citizens' initiative were identified as the appropriate partners for including civilian complaints and ideas in the development of the mobility project, in particular to define initiatives in favour of cycling. The participation model was then tested in workshops.

The expected results were an increase in the level of civilian participation in the meetings organised in district councils on bicycle use.

Automatic counting systems have been installed in recent years for assessing bicycle use in the city. Cycling slightly increased (by around 1.2 %) during the year after the implementation of the measure. In 2008, the city bicycle project introduced 80 bicycles for hire in 8 locations in Ljubljana. There are now also 480 new stainless steel bicycle racks and 50 stainless steel covered bicycle racks in public spaces in Ljubljana.

Sustainable awareness

The measure consisted of several, interconnected tasks with the common goal of increasing awareness and knowledge among various stakeholders, from the public to decision-makers.

The objectives can be grouped into two clusters:

- setting up of two info-points on clean vehicles and alternative fuel use and
- raising awareness and promoting use of innovative technologies, systems, services and policies on clean vehicles and alternative fuels.

However, the general idea was to have a set of events and materials providing information for various stakeholders on sustainable mobility, clean vehicles and alternative fuels in the city and at project level and to use results from two others measures.

After preliminary discussion at city level, three info points were set up and equipped regularly with updated materials from MOBILIS activities. The info point personnel were trained on MOBILIS issues with specific focus on clean vehicles and alternative fuels. After the info points were set up in the existing local tourist information offices, information was provided (leaflets, brochures, etc.).

Awareness of aims and goals concerning clean vehicles was not assessed, as unfortunately no comprehensive public opinion survey regarding the issue was planned. It can nevertheless be assumed, in view of the number of events, information disseminated and number of participants, that their awareness and knowledge about clean vehicles and alternative fuels has increased.

Comparison of results, objectives and targets

The measures implemented in Ljubljana aimed to foster environmentally friendly transport by:

- Reducing the negative impact of traffic, especially as regards emissions
- Raising awareness among people and promoting environmental friendly vehicles
- Getting lots of people actively involved through different dissemination channels
- Giving an example of good practice for large-scale clean vehicle implementation at national level

The targets to obtain at city level were to:

- Reduce air pollution due to PT vehicle emissions
- Foster a modal shift from car use, specifically to cycling
- Improve the awareness level of citizens and influence both their views and behaviour regarding transport in the city.

The results, presented above, reveal that these key objectives have mainly been reached.

Even if the initial objective was to have 100 buses running with biodiesel at the end of the MOBILIS project, the public transport operator (LPP) now has a clearer idea of which buses to purchase in the future and how to make up the PT fleet in Ljubljana. Justification could also be based on cost and environmental arguments.

The project has highlighted that cost-effective production of biodiesel at small farms is feasible. Up-scaling potential is related to oil and biodiesel production at small farms; several new producers of rapeseed oil in Slovenia have set up recently (from 2007).

The measure regarding participatory planning and promotion of sustainable mobility in Ljubljana, with emphasis on safe and increased bicycle use, brought about considerable change in the understanding of cycling in Ljubljana. Some outcomes of the measure were already incorporated in important strategic decisions of the City of Ljubljana, i.e. creating the position of a city cycling coordinator was identified in the Ljubljana Environmental Action Plan as a task to be implemented. The development of the overall public debate regarding traffic and transport issues in the City of Ljubljana has raised various transport issues, including cycling.

Participatory planning contributed significantly to direct public awareness, maybe even more than the dissemination actions, which focused more on activities around annual European Mobility Week, because the information flow concerning clean vehicles and alternative fuels was not so intensive.

. Conclusions and Lessons Learned

CIVITAS MOBILIS brought considerable change in the understanding of transportation issues. Use of alternative fuel is increasing, farmers are encouraged to produce oil rape, crude oil and fodder, public transport is more popular and cycling is becoming more popular.

Alternative fuels

It is clear that biodiesel use is not recommendable for old buses Euro 0 (due to high costs for preparing and maintaining/servicing the fleet). Also, winter time may be problematic in terms of causing non-operability of buses due to parafin crystallization in biodiesel below -7 °C. Apart from this, introduction of biodiesel is environmentally beneficial. The public transport operator (LPP) will replace 100 existing Euro 0 buses with new Euro 4 buses. About 30 will run on D2 while the others will partly run on biodiesel, partly on CNG, and some will be hybrid.

Production of biodiesel at small farms is feasible; however, crude oil esterification would be better elsewhere, i.e. at industrial plants.

Participatory planning

The external pressure of civilian organisations (especially the Ljubljana cyclists' network) furnished additional support.

The debates identified many user needs, for which environmentally supportive solutions depend on the systematic use of participatory decision-making in the city administration. They also provided rich and structured information for updating the Ljubljana Sustainable Transport Plan and made a considerable contribution to the development of some measures for the CIVITAS Plus – ELAN project.

Sustainable awareness

Establishing info-points at the existing information offices (basically targeting tourists) was a good move in view of the limited budget for this measure. However, due to the specific scope of information requests at such a location, its role as an info point on MOBILIS issues is somehow doubtful. In fact, Ljubljana suggests that tourist info points should not be used any longer as info points for sustainable transport; rather, specific info points should be set up.

Dissemination activities in the campaign were too spread out over time (gaps between information) – a campaign, such as an action or series of actions proactively carried out to accomplish a purpose, should not last as long as four years.

Concluding remarks

Work on CIVITAS MOBILIS was extremely beneficial in terms of learning for all stakeholders from Ljubljana/Slovenia. It brought considerable change in the understanding of transportation issues. Use of alternative fuel is increasing, PT is more popular, cycling is becoming more popular and farmers are encouraged to produce and use crude oil from rape seeds in their machinery, as well as to sell it on an open market. The latter may reduce prices of alternative fuels in Slovenia. The learning process also revealed that many more integrated measures were necessary to achieve further substantial change in sustainable mobility in Ljubljana and somehow naturally leads to its involvement in the Civitas plus initiative.

4.4 City 4: Odense

Over the past four years, the Mobilis activities have added great value to Odense' long tradition of promoting soft modes through campaigns, citizens' involvement and new concrete developments within the field of cycling and public transport. The purpose of the Mobilis initiatives is related to behavioural change and has focused on altering habits and emphasising the positive advantages of alternative modes of transport.

Key findings

Citizen involvement

One of the measures in Odense to receive a lot of attention is the implementation of 30 km zones in residential areas through a process with high citizen involvement.

A web page was created, providing citizens with information throughout the project. The web page was also used for a questionnaire survey both before and after the project.

In order to make the residents in the areas aware of the project and to meet the Municipality's wish to engage in a dialogue concerning the establishment of the speed restriction zone, flyers were distributed door-to-door and display boards and posters were put up in the selected areas with information about the project.

A working group was set up in each of the residential areas and given the task of finding out which solutions they wished to implement in the area. The members of the working group were very much involved in the work. Besides representing the residents in the area in discussions with the municipality concerning the design of solutions, the members also acted as local ambassadors for the municipality and for the project in relation to the critical residents in the area, with whom they discussed and defended the chosen solutions. In fact, through this work the citizens involved saw for themselves that there are many considerations and priorities to be taken and thus not all demands can necessarily be met.

The measure reduced average speed in the two pilot areas by 12% in Korup and 22% in Bolbro. Cycling has increased by 62% in Korup. In Bolbro the number of cyclists remains unchanged. This is partly due to the fact that bicycle traffic from the beginning was higher in Bolbro than in Korup, since the former is closer to the city centre and to schools. The amount of residents who find the speed too high has decreased from 72% to 31%.

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Direct marketing

Citizens are normally very positive about direct contact, as long as it is voluntary and without any commercial pressure. In the measure regarding personal transport choice marketing, more than 25,000 citizens were contacted directly at their home, and hardly anyone refused to participate. Odense has a lot of basic information on mobility options, including brochures and websites, which could be presented for the citizens in this very efficient way. So this was not only an opportunity to invent new features but also to present all the existing options in a way which gave people a good overview and got them talking about mobility - all as an incentive to change mobility behaviour.

Direct marketing concerning transportation is very suitable for many cities in Northern Europe. Direct marketing could be a way to get a very high citizen involvement and ownership just ahead of major changes in the overall mobility in a city. The concept also underlines that citizens themselves can do just as much as the local authorities just by changing a few trips per week.

Interactive traffic training

In Odense, cycling is a natural form of transport for a large percentage of the population. Children cycle to school and, with the Mobilis measure B-Game, the municipality wanted to invite children to learn through playing a computer game. The interactive aspect of B-Game can be seen as a fun way for children to improve cycling abilities and learn about dangerous situations in traffic. The interactive game teaches children about distances, speed and motion traffic through a number of planned and structured video sequences which make the situation as real as possible. Filming was done in a very realistic way thanks to an on-site film from a special bicycle, which means that the children could recognize the scenarios from around the city.

Using a format that the children can relate to and which they use for fun and entertainment is a very good way of getting their attention.

New technological solutions

Private cars are constantly improved through new technologies. To catch up with this trend, electronics can be used in many new services for public transport to heighten the impression of being a modern public transport.

The mobile phone has been used with success in Odense as a way of creating a more attractive public transport service through the introduction of the SMS ticket and the “SMS your bus” feature.

It is now possible to buy your bus ticket on your mobile phone in Odense. By sending an SMS to a specific number, the user pays for a bus ticket via the mobile phone and thereby accepts the amount to be withdrawn from his mobile phone account. This feature has proven a great success – especially with the younger passengers - and was a first of its kind in Denmark. A lot of attention was drawn to this innovate way of using technology and national media, with both the TV and press running stories on this feature. The SMS ticket will be spread to all the other bus services in Funen and other cities around the country have introduced similar features.

“SMS your bus” was another technological way of approaching bus users. The activity is linked with the installation of GPS in all the buses. This gave the possibility of using the exact location of the bus in a new passenger service. Passengers standing at the bus stop can send an SMS and in return receive real time information on when the next bus will be at the bus stop. This can prevent or reduce the irritation of waiting for the bus, not knowing when it will arrive.

<u>Comparison of results, objectives and targets</u>

Within the Odense contexts, the selection and design of the concrete measures in MOBILIS aimed to foster environmentally friendly transport through a combination of the following:

- To increase the number of individuals and families who choose environmentally friendly traffic modes.
- To remove physical and psychological barriers which limit mobility choice.
- To carry out necessary events and marketing activities to support the objectives above.

Seen as a whole, the package of MOBILIS initiatives had intended to demonstrate not only that a further modal shift can be achieved, but also that the viability of this shift depends on regulation and

intervention as well as a broad public understanding of the significance of mobility choice for the environment, for public health etc. The key objectives have, to a large extent, been achieved in the measures implemented, although a major change in choice of transport within the population does take time.

But most importantly, Odense has seen that the objectives of involving citizens and using personal interaction, both for marketing purposes and for targeted citizen involvement activities, are an excellent way of motivating a change in transport choice behaviour. Also the use of technical innovations has proven that, by introducing modern technology and channels which people can relate to or which they use in daily life, this is a good basis for aiding a shift in transport choice.

The largest deviation in relation to the original plan was in the measure regarding mobility management services for the harbour area. The idea about drawing up and implementing environmentally friendly mobility management plans for private companies and residents in the harbour area has been abandoned, due to a change in the target group caused by a rapid development in the harbour area. Many former industries are leaving the area and new businesses are setting up. Instead increased focus was put on the development of the traffic- and mobility plan for the city as a whole, which has the harbour area as a key area of interest.

The plan is very ambitious and includes all modes of transport and both soft and hard measures. Quality of life - a city for people - is very much one of the main criteria. Urban life is seen as an integrated issue, as are traffic volumes and the speed of traffic. To create a stronger connection between the harbour area and the city centre, plans have been set up for establishing a local city bus in a ring route, probably run by electric power. The bus might become a free service to increase the number of users and to promote public transport in general. Also, the city is now looking into the possibility of establishing a light rail which can connect the harbour area, the inner city and the future university hospital area.

Conclusions and lessons learned

Odense found it very important, for good process, to involve citizens in development processes in the area of traffic and mobility. In Living Street we had the highest level of involvement with working groups, influence on process, implementation, etc. The project shows that through a close dialogue with and involvement of the citizens, it is possible to gain a lot of resources and to create commitment to and ownership of the chosen solutions in the local area. The residential group for instance actively participated in the drafting of information for the rest of the residents. It is vital though that the purpose of the involvement and the liberty of action of the citizens is clear from the outset, so that no expectations are created that cannot be met.

The press was used continuously in the project in order to get the projects mentioned outside the residential areas concerned. This has led to the Municipality of Odense regularly getting enquiries from other residential areas wanting to impose limited 30 km/h zones. Thus these pilot projects have paved the way for the introduction of 30 km/h zones in other areas in Odense and have contributed to significantly reducing the resistance against such zones.

