

BURGOS · GENOA · KRAKOW · STUTTGART

2005-2009



CiViTAS

Cleaner and better transport in cities

CARAVEL

Travelling Towards a New Mobility

the **CARA** **VEL** Experience



FINAL PROJECT REPORT

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LOCATION OF THE CARAVEL CITIES



Foreword

For the four partner cities of Burgos, Genoa, Krakow and Stuttgart the CARAVEL project presented an excellent opportunity to take a giant step forward in matters of urban mobility quality and in the communication of a clean and sustainable mobility culture to a wide public. It is an experience worth communicating and this report is a descriptive summary of the four year journey.

Travelling Towards a New Mobility – the CaraVel Experience has been created by all CARAVEL partners and will be published in English as well as the four languages of the project, namely Spanish, Italian, Polish and German. In a unique, readable and colourful way both the overall project understanding, its foundation and structure, the general strategic approach and history are described and detailed insights given into the measures taken, the process of implementation, final results and first impacts.

The report is generally aimed at showing other cities, institutions, scientists, politicians and other parties throughout Europe interested in advanced urban transport systems and

services viable and appropriate approaches, tangible solutions and measurable results.

The endearing characters Cara and Vel lead you through this report. The idea to introduce Cara and Vel to guide through the report developed from “little Caravel”, a character already used in Burgos to market the CARAVEL measures taken in this city. Once again, an idea borne in one CARAVEL city has been transferred to the other members of the project consortium.

In this report Cara and Vel pay a visit to Burgos, Genoa, Krakow and Stuttgart and meet Carlos, Anna, Marek and Sabine, the characters representing the citizens of the cities, who talk about their experiences and thoughts on the changes CARAVEL has brought. With their typical childlike curiosity and refreshing frankness Cara and Vel always have something to say about the achievements made in each partner city.

At the end of a long, challenging and demanding path, we would first like to extend our thanks to the European Commission not only for the strong financial

support afforded to the cities in implementing these ambitious measures, but also for all the opportunities provided to exchange knowledge, information and culture with many other European cities within the “CIVITAS Family” during so many events.

We should also like to thank all the staff working for the partner cities for their untiring efforts: civil servants, engineers, technicians, scientists who have also become friends and not simply partners over these four years. We hope that this fruitful cooperation will continue into the future to the benefit of our cities.

Finally, we wish to thank our colleagues, the political representatives of our partner cities, for the most interesting exchange of opinions during our meetings and for the political support given to the project. Without their work and effort, CARAVEL would never have reached such a satisfactory conclusion.

Paolo Pissarello
Deputy Mayor
Municipality of Genoa
Vice-Mayor and Councillor for Sustainable Mobility of Genoa

Strategic Focus and Urban Transport Policy

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The four CARAVEL cities – Burgos, Genoa, Krakow and Stuttgart – were well known in their respective countries as pioneers of innovative urban mobility policies. The experience and lessons learned from the measures realised in the 1990s clearly indicated that single and isolated actions have only marginal impact and are therefore no longer appropriate to face today's problems of urban density, economy and mobility. They observed that only radical changes in urban transport will help to tackle these problems. However, appropriate solutions must be embedded in a policy that interlinks urban development with all directly and indirectly related areas using an integrated, policy-led approach.

The strategic objectives of a sustainable urban transport policy are to increase the quality of life and well-being of citizens, employees, visitors and tourists as well as to improve the economic competitiveness of the cities and their surrounding regions: these goals are common to Burgos, Genoa, Krakow and Stuttgart. The cities also recognised that they are facing similar problems for which similar technical and non-technical solutions may exist. The cities therefore decided to join forces, strengthen their co-operation, share experiences and lessons learned, and to transfer proven concepts and technologies.

The CIVITAS II call in 2003 and the EU funding made available offered the chance to search jointly for new integrated solu-

tions, to develop and implement new mobility concepts, technologies as well as services and to evaluate their impacts through large scale pilot demonstrations. The CARAVEL project was born. It started in February 2005. The participating organisations are shown in the box on the next page.

The strategic objectives have been transformed into operational objectives and into 54 integrated measures covering all policy fields of CIVITAS. The cities also established their own focus and topics in the CARAVEL project that referred to specific local needs.

» CARAVEL serves as a means to establish effective and operative **public-private partnerships**.