With the Traffic and Mobility Plan, the public hearing phases have responded positively and have meant that there is a much broader understanding of the major changes that will take place in the years to come. The hearings have meant that the two-way communication between local authority and the public has had a very constructive forum, where concrete ideas and issues have been communicated both ways. The plan will introduce significant changes to traffic structure in the inner city – closing of roads for cars, introduction of environmental zones, etc. so there is a large amount of insecurity which has to be handled in the best possible way.

Changing peoples transport habits in favour of public transport and bicycles is a very difficult task.

Odense found that a very effective aid in this mission is the use of the media in combination with the personalisation of the issue you wish to market. One of the activities in Odense was a campaign involving 160 families who were given the possibility to change their transport behaviour through a package of different incentives (free bus rides, car-sharing, discounts on purchase of bicycles and on taxi rides, etc.). Two of the families were followed throughout the campaign period by local television. By personalising the message through the media, the campaign had very high visibility and high interest among residents. As the station broadcasts all across Funen, the campaign actually gained a visibility which reached far beyond the city limits

Finally, the technical services and technical innovative solutions have proven to be a very effective factor. As mentioned above, the technical installations regarding the public buses have all been a success. However, it is clear that although the GPS-based bus priority system is a good asset in moving towards better flow for the buses, this does not work optimally in Odense, since we do not have priority lanes for buses. This means that in heavy traffic, the buses are still stuck in long lines of traffic.

The creative use of mobile phones for ticket sales and for providing relevant information very much fits into the image of the younger generation. Furthermore it is a very cost-effective way of using people's existing equipment in new dimensions.

Public transport, buses especially, need much better promotion, not only to attract new passengers, but also to increase the perceptions of present users. Campaigns need to be repeated continuously, which is often neglected due to high budget costs.

The Mobilis experience has taught Odense partners that the use of interactive tools on the Internet and the computer game as a teaching aid and training is a very good way of reaching the target population. They learned that the handling and access to the interactive traffic training tool for children need to be much more simple, without the access restrictions, etc. Also they found that teachers could be a barrier themselves, since they were often unsure of how to use the administrative platform and how to retrieve the statistical data from the students' game sessions. The conclusion is that the game should have been easier to use and made available for everybody to play for free online. That way the students could have used the game wherever and whenever they wanted.

The experience gained from participating in Mobilis has made a substantial number of direct improvements in the city regarding sustainable urban mobility. It has also given a wide range of technical experiences and lessons learned which would benefit the future work with mobility and urban planning in Odense. As many of the activities have addressed the individual, in offering and marketing better mobility choices, these experiences will be directly adopted and further developed in the coming years as Odense begin the very large task of implementing the new traffic and mobility plan.

4.5 City 5: Venice

The challenges for sustainable mobility in Venice are multiple. The city has a unique traffic system characterised by mainland city traffic and waterborne traffic. However, this does not exempt Venice from some of the same critical mobility problems that the average major city faces. Through a large package of mobility policy measures, Venice has sought in particular to make public transport fleets cleaner, to increase accessibility to transport, to better manage traffic flows and parking on the mainland and in the lagoon and to promote alternative modes of mobility.

Key Findings:

With a focus on quality of life in the Venice mainland and islands and thus on residents, commuters and visitors, initiatives in Venice brought about positive changes to the environmental impact of the public transport system.

CIVITAS MOBILIS has permitted ACTV to broaden its natural gas powered fleet, thus increasing the attractiveness of public transport as a whole and reducing polluting emissions. The expansion of the fleet with 35 CNG buses and the 5 CNG minibuses has been accompanied by an increase in refuelling infrastructure. Having come through a complex authorisation procedure for the construction of the pipeline connecting the new ACTV filling station to the gas supply network, by January 2009 the refuelling station will be able to satisfy the refuelling needs of the growing CNG fleet more efficiently and faster.

The introduction of natural gas in the public transport bus fleet has been accompanied by the promotion of GPL as a fuel for private recreational boats in the Venice lagoon, with the development of 10 LPG demonstration pilot boats circulating in the lagoon. Testing LPG in Venice and promoting through an awareness-raising campaign at the local level is particularly important in a city where the use of boats by private citizens is particularly high and where the aquatic environment is particularly sensitive. Initially the objectives in MOBILIS were more ambitious, as a transfer of the use of LPG to some 4,000 private boats was aimed at. However, given a series of factors which made this impossible during the timeframe of the project (these are discussed in more detail below), the measure adapted admirably, conducting a much called-for market analysis and drawing up a local action plan for LPG.

18 new waterbuses with lower environmental impact have been introduced in the ACTV public waterborne fleet. They have been designed to have a lower noise impact, more energy efficient engines and a specific design that reduces harmful impact due to wake action. They are also designed and equipped for the transport of disabled passengers.

On the mainland, new parking management strategies supported by a combination of tools including differentiation of tariffs, marketing strategies, and real time parking information to facilitate and encourage a correct use of car parks around the mainland have been introduced. The Mestre electronic access control system supported by a set of tele-cameras combines park-and-ride, together with frequent bus services and public transport from the edges of the Limited Traffic Zone, to better control and improve access to the city centre. The supply of parking areas around the centre grew fast with 10 park&ride car parks and a total capacity of 2,124 car spaces - free of charge - in order to promote the use of the scheme. In addition, the control of on-street parking spaces by the Municipal Police and the officers of ASM has been enforced. A communication campaign on alternative forms of mobility in the city has been carried out.

On the mainland, specific economic instruments have been successfully used to encourage the use of more environmentally friendly tourist coaches. In particular, the share of Euro 4 tourist coaches reaching Venice increased from less than 0.5% at the beginning of the project to around 5.5% in June 2008.

With regards to the share of transport given over to the private car, in order to reduce the number of private vehicles on the road, bicycle use and the car-sharing system have been strongly promoted. The car-sharing fleet has been expanded and 18 alternative fuel vehicles have been added, allowing the service to become increasingly appealing to the public. Two vehicles suitable for passengers with disabilities have been also included in the car sharing fleet.

Boosted by the bicycle master plan adopted by the City, the Venice Bike office has installed 100 new bicycle racks and carried out specific initiatives to promote the safe use of bicycles in Venice, with a special focus on young people. In particular, a specific communication campaign and a sustainable mobility education project have been implemented, along with a Biking-to-School-Bus demonstration in order to raise awareness about safe bicycle mobility on home-school routes.

Thanks to MOBILIS, specific investments have been made in technology applied to control traffic. This has taken place on the mainland through the installation of electronic access points around the Mestre city centre, whereas waterborne traffic is controlled through an

innovative water traffic navigation control system on the Grand Canal known as the ARGOS system. Waterborne traffic and parking management in the other canals have also been improved by the use of a dynamic model with a user interface and a parking management tool. Furthermore, the integration of the waterborne public transport GPRS system - for Venice waterbuses - into the municipal police centre - increases the range of application and also makes it easier for local stakeholders involved in lagoon traffic to cooperate more closely.

Comparison of results, objectives and targets

The objectives of the implemented measure combination were

- On the Mainland,
  - To limit tourist bus access
  - To foster a modal shift through new car parking management and the promotion of alternative modes to the private car.
- In the lagoon,
  - To regulate waterborne traffic through the development of new tools and the implementation of new regulations
  - To increase waterbus accessibility to disabled users.
- In both regards, to introduce public transport modes with a lower environmental impact

The MOBILIS partners of Venice have reached the main objectives: to develop cleaner, more environmentally friendly public transport fleets through the measure regarding CNG buses and introduction of new waterbuses, as well as to encourage cleaner modes of personal transport through the introduction of LPG in private boats and promotion of car sharing. The Venice partnership also had objectives regarding accessibility, by making two cars in the car sharing fleet available for the transport of disabled passengers and by introducing waterbuses, which not only have a lower environmental impact but are also designed and equipped for the transport of disabled passengers. Other measures have sought to monitor and control traffic and parking in order to make both the streets of Venice and the Venice canals more liveable. Measures such as car sharing and bicycles are aimed at promoting different modes of mobility to the private car.

The main targets were:

- A reduction in fuel consumption,
- A reduction in car and boat traffic congestion
- An increase in modal shift from car use to cycling
- A reduction in vehicle emissions and traditional boat environmental impacts
- An increase in public awareness about sustainable mobility

Conclusions and Lessons Learned

Different positive features are behind the more successful measures in Venice

The main advantage would appear to be cooperation, whether longstanding, or new, between local partners to reach MOBILIS objectives. The City of Venice Water Mobility Office and FORMA URBIS have a longstanding working relationship, which facilitated the development of the parking management tool and the dynamic traffic model. FIAB, the Italian Federation of Urban Cyclists and Bicycle Tourism has also developed a consolidated relationship with the City, which most certainly contributed greatly to the success of the bicycle measure. MOBILIS has instead created opportunities for new cooperation, such as between AGIRE and the National association for LPG, Assogasliquidi as well as between the disabled people's association ACTV for waterbuses and with ASM for the car sharing cars adapted for the transport of people with disabilities.

In addition to cooperation, a key to success is political support. This can be seen in the projects for access management in Mestre city centre, in ARGOS, for the monitoring and control of waterborne traffic on the Grand Canal and in the bicycle projects. In fact, with regards to the latter, bicycle projects are also supported by the establishment of the Bicycle Office in 2002, once again a result of the political support for this mode of mobility.

Communication has also been crucial. In spite of problems with legislation, the LPG boat project can boast extremely well-informed local stakeholders and potential users in general, both due to the use of local means of communication and ample publicity on the objectives of the measure at the annual Venice Floating Show. This has also proved very important in the bus LTZ project, where tourist agencies and operators were targeted in specific magazines and through trade fairs and in the car-sharing expansion measure.

Other factors for success are the use of suitable enforcement mechanisms, such as the on-street parking controls in the inner centre by the municipal police and the ASM officers, which have been strengthened. In addition, the support of measures with planning instruments, such as in the case of the bicycle projects: the bicycle master plan was produced in November 2006. Moreover, the commitment on the part of all of the measure leaders has been an essential factor in the success of MOBILIS in Venice.

Last but not least is the importance of lobbying and finding creative solutions. AGIRE and Assogasliquidi strongly lobbied the national government in order to raise political awareness and speed up discussions and approval of specific regulations to implement an LPG-fuelled demonstration fleet in the Venice lagoon. Regarding the LPG filling stations for marine applications, the City of Venice and the local fire department created a temporary authorisation procedure to allow the construction of a first prototype of filling station in the lagoon and the geographical position of the four LPG filling stations has been discussed with the local authorities.

Different obstacles have been encountered in Venice

The most significant obstacle has been that the development of legislation which appeared to be maturing along a reliable timeline at the beginning of the project, and would thus have permitted the measure's original objectives to be met with regards to the LPG boats measure, was too slow, in spite of lobbying. The most significant lesson to be learnt here is to keep activities which depend on factors out of your control to a minimum!

Another factor, which has hampered this measure more than others, even though it has been just as successful, is that of bureaucracy. It took two long, gruelling years to get the 28 permits necessary for the construction of the pipeline to bring CNG to the bus depot for refuelling. This was added to the fact that the City of Venice and the gas company were slow in renewing their contract. ASM also found that the permit procedures involved in building a small refuelling station for the car sharing fleet would have taken years longer than originally planned.

In a couple of measures, technical issues caused delays. This was the case for the installation of the tele-cameras in Mestre centre and in finding the right kind of information panels through the tender procedures. In both cases, the problems were solved quickly. In the case of the CNG minibuses, no

bids were put forward in response to the first tender. It was only by changing the technical specifications sought that ACTV was able to order the minibuses, but not without delays.

A final issue in implementing measures was that of gaining acceptance. In fact, implementation of the measure on parking on the mainland was slowed down by shopkeepers' concerns about a number of mobility initiatives (parking, blue lanes, trams etc) and the implications that they may have for trade. In the case of the tourist coaches LTZ, the approval of the tariffs was delayed, not because anyone opposed the idea of applying differentiated tariffs based on the emission levels of the coaches, but because the tariffs differentiate according to a number of other factors. Hoteliers opposed the fact that coaches with tourists staying in hotels in Mestre would pay higher tariffs than those staying on island Venice, and therefore blocked the approval of the tariffs until the issue was solved.

5 CROSS-SITE INTERPRETATIONS AND CONCLUSIONS

This chapter try to put in evidence the infringement of the major operational project goals of the MOBILIS project by WP / Policy Field (described in § 1.3.3Thematic goals)

We are anxious to underline the limits of this analysis. Indeed, although recovering from same Work packages, the implemented measures concern geographic, economic and social contexts very different. The local partners obviously integrated the ends of the program CIVITAS II, but their declension adapted to the local level leads to sensitive differences between measures. As a consequence the evaluation focuses, according to the concerned measures, on types different from impact.

The transverse vision expressed below raises more from the felt or complementary points than from the demonstrable comparison.

5.1 Key findings:

The tables used to synthesis the overall assesment of achievment by work package are identical to these used in the Policy Recommendations report.

WP5: Clean vehicles and alternative fuels

Introduction

Clean vehicles and alternative fuels was a very important pillar of the MOBILIS project.

Five measures were relevant for this work package in Toulouse, Debrecen, Ljubljana and Venice.

City	Measure Code	**Measure title**
Toulouse	5.1 T	Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels
	5.2 T	Solution for alternative fuels in Toulouse and complementary measures to achieve 100% clean fleet.
Debrecen	5.3 D	Operation of bio fuel and CNG vehicles
Ljubljana	5.4 L.	Implementation and large-scale deployment of bio-diesel and CNG fleets in Ljubljana
Venice	5.5 V	A: Deployment of LPG Boats in Venice B: Deployment of CNG buses Venice

Process evaluation

During the implementation of these measures, the MOBILIS cities faced several barriers and employed several drivers aiming to overcome them as showed in the following table:

WP 5	Measure Code	Measure title	Deviations	barriers	drivers
5.1	Tou	Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	Delay in the construction of the new CNG filling station	Regulatory and safety constraints	Public transport political commitment
			Stop of the commercial of micro compressor	Lack of political support for CNG at the national level	Local political support
5.2	Tou	Solution for alternative fuels in Toulouse and complementary measures to achieve 100% clean fleet	Bio diesel only used as complementary fuel, mainly for old buses	Maintenance department's and engineers' doubts over the viability, cost effectiveness and environmental performance of the use of biofuels	Local political support and working group motivation
			Biogas not allowed in gas network	Legal barriers	National stakeholders commitment
5.3	Deb	Operation of bio fuel & CNG vehicles	No use of biogas due to lack of it	Lack of biogas	
				Higher bio diesel cost	
5.4	Lju	Large scale deployment of bio diesel & CNG fleets	No possible bio diesel production	Urban planning prevents bio diesel production in Ljubljana area	Local political support
				Too many stakeholders creating management difficulties	Research activities help to precise stakeholders involvement
5.5B	Ven	Deployment of LPG boats	The lack of legislation regarding LPG engines and stations hindered AGIRE to complete this measure as originally foreseen, national bureaucratic procedures delayed the realisation of the four LPG filling stations	Bureaucratic procedures delayed the realisation of the four LPG filling stations	Lobbying activities, local and national political support to obtain appropriate legislation

5.5A	Ven	Deployment of CNG buses	Abandon of engines conversion and purchase of new CNG buses. Delay in refuelling station building	Administrative procedures linked to the connection to the natural gas distribution network (pipeline)	City of Venice and public transport operator commitment

Most of the barriers concern regulation and technology, in particular several technical problem to converse existing classical engines to alternative fuels, the bio fuel prices, which are often not incentive, and the lack of appropriate regulation hindering easy alternative fuel use and in particular gas supplying.

Some measures were therefore reformulated in accordance with the Commission to overcome the main difficulties. The main driver to succeed in developing and implementing alternative fuel use has been the commitment of the public transport operators and local, and even national, political authorities in this type of policy.

Main outputs and results

The following project-specific **goals** were identified for this technical work package:

- Develop transition strategies towards a sustainable production, supply and use of alternative fuels and clean vehicles, tailored to local conditions
- Substantially increase the current use of clean vehicles, alternative fuels and emission reduction technologies in municipal fleets
- Stimulate the demand for clean vehicles and alternative fuels among mobility service operators and private car owners
- Build up local capacities in working with alternative fuel technologies.

WP 5	Measure Code	**Measure title**	**Main outputs**	**Key results**
5.1	Tou	Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	68 new CNG buses and two CNG filling stations	Environmental benefits; long term cost effectiveness and environmental friendly image of PT
			58 micro compressors set up	
5.2	Tou	Solution for alternative fuels in Toulouse and complementary measures to achieve 100% clean fleet	101 new diesel buses fitted with particle filters+ 28 particle filters for diesel buses, 81 buses running with 30% bio diesel mixture	Environmental benefits, extra costs for using bio diesel mixture, minor extra costs for particle filters and environmental friendly image of PT
			Biogas use	Biogas feasibility study

5.3	Deb	Operation of bio fuel & CNG vehicles	3 buses converted to CNG+ 3 new CNG buses	No results yet
			Test of bio-diesel mixture use with different mixture rates (10,20,50%)	Higher consumption rate and slightly lower engine performances
5.4	Lju	Large scale deployment of bio diesel & CNG fleets	20 buses converted to 100% bio fuel	Technical problems and extra running costs
			Bio diesel improvement study	No environmental benefit
			Cost-effective production of bio diesel at small farms	Feasibility of this type of production
5.5B	Ven	Deployment of LPG boats	10 demonstration boats with new bio-fuel LPG outboard engines.	Large environmental benefits and cost effective operation
5.5A	Ven	Deployment of CNG buses	Two existing buses converted to natural gas+diesel mixture and purchase of 35 CNG buses + 5 CNG powered minibuses	Few environmental benefits for dual fuel engines in comparison to new CNG ones

Table 19: Summary of overall effects of the Work package 5

In general, the MOBILS cities achieved most of the outputs, although there were delays and modifications to the activities, hindering to achieve the measurement of the impacts. Some measures will be finalised after the end ot the MOBILIS project.

As in the case of Toulouse Debrecen, Ljubljana, Venice and, the conversion of the public transport fleets towards more appropriate or cleaner alternative fuels has generally succeeded in so far as it has led the acquisition of recent vehicles; the conversion of the existing ones does not seem to be very effective overall, in particular from environmental and economic points of view.

GNG and LPG have the best environmental and cost effective results. Bio fuel mixtures are better solutions than 100% bio fuel. We must underline the good environmental results of classical diesel buses equipped with particle filters (reduction by around 85%).

The research studies conducted on the production or quality of bio fuels increased knowledge on the subject. They will be useful for guiding subsequent choices of decision-makers, according to their particular context.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Clean vehicles and alternative fuels	Bio diesel production*			-	-			
	Bio diesel use*			-	-			
	CNG infrastructure*	-	-	-	-			
	CNG vehicles*			-	-			
	Biogas production		-	-	-			
	Biogas use*			-	-			
	LPG boats*			-	-			
	Soot filters		-	-	-			

* in comparison with fossil diesel use

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 5	Measure Code	Measure title	Recommendations
5.1	Tou	Large scale operation of clean bus fleets in Toulouse and preparation of sustainable supply structures for alternative fuels	Strong and open management is necessary
			Long term vision and stakeholders' involvement are necessary
5.2	Tou	Solution for alternative fuels in Toulouse and complementary measures to achieve 100% clean fleet	Bio diesel only used as complementary fuel, diesel buses equipped with particle filters bring real environmental benefits

5.3	Deb	Operation of bio fuel & CNG vehicles	
			Only 20 to 50 bio diesel mixture is an alternative to classical fuel
5.4	Lju	Large scale deployment of bio diesel & CNG fleets	100% bio fuel not recommendable for old buses
			Bio fuel mixtures have environmental benefits
5.5B	Ven	Deployment of LPG boats	LPG is a good alternative fuel. Beware when appropriate legislation is not in place
5.5A	Ven	Deployment of CNG buses	Purchase new CNG buses is more efficient then converting existing ones to dual fuel

Development of the industrial production of alternative fuels remains dependent on suppliers' economic choices. Local political authorities master with difficulty the corresponding orientations.

Legal framework context needs to facilitate introduction of alternative fuels, specifically for gas.

Before going ahead with fleet conversion, practitioners should be careful when suitable legislation is not yet in force, realize prototypes and carry out cost-benefit analysis including possibility of purchasing new vehicles or at least new engines.

Appropriate fuel supply availability must accompany purchase of alternative fuel powered vehicle. The contribution of national or local government CNG filling stations for public transport fleets could facilitate CNG buses fleet expansion.

National or local authorities subsidised most public transport fleets and may so require the introduction of "environmental friendly" specifications in the calls for tender regarding purchases for fleet renewal or expansion. This should be seen as an opportunity for governing bodies to request that fleet expansion is based on the purchase of buses, which are CNG powered.

LPG is a viable more sustainable alternative to petrol for boats and as such could be promoted by any Member State, which has a significant concentration of boats, such as in the Venice lagoon.

WP6: Access management

Introduction

The management and regulation of access to vehicles in the city hyper centre or a restricted access zone is a typical problem of quite populated cities with high density traffic, which intend to adopt policies for the management of urban mobility with the aim of reducing congestion and pollution due to traffic.
Eleven measures were relevant for this work package in Toulouse, Debrecen, Odense and Venice. Their content and implementation context vary due to different initial context, complexity level, area concerned.

The project-specific **goals** identified for this technical work package were as follow:

- Create and enlarge access-controlled and "clean zone" areas
- Reduce car and boat traffic in inner urban areas by managing parking space availability and costs
- Provide incentives for the use of clean vehicles and alternative fuels
- To improve the acceptance of access restriction policies for sensitive areas.

Process evaluation

The deviations observed, barriers and drivers met by the measures are presented in the following table:

WP 6	Measure Code	Measure title	Deviations	Barriers	Drivers
6.1	Tou	New parking management policy in Toulouse	Quicker up-scaling of the measure	Professional needs	Political will, citizens' information actions, parking observatory actions
6.2	Tou	Public space redesign in Toulouse	Extension of the planned pedestrian area	Commercial use of the public space	strong political support and important communication campaigns
6.3	Tou	Urban mobility plan in Blagnac	None	None	Public demand of parking regulation and extra parking spaces available in the outlying area
6.4	Tou	High quality bus corridors (Toulouse)	Corridor building delay due to public enquiry process and delay in the development of priority and information systems	Political changes	Bus network modification linked to 2nd underground line building
6.5	Deb	Access & parking management for city centre (Debrecen)	Slight administrative delays	None	Political will
6.6	Deb	Accessibility scheme for conference centre & pedestrian zone (Debrecen)	Delay to obtain building permit	Slow administration process and financial shortenings	Political will

6.7	Ven	Parking management strategy for Mestre	Delay due to measure leader change and to technical difficulties to implement information panels (solar electric panels)	Acceptance of new tariffs and high parking fees in the inner city zones ; technical characteristics of the experimental panels, tender procedure longer than expected.	Good transport system in the city centre+ collaboration between local authorities involved in the measure+ targeted information and communication campaigns
6.8	Ven	Access management for the city centre (Venice)	Delay in the new tariff approval and change of the measure leader	Hoteliers' opposition	After negotiations, the tariff increases are considered acceptable by important stakeholders; the communication campaigns and dedicated web site have been good supports
6.9	Ven	Electronic control of the Mestre restricted access zone	Modification of the measure leader and slight delay due to technical difficulties	Technical difficulties	Political willingness to implement an automatic control system to limit access
6.11	Ven	Access and traffic management in the Grand Canal through ARGOS	None	None	Strong political support and police involvement
6.10	Ode	Implementation of environmental zones	Implementation delay	Administrative constraints	Dedicated website and strong involvement of residents, stakeholders and road authority

In the MOBILIS project, implementations of access management measures have mainly been successful. Almost all measures have been strongly supported by politicians. Support from local authorities, participative working groups, appropriate stakeholders involvement, identification of citizens' needs and constrains and good communication have ensured implementation success. Minor administrative and technical constrains have introduced delay in some cases.