These partnerships combine the competitive advantages of private and public organisations and help to break down existing barriers, even between different departments of city authorities.

» **The involvement of stakeholders** (including associations representing the population or specific user groups) from the earliest stages of development and implementation processes is also a very important aspect as the potential beneficiaries are likely to develop good ideas and are more likely to accept the implementation of jointly agreed measures.

» **Awareness and marketing:** The quality of public transport services is often perceived as poor. This personal perception may be right or wrong. Actual improvements and innovations fall flat due to an insufficient

or inappropriate information policy. The CARAVEL cities were aware of this and established wide-spread activities aimed at raising the general awareness about urban mobility issues and informing the population about changes in attractive mobility marketing formats: competitions, post card campaign, mobility forum, Internet.

» Aware of the fact that CARAVEL is a research and demonstration project, the four cities are interested in **reducing the risks**, be they of a technical, financial, organisational or political nature. Therefore, all actions within the project as well as the external developments and events are permanently monitored. This enables adaptations or counter measures to be taken in order to avoid negative impacts. It must also be said, however, that in a research project it is not possible to anticipate all influences and potential effects and external ones in particular, such as the development of the energy markets.

A few of the actual measures are presented here to illustrate the intelligent solutions that address the vital issues of local mobility in the four CARAVEL cities:

» **Burgos** put considerable effort into involving stakeholders – representatives from the population, shopkeepers, hotel owners, technology providers, consultants, concerned departments of the city council. This created an exemplary momentum in the re-





The CARAVEL project consists of the following partners:

- » **City authorities:** Municipality of Genoa, Municipality of Burgos, Municipality of Krakow, Municipality of Stuttgart
- » **Public Transport Operators:** Azienda Mobilità e Trasporti S.p.A. (AMT) and Azienda Mobilità e Infrastrutture s.p.a (AMI) of Genoa, Miejskie Przedsiębiorstwo Komunikacyjne SA (MPK) of Krakow
- » **System and software providers:** Softeco Sismat SpA (Genoa)
- » **Private research and consultancy companies:** Rupperecht Consult Forschung & Beratung GmbH (Cologne), D'Appolonia s.p.a (Genoa), SSP Consult Beratende Ingenieure GmbH (Stuttgart), FORMS Group (Krakow).
- » **Public research and government agencies:** Agenzia Regionale per l' Energia della Liguria Spa (Regional Energy Agency), Agenzia Regionale per la Protezione dell' Ambiente Ligure (Environmental Protection Agency of the Regione Liguria), Verband Region Stuttgart
- » **Universities:** University of Genoa – Department of Economics and Quantitative Methods, Politechnika Krakowska im.Tadeusza Kosciuszki (Krakow University of Technology), University of Stuttgart – Department of Transport Planning and Traffic Engineering
- » **Non-profit organisations:** Istituto Internazionale Delle Comunicazioni (Genoa),

cent urban development projects and is why Burgos succeeded in both improving the quality of its historic city centre by introducing selective access restrictions for motorized transport in sensitive areas, and enhancing the accessibility of the central areas by significantly improving the quality of public transport. Burgos has been honoured with awards several times for its endeavours.

» **Genoa** enriched the car sharing system by special cars for the disabled and through shared use of cars by private persons and public institutions using more energy-efficient cars. The access control scheme has been extended by a pricing scheme for goods distribution in the city centre which is based on a mobility credit concept. All stakeholder needs were taken into account during the development phase. The concept tends to change delivery behaviours, leading to less vans and cars circulating in the historic city centre.

» **Krakow** has implemented the first demand responsive (bus) transport service in Poland; it is the result of a real transfer of this concept and IT solution from

Genoa to Krakow. Krakow has also set up an integrated ticket that covers public and private transport operators from the city and the region and is developing a transfer centre in which interested cities will find vital information for their own mobility projects. Krakow was also the first city in Poland to implement a public bike scheme.

» **Stuttgart** has extended its existing car pooling system: today 35 companies in Stuttgart and the region – among these the world's leading enterprises from the automobile and IT sector – have integrated the system into their Intranets and more than 30 towns in the region have set up links on their Internet sites to the car pooling system. Leisure-related events, like football games or the local zoo, are also integrated in the system. Stuttgart hosts Germany's first integrated traffic management centre where the city traffic management, the police, the fire department, the emergency service and the public transport operator work together under one roof.