Main outputs and results

WP 6	**Measure Code**	**Measure title**	**Main outputs**	**Key results**

6.1	Tou	New parking management policy in Toulouse	Creation of resident parking rate, extension of pay parking time, preferential rate for some professionals (emergency,), development of car park observatory	Decrease of free park spaces and increase of pay parking, decrease of occupation and congestion rates of parking spaces, illegal parking rate decrease and high satisfaction rate of residents
6.2	Tou	Public space redesign in Toulouse	Traffic layout modification, urban planning for bicycles, pedestrian zone extension and delivery area implementation right in the city centre.	Car traffic decrease (-15%), modification of pedestrian' and cyclists' habits and cyclists' routes, high acceptance level
6.3	Tou	Urban mobility plan in Blagnac	Implementation of blue zone Area	Better access to the centre for shops and service customers & decrease in long-term parking by 59%;
6.4	Tou	High quality bus corridors (Toulouse)	Creation of bus segregated manes in city centre, of dedicated bus corridor linked to underground final stations and of Park &Ride at this stations	Segregated bus lanes have reduced the average bus travel time, average bus speed has increased in bus corridors, VP speed is the same or slightly higher, low occupancy rate of the P&R
6.5	Deb	Access & parking management for city centre (Debrecen)	Study for access restriction and parking management, modification of traffic light cycles, implementation of P&R availability information signs	Traffic flow increase during green cycle, citizens' satisfaction
6.6	Deb	Accessibility scheme for conference centre & pedestrian zone (Debrecen)	Drawing up of the extension plan of the pedestrian area	No short term result
6.7	Ven	Parking management strategy for Mestre	Ten new park and ride car parks opened with public transport services available and 4 information panels + differentiated park tariffs in surrounding areas+ communication campaigns	Park & Ride use by visitors and commuter increased by 309%; traffic flow increase has been limited and car park turnover has improved in favour of business activity

6.8	Ven	Access management for the city centre (Venice)	New tariff system in favour of euro IV buses and limiting access to city centre+ large information campaigns towards stakeholders= training of the check-in employees	Increase of Euro IV buses proportion
6.9	Ven	Electronic control of the Mestre restricted access zone	Implementation of video control system in the limited traffic zone (LTZ)	Effective enforcement of the limited traffic zone=> reduction by 10% in the number of car accessing to the city
6.11	Ven	Access and traffic management in the Grand Canal through ARGOS	ARGOS system provides information on the exact number, types and speed of boats navigating: Concept design based on image analysis software, installation of the Survey Cells along Grand canal and Local Police Operative Centre implementation. Training of control employees	Police efficiency has increased=>Firstly, fine number was increasing, then decreasing
6.10	Ode	Implementation of environmental zones	Implementation of interactive information system for cyclists in the city centre and establishment of limited 30km/h zones and street narrowing in two residential areas	Car speed decrease by around 20% in residential areas and good acceptance level

Access Management initiatives aimed to limit and consolidate access along major roadways, while promoting a supporting street system and unified access and circulation systems for development. It helps provide safety and mobility of the travelling public while accommodating the access and accessibility needs of property owners, and in some cases also more attractive corridors.

The MOBILIS measures listed above highlight that the successful implementation of access restriction to a city centre requires to preserve a minimum level of access to the area for residents, customers, shopkeepers and carriers.

One of the measures will only produce measurable impacts after MOBILIS time. The other nine ones have shown positive impacts and therefore their efficiency. Access management can reduce traffic, congestion, and pollution and can also influence the behaviour of focus groups.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Access and Parking Management	Restrictive parking *				-			
	Restrictive access*				-			
	Environmental zones*				-			
	Pedestrian zones*				-			
	Bus lanes				-			
	High quality infrastructure for bus				-			

* Effects on the local area

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 6	Measure Code	Measure title	Recommendations
6.1	Tou	New parking management policy in Toulouse	Have good knowledge of initial parking supply and use, firstly test pay parking and assess the experiment before up-scaling, respect dialogue step with citizens. Police ongoing surveillance and appropriate offer of alternative to car are necessary
6.2	Tou	Public space redesign in Toulouse	The design of a city centre has to be combined with the renewal of the parking policy and the development of public transport. The needs of the inhabitants must be clearly identified.
6.3	Tou	Urban mobility plan in Blagnac	Communication between the different stakeholders is a key point
6.4	Tou	High quality bus corridors (Toulouse)	High quality bus corridors are an affordable option to enlarge the scope and improve the services of public transport

6.5	Deb	Access & parking management for city centre (Debrecen)	P&R creation around access limited zone
6.6	Deb	Accessibility scheme for conference centre & pedestrian zone (Debrecen)	P&R available close to pedestrian zone and tramline to cross the city centre
6.7	Ven	Parking management strategy for Mestre	It is crucial to avoid local public opposition by developing appropriate public communication campaigns targeting all groups involved
6.8	Ven	Access management for the city centre (Venice)	Involve all counterparts in the at all stages of the planning process; Integrate the tariff scheme within a general regional Bus entry charging strategy and duly inform in time the concerned stakeholders and all counterparts to foster debate and avoid opposition
6.9	Ven	Electronic control of the Mestre restricted access zone	Guarantee a good accessibility to the affected areas by public transport and alternative mobility modes and special attention should be paid to residents and people with reduced mobility
6.11	Ven	Access and traffic management in the Grand Canal through ARGOS	Coherent parking policy and management package required
6.10	Ode	Implementation of environmental zones	Political willingness; citizens' involvement and appropriate communication actions and tools are crucial success factors

Access management is a sensitive subject. It can be used as a global instrument or as a focus measure. Experienced measures show not only the efficiency of access management policies but also their flexibility. A formal policy should be established to give access spacing guidelines to aid in the planning of future developments and roadways. It is important that the development of public transport and sustainable modes accompanies restricted access policy.

Political willingness, clear knowledge of the needs of residents and/or economical actors, active participation of stakeholders, adequate implementation calendar and large communication actions are great success factors for introducing access management measures.

WP7: Integrated pricing strategies

Introduction

During the last decades, many advanced ticketing systems and integrated services have been developed in Europe.

Only one measure, implemented in Toulouse, was relevant for this work package: “Innovative multimodal Public Transport contracts, services and electronic ticketing in Toulouse”.

The project-specific **goals** identified for this technical work package were the following:

- Achieve full integration of tariff and ticketing systems between PT services, but also for car parks and motorway use,
- Increase Public transport service attractiveness and enhance modal shift by integrating other services and using electronic tools (e-purse, service cards),
- Use transport service contracts as a tool for quality improvements and targeted service development for specific user groups,
- Promote P&R infrastructures and intermodal travelling to <reduce car traffic in the city centre.

Process evaluation

During the implementation of this measure, the measure leader (the public transport authority-Tisséo) faced several barriers and benefited of some drivers helping to overcome them as showed in the following table:

WP 7	Measure Code	Deviations	Barriers	Drivers
7.1T	Innovative multimodal PT contracts, services and electronic ticketing in Toulouse	Delay in the development of integrated offer between car park and public transport that revealed structural and organisational difficulties	Difficult cooperation between involved bodies for financial and technical reasons	Willingness to improve the PT public image and to decrease users’ fraud
		Delay in the development and implementation of the new ticketing system from November 2006 to June 2007 due to political willingness to have an in-depth knowledge of users’ behaviour in term of journey practice and PT contract use		

The financial sensitivity, the organisation and technical difficulties of the subject revealed to be higher than it had been foreseen.

The work methodology and the overall objectives of the measure had to be reviewed because the local political authorities wished to have at disposal an in-depth analyse of the users’ practices towards the new ticketing system and especially, towards the new contactless card (PASTEL) before the development of new multiservice cards. The results of the major marketing study were analysed and delivered in February 2008. The public transport authority undertook then only some specific

demonstrations of innovative PT products, considered as relevant regarding the marketing study conclusions.

The integration of the Park & Ride use in the ticketing system revealed itself to be complicated because the wide extension of the offer and use complicated their efficient running.

Main outputs and results

WP 7	Measure Code	Measure title	Main outputs	Key results
7.1T	Tou	Innovative multimodal PT contracts, services and electronic ticketing in Toulouse	Interoperability chart between the different PT authorities about the ticketing system Creation of a new contact less ticketing system and new mobility card	300,000 Pastel card subscribers. Increase of the users' satisfaction and of the PT public image+ increase of PT use (49%) + fraud decrease
			Marketing study taking into account flexibility for the development of new services	No measure of the impacts, yet
			Development and implementation of incentive PT contracts targeted to specific users groups (commuter) and exploiting innovative functions proposed by the new ticketing system	High satisfaction level of commuter card users (ACTIVEO), slight modal shift already noticed

This type of measure contributes to enhance the public image of public transports.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Integrated pricing and ticketing strategies	Integrated pricing							
	Ticketing systems and smart cards	-	-					

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 7	Measure Code	Measure title	Recommendations
7.1T	Tou	Innovative multimodal PT contracts, services and electronic ticketing in Toulouse	It is important to define the different marketing and organisation requirements before implementing a new technical ticketing system. The ticketing system and tariffs must be easy to understand and use. Reduced prices for dedicated users' groups help to promote PT use. The main success factor for the development of new ticketing system is to enhance price integration firstly between public transport networks and secondly with car-park services Appropriate communication campaigns must accompany the implementation of new ticketing system and of each new tariff

The main recommendations are:

- The implementation of new ticketing system and services requires previous in-depth analysis of the users' needs and acceptance level.

- The integration of different services in ticketing system requires a strong management of its development, in particular when they involve many partners.
- The application of standards and norms facilitate its implementation.
- Communication towards users is a key factor of success.

WP8: Stimulation of collective transport modes

Introduction

Seven measures were relevant of this work package in Toulouse, Debrecen, Odense and Venice.

City	Measure Code	Measure title
Toulouse	8.1	Improving quality and structure of PT services in Toulouse
	8.2	Development of proximity services at important transport hubs
	8.3	Improving the accessibility of PT services in Toulouse
	8.4	Integration of the Demand Responsive Transport as a complementary service to PT in Toulouse
Debrecen	8.5	Safety & security for public transport drivers
Odense	8.7	Integration of quality improvements of sustainable modes
Venice	8,.8	Introduction of low impact access for all waterbuses

The project-specific **goals** identified for this technical work package were the following:

- Improve the overall availability, quality, accessibility and attractiveness of PT services,
- Remove barriers for using PT through comprehensive accessibility strategies and targeted service improvements,
- Enhance the intermodal connectivity of PT services,
- Improve security in PT for all user groups,
- Increase the integration and complementarities of PT services through enhanced cooperation, coordination and participation in planning.

Process evaluation

WP 8		Measure title	Deviations	Barriers	Drivers
8.1	Tou	Improvement of PT bus lines services	Measure launched late due to reorganisation of the PT network	Political misunderstanding on the measure objective	Commitment of the public transport operator
8.2	Tou	Development of proximity services at important transport hubs	Delay	Delayed underground opening and shop implementation	Willingness of public transport authority and operator; specialised marketing agency

					involvement
8.3	Tou	Improving the accessibility of PT services in Toulouse	Delay	Financial investment level	National regulation in favour of accessibility
8.4	Tou	Integration of the Demand Responsive Transport as a complementary service to PT in Toulouse	None	Transport-on-demand running conditions	Willingness of public transport authority and operator
8.5	Deb	Safety & security for public transport drivers	None	None	Public transport operator support
8.7	Ode	Integration of quality improvements of sustainable modes	None	None	Political support
8.8	Ven	Introduction of low impact access for all waterbuses	None	None	Good cooperation between partners

The implementation of these measures met few difficulties; the main barrier identified concern financial investment to improve accessibility of PT services.

The commitment of public transport authority or operators has been very efficient in main cases;

Main outputs and results

WP 8			**Main outputs**	**Key results**
8.1	Tou	Improvement of PT bus lines services	Automatic measurement and analysis systems for route times and passenger numbers; certification methodology for service quality	No results available yet; improvement of service quality excepted
8.2	Tou	Development of proximity services at important transport hubs	Creation of shopping areas at underground stations	51% of underground satisfied by these new services
8.3	Tou	Improving the accessibility of PT services in Toulouse	Validation of an accessibility master plan: employees' training; first actions implemented	Few results yet except slight accessibility improvement
8.4	Tou	Integration of the Demand Responsive Transport as a complementary service to PT in Toulouse	Increase of demand responsive transport line from 5 to 18	Increase of transport-on-demand users; decrease of energy consumption and maintenance costs

8.5	Deb	Safety & security for public transport drivers	Bus Drivers' training about new safety technologies use	High acceptance level; no result available yet on transport energy, economy or environment
8.7	Ode	Integration of quality improvements of sustainable modes	PT Marketing campaigns, installation of bus priority, ticket sale system through mobile phone and real time information system	High satisfaction level among PT users, decrease of bus travel time; higher PT awareness
8.8	Ven	Introduction of low impact access for all waterbuses	18 new waterbuses in operation with facilities for disabled people	Improvement of transport facilities for disabled people and travel time reduction; noise reduction; environmental impact improved; high users' satisfaction level

The project-specific goals for this work package have been mostly achieved.

The most relevant impacts concern improvement of PT service quality, increase of users' satisfaction, higher integration of disabled people. Nowadays, the impacts on modal shift and thus, on energy and environment are yet difficult to measure except for the new waterbuses in Venice.

Most measure impacts will be maintained after MOBILIS time.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Stimulation of public transport modes	Quality measurement systems				-			
	Proximity services	-	-					
	Accessibility measures	-	-	*				
	Demand responsive services**							
	Safety and security training	-	-					
	Integrated public transport services	-	-		-			

* For physically handicapped travellers

** in comparison with a regular outskirt bus line

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 8		Measure title	Recommendations
8.1	Tou	Improvement of PT bus lines services	Use of the methodology developed to define quality strategy and obtain certification as learning practice
8.2	Tou	Development of proximity services at important transport hubs	Take into account the specific features of the transport area and the expected services by PT users
8.3	Tou	Improving the accessibility of PT services in Toulouse	Necessary diagnostic of the PT network before drawing up action plan
8.4	Tou	Integration of the Demand Responsive Transport as a complementary service to PT in Toulouse	Sign a quality-monitoring contract with the RTD operator
8.5	Deb	Safety & security for public transport drivers	Renew training on regular basis
8.7	Ode	Integration of quality improvements of sustainable modes	Awareness campaigns must be repeated; gadgets motivate; segregated bus corridors improve bus priority results
8.8	Ven	Introduction of low impact access for all waterbuses	Necessary identification of travel needs of disabled people and participative project management

The recommendations are mainly linked to each type of measure.

The methodology developed in Toulouse to define quality strategy seems to be a useful tool for other PT operators.

WP9: New forms of vehicle use and ownership

Introduction

Cities aim to modify car users' practices to reduce in the average number of car kilometres. The expected benefits are less congestion, lower costs (reduction of new infrastructure), better access to economic centres and fewer emissions providing a better environment to live in.

Five measures were relevant of this work package in Toulouse, Debrecen, Odense and Venice, two concerned carsharing, two carpooling and one the promotion of alternative transport mode. Their common objective was to promote new approach of car use and car ownership.

The project-specific **goals** identified for this technical work package were the following:

- Reduce the number of car trips and increase the average vehicle occupancy
- Enlarge service offers for car sharing based on sustainable marketing strategies
- Improve the integration between car-pooling and PT services
- Provide new car-pooling services for specific target groups
- Limit the circulation of especially polluting cars providing tailored mobility service alternatives

Process evaluation

WP 9	Measure Code	Measure title	Deviations	Barriers	Drivers
9.1	Tou	Promotion of car pooling and integration in PT offer	Car polling firstly experimented on a restricted area	Variable working hours and dispersion of residential areas	Existing carpooling initiative, support of local authorities and parallel development of commuter plan
9.2	Tou	Implementation of a new carsharing service linked to PT services	Delay in the implementation of the measure	Political changes and legislative lack for financial support by public transport operator	Carsharing associative initiative
9.3	Deb	Car pooling service for students	None	Lack of communication about the new service	Participation of students in the development of the service
9.4	Ven	Expansion & diversification of car sharing scheme	Delay due to the weak commitment of gas provider	Recurrent reluctance of companies to turn to carsharing	Carsharing integration in local traffic plan, financial incentives and local and national promotion of carsharing
9.5	Ode	Creating alternative mobility options for owners of old cars	Reduction of the panel from 400 families to 160 to make good use of the free TV- coverage of the measure	Misunderstanding of the campaign title: 'Car Free Families'	Stakeholders and media support

General approach of civil society, media and politics regarding car use is evolving; their supports and sometimes initiatives helped to develop and implement these measures.

Workers and companies are still slightly reluctant to new approaches in car use, so flexibility of new services is crucial.

Main outputs and results

WP 9	Measure Code	Measure title	Main outputs	Key results

9.1	Tou	Promotion of car pooling and intergation in PT offer	Development of carpooling service in public transport offer and of a web space dedicated to carpooling on the official page of the public transport operator	Increase of carpooling practice at conurbation level reducing commuter journeys and associated impacts on energy consumption and environment
9.2	Tou	Implementation of a new carsharing service linked to PT services	in-depth marketing study and financial analysis and implementation of carsharing service	None due to late carsharing service implementation
9.3	Deb	Car pooling service for students	Development of a web space dedicated to carpooling on the official page of the City	Few subscribers in the first months because of the end of the school year, but good average satisfaction level
9.4	Ven	Expansion & diversification of car sharing scheme	Increase of the carsharing fleet from 22 to 56 vehicles. Among them 2 modified for disabled people and 25 are alternative fuels vehicles.67 carsharing plots and 7 new carsharing collections points and new carsharing management and tariffs.	4,600 users and car sharing agreements with 9 organisations/firmsresulting in reducing emissions by about 79t/y of CO2, 218 kg/y of CO, 19 kg/y of NOx and 18.8 kg/y of HC
9.5	Ode	Creating alternative mobility options for owners of old cars	160 families joined the campaign "living without car" and 132 did it during 2months	On average, each family travelled 2,367 km less by car and saved 427 kg CO^2 in 2 months. They mostly turned to public transport. Their health globally has improved. Other results may appear after the MOBILIS time

According to the results of the measures, promote new approach of car use and occupancy seems to introduce a modal shift towards more sustainable forms of transport and away from the private car. Encourage higher vehicle occupancy rates reduces the number of car kilometres, associated energy consumption and emissions provides a better environment.

Car sharing and carpooling make automobile use more accessible to students or low-income households. The acceptance of these solutions is globally good among the members. Firstly the car-poolers have reduced travel costs and in some cases even improved social contacts, they no longer have to drive their cars in rush hour traffic every day

Carsharing does however require initial investments. Adapting carsharing vehicles to persons with physical disabilities presents special challenges not faced by traditional car rental, the experiment lead in Venice proved the interest of it.

Recommendations

WP 9	Measure Code	Measure title	Recommendations
9.1	Tou	Promotion of car pooling and integration in PT offer	Integration in transport offer, commuter plan implementation and restrictive parking policy in favour of carpooling development/ Adequate management and promotion are compulsory
9.2	Tou	Implementation of a new carsharing service linked to PT services	Appropriate urban and transport planning, integration of carsharing service in transport offer and intense promotion of the new service
9.3	Deb	Car pooling service for students	Promote the new service through awareness and information campaigns at local level
9.4	Ven	Expansion & diversification of car sharing scheme	Integration of car sharing in local traffic and mobility plans+ financial incentives and awareness campaigns

9.5	Ode	Creating alternative mobility options for owners of old cars	Close cooperation with the local media is highly recommended and crucial for success. Rewards of the volunteers could increase the success of this type of measure

Companies or local authorities may introduce facilities such as defined pick-up points, preferential parking and general advices, to encourage private carpooling, often as part of wider transport programs like commuter mobility plans.

Urban car sharing is often promoted as an alternative to owning a car or multiple cars. Successful carsharing development should be associated mainly with densely populated areas and restricted parking regulations. The financial investment shall not be underestimated.

Central listing facilities through dedicated web pages, mobile phones and other software support systems increase use of these services and users' awareness;

Active promotion campaigns and political support of the new services are crucial.

WP10: New concepts for the distribution of goods

Introduction

Only two measures, in Toulouse and Venice, were relevant of this work package. The common objective was to limit the impacts of good transport and delivery in sensitive areas.

Measure Code	**Measure title**
10.1 T	Clean urban logistics and goods distribution platform in Toulouse
10.2 V	Clean urban logistics in Venice

Firstly, the geographical context of both cities is very different, but the objectives were also different.

Toulouse aimed to:

- improve transport and freight delivery in the very centre of Toulouse by implementing a new freight regulation,
- prepare for the development of a logistics platform at conurbation level: an urban delivery centre (UDC) through the implementation and evaluation of a new protocol delivery system led by Chronopost , a mail and parcel delivery company,

and Venice:

- to manage the permanent and temporary boat parking spaces along the inner canals in Venice more effectively, through the creation of a web-enabled information system that integrates day-to-day administrative acts (requests, authorisations, etc.);
- to provide support to decision-makers for the integrated management of boat traffic and circulation, during ordinary and extraordinary situations.

Process evaluation

WP 10	Measure Code	Measure title	Deviations	Barriers	Drivers
10.1	Tou	Clean urban logistics & goods distribution platform	Failure of urban delivery centre creation	Financial and organisation constraints of freight road haulers / local economic context not favourable	Company commitment to environment and local authority support to experiment new delivery organisation in the city centre
10.2	Ven	Clean urban logistics		None	Commitment of the city of Venice in improving Permanent and temporary boat parking end users and stakeholders involvement in definition process

In France, the freight delivery sector is subject to a high competition level and small margins. This context makes it difficult to build up a relation of trust and carry out a joint project with carriers. The city of Toulouse abandoned the project of UDC creation in June 2007, due to the opposition of many road haulers, and produced a process evaluation report analysing the failure of the project, more clearly identifying the barriers and giving recommendations on how this could be overcome in the future (cf. Annex C.1- measure 10.1- In depth process evaluation).

Main outputs and results

The project-specific **goals** identified for this technical work package were to:

- Rationalise urban logistics and goods distribution, reducing empty carriages and vehicle emissions, especially in sensitive areas
- Promote clean vehicles for urban logistics and goods delivery services
- Reduce congestion, traffic perturbation and incidents caused by goods distribution
- Enhance participation and cooperation of all stakeholders in urban goods distribution

WP 10			Main outputs	key results
10.1	Tou	Clean urban logistics & goods distribution platform	Urban freight delivery centre study/ delivery new regulation and associated quality chart about freight deliveries in the city centre, video-controlled delivery areas in the city centre	Decrease of freight delivery duration and vehicle tonnages / acceptance of the constraints/ dialogue created between local authorities and stakeholders
			Chronopost Company new delivery organization.	Environmental, economic and social benefits
10.2	Ven	Clean urban logistics	Redefinition and renewal of parking management for boats Parking management GIS system	Functionalities of a new policy instrument and a decision-support tool defined. The expected results are: Reduction of the time for parking permit allocation of about 8 months, Traffic and boat parking improvement; thus, easier freight delivery

Most goals have been achieved or will be after the end of MOBILIS project. For such measures, results are long term ones. It can be expected that the effects on environment and society should be in most cases although there is no actual proof available. Reducing the number of kilometres per freight movement has a positive effect on environment and energy.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
New concepts of goods distribution	New freight regulation and charters				-			
	Micro platform and clean vehicles				-			
	Web-based delivery management				-			

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 10	Measure Code	Measure title	Recommendations
10.1	Tou	Clean urban logistics & goods distribution platform	Implement a public and stakeholder information campaign highlighting the expected effects + develop cooperation with all stakeholders
			Example may encourage other companies to undertake similar changes
10.2	Ven	Clean urban logistics	Analyse the parking offer and demand
			The GIS Grid system permits an accurate visualisation of the parking use

A large range of vital functions in city centres depends on urban freight transport. The implementation of these MOBILIS measures highlighted the importance of a participative management. Public actors cannot regulate this sector without consultation and partnership with private actors: retailers, shippers and transport operators. They have to find the balance between a visionary strategy on clean urban freight delivery and the commercial interest of the stakeholders.

- Cooperation between the local authorities and the local actors is an efficient way togain their acceptance about new freight delivery permit or regulation and to contribute to the optimisation of urban freight transport.
- The most promising way to follow is a step by step procedure at the local level: How to improve the quality of life in city centres, without impairing the quality of supply and the activity of transport operators in the process of urban goods transport .

Attention should be paid to local conditions:

- contradictory interests in the region (economy, transport, urban development, environment) and the commercial sector prevent unified action
- feedback between planning decisions and the commercial practices increases urban freight regulation effectiveness
- urban and traffic plans and parking management policy should integrate freight delivery constraints.
- Experiments may help to demonstrate feasibility and to build consensus between public and private actors,

Preparing integrated freight traffic plans is a long term measure; new technical tools may contribute to its drawing up, implementation and control.

WP11: Innovative soft measures

Introduction

Many innovative actions were developed in favour of sustainable transport.

Twelve measures were relevant of this work package in Toulouse, Debrecen, Ljubljana, Odense and Venice. The content and specific objectives were very different.