These examples illustrate the political will to radically change the urban passenger and freight transport system by not working against the beneficiaries and those concerned but with their assistance. The key result has been to involve and convince those parties concerned. The mission of the four mayors of the CARAVEL cities “to establish a new culture for clean mobility” thus becomes reality.

The four CARAVEL cities Burgos, Genoa, Krakow and Stuttgart with all the organisations and persons involved in the realisation of the project became a real CARAVEL family over the four years and have gained extraordinary experience that extends beyond the field of mobility.

The CARAVEL “Family”



*Dear Travellers and Passengers,
and indeed all those interested in public transport,*

We, Cara and Vel, warmly welcome you to share with us the experience of four years travelling towards a new mobility within the CARAVEL project. The cities of Burgos, Genoa, Krakow and Stuttgart embarked on their mobility journey in February 2005 with the common aim of achieving sustainable mobility of so vital importance to their cities. A total of 54 measures in the field of urban mobility were implemented over the past four years up to the completion of the project in early 2009.

The measures fall within the eight categories (policy fields) of sustainable mobility which the CiViTAS Initiative identified as the basic building blocks for an integrated strategy. All measures have contributed to creating cleaner and better transport in the four CARAVEL cities.

We are proud to lead you through this report that explores the world of cleaner and better transport in the cities of Burgos, Genoa (leading city), Krakow, and Stuttgart. You will become acquainted with all activities of the project such as the process of measure implementation, impact and results, evaluation, outcome, and last not least the involvement of all stakeholders, a unique aspect of the CARAVEL project.

But first, to be polite, we would of course like to introduce ourselves...



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My name is **Cara**, I'm nine years old, well almost ten actually, and I go to primary school. I love my dog and playing hopscotch. What I don't like are cars. They stink, they're dangerous and a real nuisance! I just don't understand why some people love them so much.



And I'm **Vel**, Cara's big brother. I'm eleven. I really like sports, especially football. My bike and me are inseparable. I take it everywhere I go. But when I grow up I want to be a train driver!

And these are the people and the places we will be visiting...

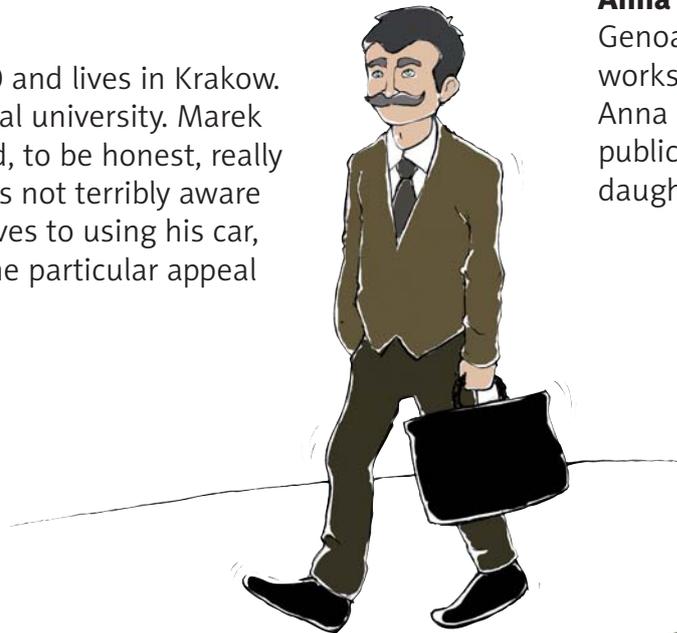


First, there is **Carlos**, a pensioner with a passion for sport from Burgos. He's just as mad about cycling as Vel, and loves being with his grandchildren. Carlos is 75 years old and is really enjoying his retirement.



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Marek is around 40 and lives in Krakow. He works at the local university. Marek relies on his car and, to be honest, really loves it. In fact, he's not terribly aware about any alternatives to using his car, to say nothing of the particular appeal of public transport.



Anna is 36 years old and lives in Genoa. She's a single mother and works part-time at a law office. Anna has no car and always uses public transport. She has a small daughter and likes to go shopping.

And finally we have **Sabine** from Stuttgart. Sixty-five years old, this 'young' lady adores travelling, exhibitions and long walks. Sabine has been to many places and so has always many a story to tell.





Burgos

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Burgos is a medium-sized city with 180,000 inhabitants, situated in north-western Spain, in the Autonomous Region of Castilla-León. Its history dates back to the 10th century. Even before the arrival of the Romans, prehistoric man had already left his mark in the area, as highlighted by the significant finds unearthed at Atapuerca, one of the most important paleontological sites in the world.

The City of Burgos enjoys a privileged geographical position half-way between Madrid and the border with France, and on the main roads to Bilbao, Santander, Logroño and Valladolid. Due to its strategic location and excellent communications, Burgos has a dynamic and varied industrial base. Thanks to all of these factors, the economic presence of Burgos in the region is significant.

Burgos offers a rich historic and cultural heritage and an active cultural life around its flourishing university with the bustling presence of 9,500 students. Its



new airport was inaugurated in July 2008 and its future service area and industrial zone will have a great impact on the city.

In 2003, each citizen made about 1.53 trips on foot, 1 trip using private transport and only 0.33 trips by public transport per day in Burgos. Public opinion on public transport was not particularly encouraging: the habitual destinations were considered to be too far away from the nearest bus stop or the bus simply did not stop at the desired destination; in addition, the service was perceived as uncomfortable.

The use of bicycles is very small compared to other European cities. In 2003, only 15 bicycles per hour were counted on the San Pablo Bridge; the network of cycle lanes and paths was poor. There was no real parking fee policy, and the city centre was freely accessible to cars. Finally, information systems on traffic circulation and free car parks were virtually non-existent.

Burgos devised and drew up a Civic Mobility and Accessibility Pact, which was the first step towards developing a serious mobility and transport policy for the city. This Pact is founded on the premise that the key to a sustainable city and an improved quality of life is to solve the problem of mobility and urban accessibility. Innovative solutions must be found for problems of mobility without causing further harm to the environment and quality of life.

The principles of mobility, global accessibility and sustainability formulated in the Mobility Pact provided the framework for the CARAVEL project in Burgos. Its implementation has meant a complete transformation for the city in terms of mobility. The latest data on the use of alternatives to the private car show excellent results: today, more than 28% of citizens are using bus, bicycle and other alternative ways to move about in the city.



Over the past four years the City of Burgos has developed a series of integrated measures within the CiViTAS CARAVEL project that has defined its mobility strategy. Major features of these projects are managing access to the historic city centre, pedestrianisation schemes, modernisation of the bus service, the launching of a bicycle loan scheme and an initiative for cleaner fuels.

This mobility policy has been reinforced by dialogue with the social agents responsible for ensuring the successful implementation of the measures. The dialogue has been accompanied by various marketing and publicity campaigns which encourage the public to opt for less-polluting, quieter and cleaner forms of transport. Taken together these have produced growing public awareness and recognition of the broad potential of sustainable transport.

There has been a strong increase in the use of public transport and the same holds true for alternative measures such as those involving bicycles which are now a common sight on our streets. Burgos now also ranks highly amongst Spanish cities in the percentage share of cleaner fuels used.

Throughout the life of this project, the city has received three extremely prestigious awards. In 2006 Burgos was rated the most sustainable city in Spain by the Spanish Ministry of Industry due to its urban transport system. In the same year the City was recognised by the Recycling Association for its policy on using and promoting new, cleaner fuels. Finally, an award presented in the city of Kaunas in 2007 named Burgos as the "CiViTAS City of the Year", the European City that has been most successful in spreading awareness of the need for advanced, sustainable transport.

Based on the achievements in Burgos, our wish is to urge other European cities to pursue measures that will ensure cleaner air, less noise and less congestion. The objective is to enjoy the full potential of our cities, their paths, their streets and their squares: a city for its citizens, a city offering quality of life.

Juan Carlos Aparicio
Lord Mayor of the City of Burgos

Burgos

Uncomfortable buses, lack of information about routes and at bus stops, poor frequency, inadequate accessibility and polluting vehicles: these were the main reasons why I didn't like public transport in Burgos. But the new strategy from the CARAVEL project resulted in one of the newest fleets in the whole of Spain: comfortable, 100% accessible and clean. In this way Burgos has set a good example for private vehicles to also use alternative fuels.