Measure Code	**Measure title**
11.1 T	Awareness raising campaign for changing mobility behaviour in Toulouse
11.2 T	Promotion of bicycle use and integration with PT services in Toulouse
11.3 T	Set-up of a mobility agency and customised services in Toulouse
11.4 T	Commuter and school mobility plans in Toulouse
11.5 D	Sustainable city-traffic development plan for Debrecen
11.6 D	Integrated and extended cycling network in Debrecen
11.7 L	Participatory planning and promotion of sustainable mobility in Ljubljana with emphasis on safe and increased bicycle use
11.8 L	Set-up of information points and campaign on clean vehicles and alternatives fuels in Ljubljana
11.9 V	Promotion of safe and increased bicycle use in Venice
11.10 O	Interactive traffic training for children in Odense
11.11 O	Personal transport choice marketing in Odense
11.12 O	Mobility management services for Odense harbour

The project-specific **goals** identified for this technical work package were to:

- Raise overall awareness and create commitment among citizens and local stakeholders for sustainable mobility, including alternative fuel use and clean vehicles
- Establish a new "mobility culture" in all partner cities based on policy integration, stakeholder consultation and participatory planning
- Achieve behavioural change through targeted service marketing, information dissemination and cooperative mobility planning
- Introduce innovative planning approaches for addressing mobility and urban development in an integrated way
- Enhance the use of alternative modes to the private car and improve the safety of and integration between walking, cycling and PT
- Build sustainable mobility into school education

Process evaluation

WP 11		**Measure title**	**Deviations**	**Barriers**	**Drivers**

11.1	Tou	Awareness raising campaign for changing mobility behaviour	the size of the panel has been extended from 200 to 1000	Lack of knowledge of the PT users and necessary respect of the "Information & Liberty" law.	New PT ticketing system and extension of the PT network
11.2	Tou	Promotion of bicycle use	Integration of bicycle use in PT ticketing system not realised	Many responsible level in cycling policy at local level	Bad traffic conditions; public space resign and strong political support
11.3	Tou	Mobility Agency	Delay in the development of the central agency	Modification of the PT network and political changes	PT authority and local politic support
11.4	Tou	Mobility plans	University commuter plan has been cancelled for administrative reasons	Lack of communication between companies and PT authority	Methodology developed; cooperation between companies and local authorities
11.5	Deb	Sustainable city traffic development plan for Debrecen	None	septiscm of the working group members at the beginning and some conflicts of interests	Involvement of the stakeholders in the participative decision process and continuous presence of the working group advisor
11.6	Deb	Integrated and extended cycling network	Minor delay to set up the secured racks due to administrative reason	Slight opposition between the municipality and cyclists' representatives about the realisation planning and difficulties to develop a coherent cycle network due to urban structure	The establishment of the Urban Mobility Working Group (see Measure 11.5D) helped to draw up the bicycle development plan and the installation of the secured racks greatly eased cyclists' peace of mind
11.7	Lju	Sustainable mobility, emphasis on safe & increased bicycle use	Changes of the measure objectives to focus an cyclists' safety+ evaluation of the bicycle racks use added	Competences of each stakeholders not clearly identified	Open public debate revealed users' needs and pressure of the civil organization (cyclists' network)
11.8	Lju	Info points & campaign on clean vehicles & alternative fuels	None	None	None
11.9	Ven	Promotion of safe and increased bicycle use	None	None	Political support, schools and cyclists association involvement
11.10	Ode	Interactive traffic training for children	None	Pedagogic priorities and minor involvement of teachers	Consultant to define educational part of the game; specific bicycle use in the film
11.11	Ode	Personal transport choice marketing	individual marketing realised by students on behalf of unemployed people difficult to recruit	Bad weather conditions	Family involvement

11.12	Ode	Mobility management service for Odense harbour	Delay in the development of the traffic model	Technical difficulties	Politic in favour of soft mode and urban planning opportunity

Awareness and marketing campaigns, as traffic educational programme meet few barriers; extension of bicycle network meet some financial one for investment. For both subject political willingness and civil society involvement are success factors.

The implementation of mobility plans, electronic or multimodal mobility services are more sensitive to political, technical and participative difficulties.

Traffic congestion help to turn people to more sustainable solutions than private car use.

Main outputs and results

WP 11		Measure title	Main outputs	Key results
11.1	Tou	Awareness raising campaign for changing mobility behaviour	Creation of users and non users panel	Better knowledge of transport user practice and needs; possibility to adapt the PT services, follow the satisfaction level and measure the impacts of promotion campaigns
11.2	Tou	Promotion of bicycle use	Production of "how to promote cycling" guide; implementation of automatical bicycle rental service	Increased integration of cycling in urban planning; development of cycle use at city level
11.3	Tou	Mobility Agency	Creation of a mobility agency inside the public transport authority structure; dedicated web site	Public awareness increase
11.4	Tou	Mobility plans	Development of a methodology and information tool to develop and promote commuter mobility plans; implementation of commuter plans at company and business area level	Positive impacts on transport, energy, environment and society of the implemented commuter plans, increased impacts are expected
11.5	Deb	Sustainable city traffic development plan for Debrecen	Proposed development programme with specified action plan and priorities	No results available in MOBILIS time

11.6	Deb	Integrated and extended cycling network	Overall bicycle network development plan and according to it, installation of 51 secured bicycle racks and around 4km of cycle lanes created	The development plan impacts will appeared after MOBILIS time; 60% of cyclists were satisfied of the first actions
11.7	Lju	Sustainable mobility, emphasis on safe & increased bicycle use	Preparation and testing of the public participation model+ installation of 46 covered bicycle shelters and 424 secured racks	Positive results of the participative model: involvement and satisfaction increase of the stakeholders + slight increase of the bicycle use (1,17%in one year)+ high increase of the new racks and covered bicycle shelters
11.8	Lju	Info points & campaign on clean vehicles & alternative fuels	Establishment of 3 info point and of workshops on alternative fuels and soft modes	Awareness increase
11.9	Ven	Promotion of safe and increased bicycle use	Improvement of quality and safety level of home-school bicycle routes to 3 schools; educational and participative programmes for safer cycling developed and implemented in " schools, Biking to School Bus (BICIBUS) demonstration carried out	Improved cycle lane safety and security; 100 new bicycle racks positioned around the City;Bike modal share increased from 16,7% (average figure 2006) to 19,7% in 2008;
11.10	Ode	Interactive traffic training for children	Web-game for pupils training and teachers training	No quantifiable impact yet
11.11	Ode	Personal transport choice marketing	Marketing campaigns, web site dedicated to mobility and promotion of cycle trailer	No result available in short term
11.12	Ode	Mobility management service for Odense harbour	Fully functioning traffic model including private vehicles, public transport and cycles;	No result available in short term

Each measures has been successfully implemented.

As for commuter mobility plans, the impacts of these measures are often difficult to quantify in the limited time of such a project. We may note that the promotion of soft modes has a high acceptance and satisfaction level.

The implementation of bicycle rental service has quicker visible impacts.

Recommendations

WP 11		Measure title	Recommendations
11.1	Tou	Awareness raising campaign for changing mobility behaviour	Strong involvement of the commercial and communication departments of the PT operator required; possible common action with other transport operators
11.2	Tou	Promotion of bicycle use	To define cycling strategy, involve of all appropriate stakeholders and authorities representatives
11.3	Tou	Mobility Agency	None
11.4	Tou	Mobility plans	Mobility shall be included in urban planning

11.5	Deb	Sustainable city traffic development plan for Debrecen	The representatives should be conscious that they represented their organisation and are committed to working for a common situation.
11.6	Deb	Integrated and extended cycling network	To design a long-term bicycle development planning a structured and systematic way, it is important to collect all the information about the citizens' needs, diagnostic infrastructure, and take in account available financial resources.
11.7	Lju	Sustainable mobility, emphasis on safe & increased bicycle use	Before launching participative process, it may be useful to provide guide and training for the public and civil participants to improve their contributions to the identification of users' needs and to the definitions of solutions
11.8	Lju	Info points & campaign on clean vehicles & alternative fuels	Survey of a panel of citizens is useful to measure the impacts of dissemination actions
11.9	Ven	Promotion of safe and increased bicycle use	Cycling educational programme requires high quality cycling network to be efficient
11.10	Ode	Interactive traffic training for children	Game situations must be adapted at each city context
11.11	Ode	Personal transport choice marketing	Dissemination of brochures and dedicated web site help individual marketing
11.12	Ode	Mobility management service for Odense harbour	Cycle traffic model need to be integrated at the beginning of urban planning; maintain communication towards citizens and stakeholders is

A real change can only be achieved if innovative soft measures are embedded in a general mobility strategy and cooperative planning including authorities, citizens and their representations.

- Urban planning should integrate mobility needs and develop solutions in favour of soft modes and public transport.
- Develop cycling training at school level would modify the transport mode of next generations.

WP12: Telematics

Introduction

Transport telematics applications are contributing to more efficient transports.

Six measures were relevant of this work package in Toulouse, Debrecen and Venice. Two measures concerned mainly the implementation of public transport priority systems, two others related to vehicle tracking through a combination of a GNSS receiver and an electronic device installed in each vehicle.

Measure Code	**Measure title**
12.1 T	Demonstration of EGNOS/Galileo services use for the control and information system of public transport in Toulouse
12.2 T	Implementation of bus priority scheme in Toulouse
12.3 T	Development of an integrated multimodal traveller information system in Toulouse
12.4 D	Tramway public transport priority scheme and real-time passenger information system
12.5 V	Satellite control (GPS -GPRS) for water PT services in Venice
12.6 V	Management decision support system for water borne traffic in Venice

The project-specific **goals** identified for this technical work package were to:

- Validate the feasibility of the use of the GNSS systems (EGNOS & Galileo) in support of the exploitation of the surface public transport
- To use ITS for PT quality improvements (fleet management, priority scheme) and traffic control
- Provide real-time and reliable traveller information services for PT and road traffic
- Support decision making and policy integration

Process evaluation

WP 12	Measure Code	**Measure title**	**Deviations**	**Barriers**	**Drivers**
12.1	Tou	Demonstration of EGNOS/Galileo services use for the control and information system of public transport	None	None	Scientific and political favourable context

12.2	Tou	Implementation of bus priority scheme in Toulouse	Centralised bus priority system delayed	Renewal of automatic vehicle detection system; complex management of centralised solution	Engineers' conviction in bus priority
12.3	Tou	Multimodal information system	Delay in the development of Integrated Information Scheme between P&R and Urban Highway	Complexity of management and technical difficulties	Political willingness
12.4	Deb	Tramway & PT priority scheme & real time passenger info system	Reduction of the number of priority system implemented	Technical difficulties to generalise the implementation of PT priority	Cooperation between the public transport company and the municipal traffic control department
12.5	Ven	Satellite control (GPS-GPRS) for water PT services	Delay in the development of the system	Administrative and financial	Police needs for new control centre
12.6	Ven	Management decision support system for waterborne traffic	None	None	Scientific competences and cooperation

Measures related to this work package have globally been successfully implemented.

Technical difficulties or complexity of the firstly foreseen systems have delayed the implementation of some of these technical measures.

Regarding multimodality information system, the management of numerous partners was difficult, but the political willingness has been dominant.

Main outputs and results

WP 12	Measure Code	**Measure title**	**Main outputs**	**key results**
12.1	Tou	Demonstration of EGNOS/Galileo services use for the control and information system of public transport	Analysis of test results	Better location of vehicle position
12.2	Tou	Implementation of bus priority scheme in Toulouse	Implementation of two different priority system	Travel time reduction, regularity increased, importance of infrastructure context
12.3	Tou	Multimodal information system	Installation of PT information; definition of the organisation and technical specifications of multimodal information system	Good acceptance of information panels but low use; no results available yet for multimodal information system

12.4	Deb	Tramway & PT priority scheme & real time passenger info system	Installation of on board passenger information system in tram and trolley bus fleet and at each tram stop, tram priority system set up at one crossroads and traffic light cycle plan updated	Effectiveness of users satisfaction
12.5	Ven	Satellite control (GPS-GPRS) for water PT services	Development and test of control system, based on GPS/GPRS system, for waterbuses; creation of joined control centre with police	Better location of boat position; expected results: improvement of water traffic management and users information
12.6	Ven	Management decision support system for waterborne traffic	Development of waterborne traffic management decision support system	Expected decrease in boat traffic congestion expected

Telematic systems offer additional tools to traditional transport and access or parking management instruments and allow developing public transport information towards passengers.

Tangible benefits of Transport Telematics demonstrated by the project include:

- Improved PT efficiency due to public transport priority systems, making public transport more efficient and more attractive
- Improved monitoring of location, movements, status and behaviour of a vehicle or fleet of vehicles (bus or boats) tracking, achieved through a combination of a GPS(GNSS) receiver and an electronic device installed in each vehicle, communicating with the users.
- User acceptance Travel information is generally positive, with high scores for usefulness, reliability and understanding of the information
- Future improvement of decision making and multimodal policy

The impacts of telematic systems newly developed will only be effective after MOBILIS time.

Overall assessment of achievements

	Categories	Emissions	Energy	Mobility	Social	Implementation Time	Investment costs	Operational costs
Telematic application for Mobility management	Use of GNSS in transport management	-	-		-			
	Bus and tram priority				-			
	Multi modal information systems	-	-					
	Automatic observation systems	-	-		-			
	Global Mobility Management concept	-	-		-			

Positive effects on Emissions, Energy, Mobility and Social issues	Implementation time	Costs for cities
Small	Short	Low
Medium	Medium	Medium
Large	Long	Large

Recommendations

WP 12	Measure Code	Measure title	Recommendations
12.1	Tou	Demonstration of EGNOS/Galileo services use for the control and information system of public transport	Necessary investment to integrate GNSS services in management systems of PT network
12.2	Tou	Implementation of bus priority scheme in Toulouse	Adaptation of the chosen system to identified constraints and flexibility
12.3	Tou	Multimodal information system	Strong project management required; use of standards and norm for data exchange
12.4	Deb	Tramway & PT priority scheme & real time passenger info system	Necessary coordinated involvement of all political and technical stakeholders to prevent considerable delays in the development and implementation of the system
12.5	Ven	Satellite control (GPS-GPRS) for water	None

		PT services	
12.6	Ven	Management decision support system for waterborne traffic	Use the standardised data collection methodology

Transport telematics applications, developed in MOBILIS project, are mainly dedicated tools that contribute to enhance public transport or traffic management policy. For some of them, no recommendations may yet be formulated.

We shall underline that:

- Passengers information systems requires the implementation of reliable technical tools
- As a local authority develops a PT priority scheme, it needs to set up a global process for getting the maximum benefit for public transport. All stakeholders should be involved in identifying problem areas; PT operators can provide useful information, including PT usage and other non-commercially sensitive data and help to the reliability level required.

  Once a scheme is in place, it must be evaluated. So it can be modified if necessary, and the local authority can learn lessons for future schemes.

  The most important aspect of bus priority is to maintain clearance of the route; bus lanes help protect buses from the worst traffic congestion, helping to make them more reliable and attractive.

Achievement of key project targets by policy fields and synthesis of measured impacts

Key project targets by WP/Policy Field	
WP5: Clean vehicles and alternative fuels	
100% clean PT bus fleet (Toulouse)	**
Develop the CNG offer for private use (Toulouse)	0
10 LPG demonstration pilot boats circulating in the lagoon (Venice)	**
A reduction in emissions from the ACTV bus fleet (Venice)	*
WP6: Access management	
Reduce by around 2,000 the number of parking spaces in the extended city centre (Toulouse)	***
Increase by around 10 km/h the average commercial bus speed (from 13 to 23 km/h) (Toulouse)	*
Increase in patronage of High Quality Corridor Bus lines by 50 – 70% (Toulouse)	**
Decrease the transit traffic in the city centre by 30% using access limitation and P+R promotion (Debrecen)	*
Increase the number of cars using the interchange car-parks and decrease the number of cars searching for parking in the central area of the city (Venice)	**
Increase the proportion of coaches with class Euro IV exhaust emission standards accessing Venice (Venice)	**
Reduce by 10% the number of cars entering the city by 2008 (Venice)	**
Increase by 10% cyclists and pedestrians on selected routes (Odense)	**
Reduce car speed by 25% (Odense)	*
Reduce transit traffic through housing areas by 20% (Odense)	*
Increase number of walking residents on selected street stretches by 25% (Odense)	**
WP7: Integrated pricing strategies	
Develop integrated PT fares (Toulouse)	*
WP8: Stimulation of collective transport modes	
Reduce bus route times – target average minus 5% per bus route (Odense)	*
Increase number of combined bus/cycle trips – target + 25% (Odense)	*
Extent of use of new mobility card - target 100% growth in car club memberships (Odense)	*
Extent of use of new SMS service for public transport users – target 10,000 users per year (Odense)	*
WP9: New forms of vehicle use and ownership	
Reduce individual trips in the conurbation by more than 1,000 by developing carpooling (Toulouse)	**
50% rate of alternative fuel among car sharing vehicles (Venice)	**
Eliminate at least 200,000 person kilometres with old cars (Odense)	**
Number of bus trips – target 25% of trips previously made by car by target group (Odense)	*
Number of cycle trips carried out – target 40% of total trips made by target group (Odense)	*
WP10: New concepts for the distribution of goods	
Define a new organisation for freight delivery (and the associated exploitation scheme) and the use of clean vehicles	**
WP11: Innovative soft measures	

Key project targets by WP/Policy Field	
Increase the number of total trips in the mainland made by bicycle by about 10% by the end of 2006 and by 18% by the end of 2008 compared with the original 7% (Venice)	*
Reduce use of motor cars – target minus 10% (Odense)	**
Increase shared car trips - + 5% (Odense)	*
Increase number of bicycle trips - + 20% (Odense)	*
Increase number of bus trips - +10% (Odense)	*
Increase number of bicycle trips on new connection(s) - target + 15% (Odense)	*
Increase number of pedestrian trips on new connection(s) – target + 10% (Odense)	*
Increase number of bus trips to Odense Harbour – target + 10% (Odense)	0
WP12: Telematics	
MOBILIS to become the leading European project promoting EGNOS/GALILEO (Toulouse)	**

0 = Not achieved * = Substantially achieved **= Achieved in full *= Exceeded**

The main impacts of the measures by field policy in term of transport, energy, environment, economy and society are summarised in the table below:

Work Package

It must be underlined that measure dispatching among policy field was not totally clear, i.e bus priority implemented in Odense- measure 8.7)

Collective, in particular public transport, and cycling are important alternatives to the car in the cities and many measures in CIVITAS MOBILIS concentrated on this theme. The improvement of the quantity and quality of the public transport system and bicycle network and services on offer is important to create a modal shift. Innovative services and integration of services can help to foster modal change, however, without supporting measures or developing a package of measures, the impact is limited. Related measures include marketing, information systems, raising awareness, measures on restrictions and pricing regarding car use, integration of modes within a chain-based approach and city (re)development.

5.2 Lessons learned

The conditions of measure implementation depend of the local context and of the clean urban policy field.

- Clean vehicle and alternative fuel use mostly meet legal barriers
- Access management is mostly linked to political willingness and quality of participative decision process
- Integrated pricing management faces financial sensitivity of local authorities and technical barriers

- Stimulation of collective transport modes benefits of the willingness of PT authority and operator
- New form of vehicles use and ownership is supported by local authorities and now by changes in civil society
- New concepts for the distribution of goods needs to identify the economical constraints of the stakeholders;
- Innovative soft measures mainly need political support and appropriate communication actions
- Telematics use mostly meet technical constraints;

This combination of planning issues (technical, economic, policy conflict/synergy, user assessment), political-strategic implications (commitment/opposition, public funds) and cooperation aspects (partnership and involvement, key individuals) reflects the main challenge of designing "innovative" measures in a context such as CIVITAS. Almost all types of measure need political commitment, partnership and user involvement, and user needs assessment, appropriate communications activities. Issues of political support, coalition forming and administrative structures are specifically relevant for large agglomerations.

5.3 Gender issue results

The results are detailed in the "Gender Issue Report"- Annex N° B. This paragraph mention the main conclusions of the research and measures screening.

The research available in the UK, Ireland, Sweden, Belgium and the Netherlands, prove that differences exist between men and women in the way they travel, their travel motives and the barriers faced.

- Women tend to use the car less, are more often car passenger and drive fewer kilometres. Although car use is very popular amongst women with children in order to combine caring tasks and trip chaining.
- men make more work-related trips than women, whereas women travel more for caring related activities (escorting children to school, shopping etc.), mostly accompanying someone. Further, trip chaining appears to be a female activity.

The screening of MOBILIS measures focused on female travel mode (use of public and "soft" transport modes) throughout the countries examined.

- The case of Toulouse illustrates wonderfully that two in three Toulouse PT users are female. Male are mainly monthly season ticket holders and are more interested in a season ticket with no validity limit and with direct debit which can be stopped when desired compared to women. Further, men indicate to be willing to use PT when it is as fast as using the car and frequency is high.

  Further, when looking at the new carsharing scheme in the city of Venice, the average user appears to be male between the age of 30 and 45, married with children and car owner as well as a car sharing user. Two in three users of the carsharing scheme is male, one in three female.

- Cycling seems to be more important to men than women. The MOBILIS case of Debrecen illustrates this.

Literature identifies women' motives to use private car are:

- Often bus routes do not meet women's needs to travel off-peak, on non-radial routes and trip chaining.
- Cycling is not seen as a viable mode of transport, primarily due to journey complexity and safety concerns.
- Car can easily be used to combine trips, carrying groceries, escorting trips and scores high regarding personal safety.

Recommendations

Based on the research done in the CIVITAS MOBILIS project, the following recommendations are stated:

- In order to assure for a sustainable mobility system based on equality, gender should be a topic of interest for all current and future EU mobility projects
- When planning for and developing sustainable mobility measures, a gender screening of these measures should be put into place using the Gender Impact Assessment tool
- When evaluating sustainable mobility measures, differences between males and females should be taken into account
- When planning mobility measures in the field of PT, pay attention to specific needs of both male and female and include facilities to reach the needs of this large user group: female especially elderly women and women with caring responsibilities.
- When planning cycling measures, keep in mind that the majority of cyclists are male. To develop cycle use among women, try to increase the storage room for bike trailers and carrier cycles; further, introduce a pram renting service to change travel modes when arriving in the city centre by bicycle or bus.
- When setting up a promotion campaign to get women to ride a bicycle, special focus should be put on the health aspects of bicycling. In addition,

6 CONCLUSIONS

This chapter presents the conclusion of the evaluation results of MOBILS project.

In MOBILIS, a total of five cities participated to CIVITAS initiative by implementing 49 measures in eight policy fields:

- development of energy efficient clean vehicles and related infrastructure,
- management strategies to protect the quality of life in city centre or sensitive zones,
- development of integrated pricing in favour of multimodal journeys,
- improvement of public transport quality,
- promotion of new approaches of vehicle use and ownership,
- experiment of new concepts for good delivery,
- innovative soft measures,
- implementation of telematic tools to improve transport management and related information systems.

Evaluation concepts in MOBILIS were consistent with the GUARD approach. Evaluation methodology and tasks have been detailed in the evaluation plan (D.3.1); it concerned process and impact evaluation, including gender issue aspects.
The evaluation tasks have involved site evaluation managers and measure leaders at city level and evaluation project managers at project level.

The following paragraphs draw conclusions relating to the different aspects: process and impact evaluation and gender issue analysis.

6.1 Process evaluation

At the beginning of the project, the MOMBILIS partners have established MOBILIS Risk Management and Contingency Plan, which followed the below-mentioned steps:

- Identification of potential and actual risks
- Logging and prioritisation of risks
- Determination of risk mitigation and/or contingency planning actions
- Monitoring and control of assigned risk mitigation and/or contingency planning actions

The evaluation of the measure implementation process has provided useful insights into the formulation for policy recommendations. In particular, it has helped to identify typical patterns of barriers and drivers that characterise clean urban policies. Moreover, the correlation between barriers and drivers patterns at work package level, in regard to local and institutional contexts provided complementary information.
The “Glossy Magazine” presents case stories and the main lessons learned by MOBILIS cities.

Finally, all measures have been successfully implemented. Ten measures (4 in Toulouse, 3 in Debrecen, 1 in Odense and 2 in Venice) have developped action plans or technical systems that will be implemented after MOBILIS time.

The most important findings concern the relevance of particular barriers and drivers for measure implementation processes. The following barrier/driver categories appear as particularly important:

Main barriers:

- Technical planning,
- Economical planning,
- Lack of political support,
- Legislation and regulation,

These barriers were or should have been identified at local level and described potential risks and contingencies in their measure descriptions.

Main drivers:

- Political commitment,
- Partnership and user involvement,
- User needs assessment,
- Appropriate communications activities.

The weight of these identified barriers and drivers vary with the policy field concerned.

The MOBILIS project translated the results of the Process Evaluation into the following outcomes:

- development of learning practices for practitioners (Glossy magazine);
- development of tools for practitioners (Guide for the implementation of cycling policy or Method to develop commuter mobility plans);
- input in policy recommendations for local and European decision makers;
- input in transferability report.

We may conclude that it is important to identify at proposal level the scientific and technical documents, the administrative and legal procedures that are needed to progress successfully through the measure implementation and to achieve the objectives, in particular for clean vehicles and related services.

The evaluation process has stressed the importance of a full and continuous assessment of the majority of the demonstrations implemented.

6.2 Impact evaluation

The implementation of the 49 measures has reached the initial common project objectives:

- Clean energy-efficient vehicles are operating (i.e: 100 CNG buses in Toulouse, 35 in Venice) and all partners have improved their knowledge on the benefits and constraints of alternative fuel use. Further development and increased impacts are already expected.

- An other approach of car owning and car use, promotion of public transport and cycling, improvement of sustainable mode offer and of the quality and efficiency of PT services have contributed to encourage modal shift towards public transport and sustainable transport modes. Ljubljana experimented information provision on the use of clean vehicles, while Odense developed direct marketing and provided interactive and Odense bicycle training for school children. Toulouse has developed area-based commuter plans and increased the number of PT passengers by around 50%,. Car sharing scheme in Venice has exceeded its expected results; at present 1.864 contracts are in force and 4.468 valid member cards delivered.
- Limited access management initiatives require careful consideration, especially in city centres. The innovative measures of the MOBILIS project have responded to these challenges. The decrease of car traffic (-15% in Toulouse city centre and -10% in Venice at rush hours, between 6 and 35% in environmental Zones in Odense) and simultaneous increase of soft mode use, mainly cycling, improves the quality and fair share of public space in Toulouse, Odense and Venice or will do it after MOBILIS time, in Debrecen.
- Access and parking restriction in Toulouse, and Venice, mobility management in Toulouse and Odense and the development of soft modes in the five cities will allow minimising urban structures.
- New infrastructures and equipments for soft modes and public transports, accessibility improvement for disabled people have fostered safety, security, social inclusion and thus, improved equity in urban mobility. Toulouse, Debrecen, Ljubljana, Odense and Venice have extended or improved their cycle lane network. Disabled passengers are able to use 50% of the buses in Toulouse, the new public transport boats or the carsharing system in Venice.
- Restricted access to city centre in Toulouse and Venice, creation of environmental areas in Odense, increase use of environment friendly transport modes in the five cities and new waterbuses in Venice helped to reduce noise and improve air quality in urban areas. Their impacts will be going on after the project.
- The development of biofuel production in Slovenian farms, the management of freight delivery developed in Toulouse and Venice, the development of new car use in Toulouse, Debrecen and Venice and the implementation of Intelligent transport System in Toulouse, Debrecen and Venice support economic development and competitiveness.
- Participative working groups and necessary identification of users or citzens' needs have advanced efficient planning, management and implementation processes and coordination between mobility stakeholders at different administrative levels. The culture acquired will benefit to develop further mobility development or services. The "participatory planning" experiment in Ljubljana showed that a legally enforced participatory planning based on regular stakeholder consultation could strengthen the successful implementation of the sustainable urban mobility plan.
- Involvement of citizens and associations in working groups or demonstrations have increased, in the five cities, the participation of citizens and civil society in environment- and mobility-related decision making
- Marketing and information campaigns in Toulouse, Ljubljana, Odense and Venise have raised awareness for sustainable mobility and promoted behavioural change
- Development of telematic and intermodal systems, multimodal modelling in Odense, and new mode of car use has improved the innovation and creativity capacities of local mobility stakeholders and researchers.