Burgos in Motion

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Clean, Sustainable and Accessible Public Transport

Before the start of the CARAVEL project use of public transport in Burgos was low compared to other cities of similar size. The CARAVEL project in Burgos is based on a 2003 survey which identified the reasons why the public were not using public transport: uncomfortable buses, lack of information about routes and at bus stops, poor services, poor frequency and inadequate accessibility.

convert the entire municipal fleet (buses, police and fire engines, garbage collection vans and trucks) into "clean vehicles" that only use biofuels (biodiesel and Compressed Natural Gas CNG), and to also equip all buses with facilities for disabled people. The Municipality was therefore setting a good example to the public by using cleaner fuels and improving the air quality in the city.

Bus with Compressed Natural Gas

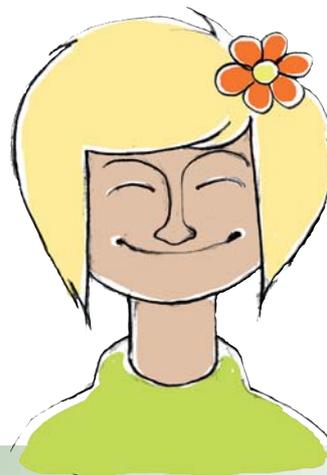


Under the umbrella of CARAVEL and an initiative launched by the Municipality of Burgos, an ambitious overall strategy was developed over the past four years to



...the use of public transport has increased by 6 % in the last three years?

Did you know that...



Ramp improving the accessibility



Clean fleet

Eight new CNG buses have been purchased by the Municipality, as well as 27 new Euro IV-V engines which can run entirely on biodiesel. Two fuel depots were built at the municipal garage for biodiesel and CNG. Depending on the weather conditions, the public fleet uses 25% biodiesel in summer and 17% in winter. As the 27 new buses are capable of running entirely on biodiesel, a new garage and depot to supply 100% biodiesel have been built as part of the CARAVEL project in the industrial area. The current percentage of clean buses (using CNG or biodiesel) is 100%.

Increase general awareness

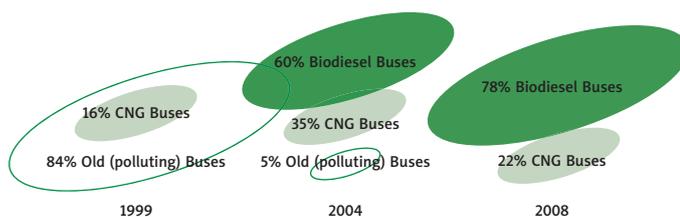
A strategy to collect used oil in order to produce biodiesel was developed and five collection boxes were installed at strategic points in the city in order to facilitate the collection of the oil from the public. TV, radio and local press marketing campaigns were very successful in raising public awareness. Special collecting bottles were distributed to the public with the aim of motivating the citizens to collect used oil.

Another awareness-raising campaign to promote good driving habits in relation to buses (not

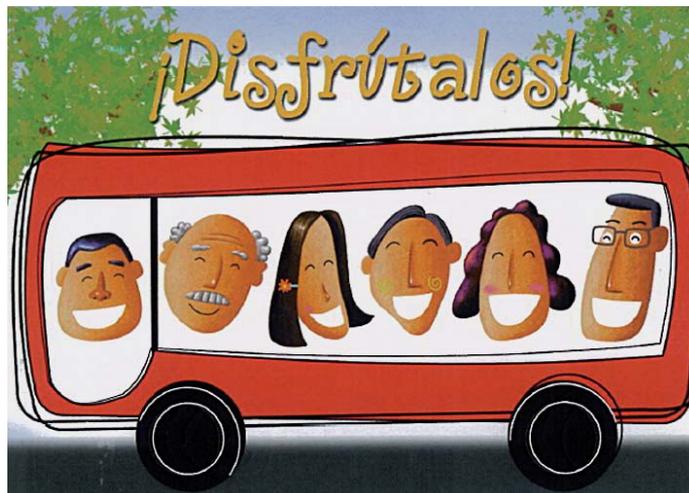
to park in front of the bus stops, give up your seat to the disabled...) was developed through an ideas contest on clean transport using free postcards. On one side of the postcard there was some advice on good conduct with respect to transport. On the other side citizens had the possibility to explain their ideas to improve the public transport and send them back to the Municipality. About 200 postcards were received with mobility solutions. The winners received two free tickets for a city event.