The evaluation conducted at measure, city and work package level has revealed that almost all horizontal and thematic goals have been reached.

Due to the short time of the project and sometimes, to modifications of the city context, precise results of the impacts on transport, energy, environment and society have been difficult to quantify. The evaluation sometimes indicates expected results. Impacts of some measures will only appear in next years.

6.3 Conclusions

The evaluation of the MOBILIS project provides information on the likely results that can be achieved when implementing integrated packages of sustainable urban transport measures.

The project has in many cases provided assessments of the introduction of a variety of innovative measures and has also highlighted some of the implementation difficulties and unexpected results that have been achieved for some measures. The information have provided inputs for the Policy recommendation Report and the “Glossy Magazine”.

The transferability report (D.3.4.2) provides more detailed recommendations for the ten measures considered as easy to implement in other cities.

CIVITAS MOBIILIS project has allowed these five cities the opportunity to promote themselves by implementing innovative and sustainable measures. The implementation of such measures does not only influence the quality of life for citizens, but also provides knowledge and methodological or technical tools for other European cities to use.

One of the main feedbacks of the cities is that measure lifetime will go beyond MOBILIS and it will therefore be interesting to have further evaluation in few years. It is recommended that data collection and analysis is continued over the lifetime of many of the measures to identify the sustained effects of the measure and to identify whether the measure is continuing to meet its objectives and/or identify areas/opportunities for improvement in the future.

ANNEXES

ANNEXE A: Measure evaluation results city by city

A 0. MOBILIS impacts and indicators

N°	EVALUATION CATEGORY/	EVALUATION SUB-CATEGORY	INDICATOR	DESCRIPTION and/or UNITS	CITIES CONCERNED	MEASURES CONCERNED	GUARD INDICATORS REFERENCE (N°)
	ECONOMY						
2		**Costs**	Investment cost		**Toulouse, Venice**	5.1.A T, 5.2A T, 5.2B T,8.4 T, 5.3D,5.4L, 5.5 V2, 9.4V,8.7O	2
			Operating cost		**Toulouse, Venice, Debrecen, Ljubljana**	5.1.A T, 5.2A T, 5.2B T,8.4 T, 5.3D,5.4L, 5.5 V2, 9.4V,8.7O	**2**
	ENERGY						
3		**Energy Consumption**	Vehicle fuel efficiency	Fuel used per vkm, per vehicle type	**Toulouse, Ljubljana, Venice**	5.2A T, 5.2B T, 5.1.A T, 5.2.C T, 5.4 L, 9.4 V	**3**
			Vehicle fuel efficiency	Quantity of LPG sold (Total and for each station – litres)	**Venice**	5.5 V2	**3**
			Use of refuelling stations	Number of refuelling at each fuel station	**Venice**	5.5 V2	/
			Number of CNG buses	%	**Venice**	5.5.1 V	/
			Number of LPG-fuelled boats	Number	**Venice**	5.5 V2	/
	ENVIRONMENT						
8		**Pollution/Nuisance**	CO2 emissions	CO2 per vkm by type	**Toulouse, Debrecen, Ljubljana, Venice**	5.2A T, 5.2B T, 5.1.A T, 5.2.C T, 5.3 D, 5.4 L, 9.4 V	**8**
9			CO emissions	CO per vkm by type	**Toulouse, Debrecen, Ljubljana, Venice**	5.2A T, 5.2B T, 5.1.A T, 5.2.C T, 5.3 D, 5.4 L, 9.4 V	**9**

N°	EVALUATION CATEGORY/	EVALUATION SUB-CATEGORY	INDICATOR	DESCRIPTION and/or UNITS	CITIES CONCERNED	MEASURES CONCERNED	GUARD INDICATORS REFERENCE (N°)
10			NOx emissions	NOx per vkm by type	**Toulouse, Debrecen, Ljubljana, Venice**	5.2A T, 5.2.B T, 5.1.A T, 5.2.C T, 5.3 D, 5.4 L, 9.4 V	**10**
11			Particulate emissions	PM10 and/or PM2.5 per vkm by type	**Toulouse, Debrecen, Ljubljana, Venice**	5.2A T, 5.2.B T, 5.1.A T, 5.2.C T, 5.3 D, 5.4 L, 9.4 V	**11**
			Hydrocarbon emissions	Reduction of Hydrocarbon emissions in air ppm/year (%)	**Venice**	5.5 V2	/
			Hydrocarbon emissions	Reduction of Hydrocarbon emissions in water (mg/l)/year (%)	**Venice**	5.5 V2	/
			Use of coches with EURO IV standard	Proportion increase (%)	**Venice**	6.8 V	/
			Reduction of wave action		**Venice**	8.8 V	/
	SOCIETY						
13		**Acceptance**	Awareness level	Awareness of the policies/measures	**Debrecen, Toulouse, Ljubljana**	6.5 D, 6.6 D, 7.1(B,C,D,E) T, 9.1 T, 9.3 D, 11.3 T, 11.8 L, 12.3.A T, 12.3.C T	**13**
14			Acceptance level	Level of satisfaction	**Ljubljana, Toulouse, Venice, Debrecen, Odense**	5.4 L, 5.5.1 V, 5.5 V2, 6.1 T, 6.3 T, 6.5 D, 6.6 D, 6.10 O, 7.1(B,C,D,E) T, 8.2 T, 8.4 T, 8.3 D, 8.7 O, 8.8 V, 9.1 T, 9.3 D, 9.5 O, 10.1 T, 11.1 T, 11.2 T, 11.3 T, 11.5 D, 11.6 D, 11.10 O, 11.11 O, 12.3.A T, 12.3.C T, 12.4 D	**14**
15		**Accessibility**	Perception of accessibility	Perception of physical accessibility of service	**Toulouse**	8.3 T	**15**
			% of waterbuses adapted for persons with disabilities		**Venice**	8.8 V	/
	TRANSPORT						
18		**Quality of Service**	Accuracy of timekeeping	Number and percentage of services arriving / departing on time	**Ljubljana, Toulouse**	5.4 L, 6.4.B T	**18**
19			Quality of service	Perception of quality of service	**Toulouse, Debrecen, Odense, Venice**	6.4.A T, 6.5 D, 6.6 D, 6.10 O, 6.9 V, 7.1.(B,C,D,E) T, 8.3 T, 8.4 T, 8.7 O, 8.8 V, 9.1 T, 9.3 D	**19**

N°	EVALUATION CATEGORY/	EVALUATION SUB-CATEGORY	INDICATOR	DESCRIPTION and/or UNITS	CITIES CONCERNED	MEASURES CONCERNED	GUARD INDICATORS REFERENCE (N°)
20		**Safety**	Injuries and deaths caused by transport accidents	% increase in the number and gravity of accidents in bus lanes	**Toulouse**	6.4.B T	**20**
21		**Transport System**	Traffic flow by vehicle type - peak	Average vehicles per hour by vehicle type – peak, or % of variation	**Toulouse, Debrecen, Venice, Ljubljana**	6.2 T, 6.5 D, 6.7 V, 6.9 V, 11.7 L	**21**
22			Traffic flow by vehicle type - off peak	Average vehicles per hour by vehicle type – off peak	**Toulouse, Ljubljana**	6.2 T, 11.7 L	**22**
23			Average vehicle speed - peak	Average vehicle speed	**Toulouse, Odense, Venice, Debrecen**	6.2 T, 6.4.A T, 6.4.B T, 6.10 0, 8.7 O, 8.8 V, 12.2 T, 12.4 D	**23**
24			Average vehicle speed - off peak	Average vehicle speed	**Toulouse, Odense, Venice**	6.2 T, 6.4.A T, 6.10 O, 8.8 V, 12.2 T, 12.4 D	**24**
26			Average modal shift	Percentage of passenger-km or veh/km for each mode	**Odense, Toulouse, Debrecen, Venice**	6.10 O, 8.4 T, 9.5 O, 11.2 T, 11.5 D, 11.11 O, 11.12 O, 11.9 V, 12.4.D	**26 and 27**
28			Average occupancy	Mean no. persons per vehicle/day	**Venice**	8.8 V	**28**
29			Average modal shift- trips	Increase in the use of PT and/or soft modes.	**Venice**	5.5.1 V, 8.7 O	**29**
			Review of TAD use : number of km covered, rate of utilisation, etc.		**Toulouse**	8.4 T	/
			Use of car-pooling	See details of the indicators in sheets 9.1 T and 9.3 D	**Toulouse**	9.1 T, 9.3 D	/
			Use of car-sharing	See details of the indicators in sheets 9.2 T and 9.4 V	**Toulouse, Venice**	9.2 T, 9.4 V	/
	PARKING						
		Parking management	Number and % of parking places eliminated in the centre		**Toulouse**	6.1 T	/
			Parking turnover ratio, unauthorised parking ratio,		**Toulouse**	6.1 T	/

N°	EVALUATION CATEGORY/	EVALUATION SUB-CATEGORY	INDICATOR	DESCRIPTION and/or UNITS	CITIES CONCERNED	MEASURES CONCERNED	GUARD INDICATORS REFERENCE (N°)
			unpaid parking ratio				
			Parking duration. Number of parking tickets for unauthorised parking. Number of parking tickets for exceeding time. Time taken to find a parking space.		**Toulouse (Blagnac)**	6.3 T	/
			Increase in the use of interchange car parks (%). Decrease in parking use in inner centre (%). Number of information panels installed. Number of parking spaces available.		**Venice (Mestre)**	6.7.V	/
	PUBLIC SPACE						
		Public space management	Public space reassigned to soft modes	m^2	**Toulouse**	6.2 T	/

A 1 MEASURE RESULTS FOR THE CITY OF TOULOUSE (joined folder)

- Measure 5.1 Results
- Measure 5.2 Results
- Measure 6.1 Results
- Measure 6.2 Results
- Measure 6.3 Results
- Measure 6.4 Results
- Measure 7.1 Results
- Measure 8.1 Results
- Measure 8.2 Results
- Measure 8.3 Results
- Measure 8.4 Results
- Measure 9.1 Results
- Measure 9.2 Results
- Measure 10.1 Results
- Measure 11.1 Results
- Measure 11.2 Results
- Measure 11.3 Results
- Measure 11.4 Results
- Measure 12.1 Results
- Measure 12.2 Results
- Measure 12.3 Results

A2 MEASURE RESULTS FOR THE CITY OF DEBRECEN (joined folder)

- Measure 5.3 Results
- Measure 6.5 Results
- Measure 6.6 Results
- Measure 8.5 Results
- Measure 9.3 Results
- Measure 11.5 Results

- Measure 11.6 Results
- Measure 12.4 Results

A3 MEASURE RESULTS FOR THE CITY OF LJUBLJANA (joined folder)

- Measure 5.4 Results
- Measure 11.7 Results
- Measure 11.8 Results

A4 MEASURE RESULTS FOR THE CITY OF ODENSE (joined folder)

- Measure 6.10 Results
- Measure 8.7 Results
- Measure 9.5 Results
- Measure 11.10 Results
- Measure 11.11 Results
- Measure 11.12 Results

A5 MEASURE RESULTS FOR THE CITY OF VENICE (joined folder)

- Measure 5.5 Results
- Measure 6.7 Results
- Measure 6.8 Results
- Measure 6.9 Results
- Measure 6.11 Results
- Measure 8.8 Results
- Measure 9.4 Results
- Measure 10.2 Results
- Measure 11.9 Results
- Measure 12.5 Results
- Measure 12.6 Results

ANNEXE B: IN DEPTH PROCESS EVALUATION for selected measures (joined folder)

ANNEXE C: GENDER ISSUE REPORT (joined folder)