Made aware of the use of biofuels in public fleets, private car users also started to use it. During the Mobility Week in September 2006, a street theatre ensemble of two clowns addressed the issue of transport behaviour and informed the public about developments in public transport and the use of biofuels.

Share of CNG and Biodiesel Buses in the PT fleet.



Postcard from the last season promoting the use of the new buses (Translation: Enjoy the new buses!)



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Operational reorganization

A major factor in the greater use of public transport in Burgos was the complete re-organization of the bus lines. A pilot with only three lines received positive feedback: the passengers interviewed were happy about avoiding useless stops and routes and considered the new arrangement to be a better service. The plan for the entire network was therefore implemented. The result was higher bus frequencies and a faster service with a reduction from 40 or 60 minute intervals to 10 or 20 minute intervals.

Some lines were also extended because of new city developments and new lines were established (e.g. the line to the new airport).

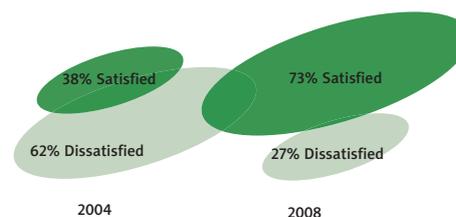
The most recent promotion campaign focused on the new service in response to the key requirements of the 2004 survey in public transport.

Today, frequency rates have been improved, the buses are more comfortable and accessible than in the past; more information is available at the bus stops thanks to real-time display panels at the most busy bus shelters.

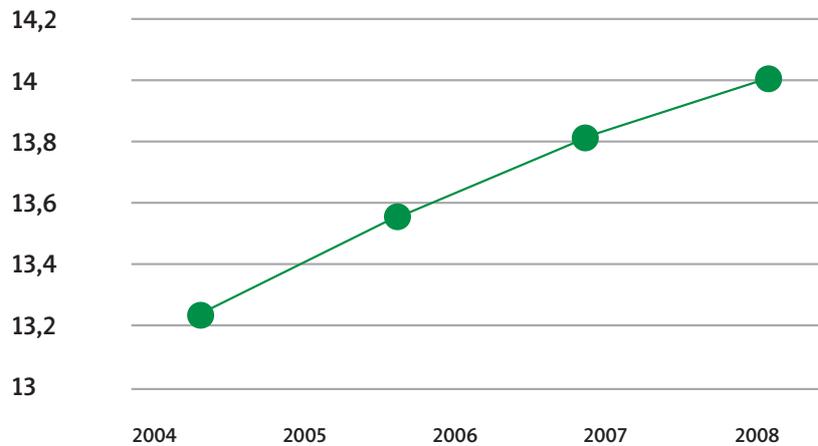


Postcard campaign addressing good behaviour (Translation: what would you do... to be more polite?)

The surveys from 2004 and 2008 show a completely different view of the PT in the city



Million of trips per year in public transport



The number of trips (passengers) in the last years has considerably increased

Technical facilities

One key element in the use of public transport is that of accessibility. Voice messaging systems and displays have been installed on buses to provide information on routes, bus stops and arrival times. The provision of low ramps in the buses now enables wheel-chair users and elderly people to access the bus.

The buses were equipped with internal cameras controlled by the driver that record the movement of people through the doors. The driver is able to block or open the door system when the bus is running. In order to avoid sudden jolts for travellers on board when accelerating and braking, a special innovative system was installed in the entire fleet.

Effects

Apart from the significant level of municipal investment to renovate the fleet, the bus stops and the information displays and access facilities, the main factor

in the success of this project was the excellent exchange of opinions with neighbourhood associations, individuals and other municipal departments such as the municipal department dealing with infrastructure and engineering. More than 75 suggestions were received from neighbourhood associations and individuals and more than 20 meetings were held to explain the new scheme and timetables organized by the Mobility Department. Some of the changes were critical as certain bus stops were going to disappear. Thanks to those meetings and an increasing level of mutual understanding between the different parties, it was possible to introduce the changes and to reorganize the bus lines, saving time on trips and improving frequency rates and commercial speeds.

The citizens of Burgos have recognized this effort with an increase in the use of public transport of about 6% over the last three years (see table above).

All comments received from the groups of the disabled have been very encouraging. The most recent report of the national organization of the blind recognized that in terms of accessibility, public transport in Burgos is "very good".

Apart from the fact that the entire public fleet is now using biofuel, the project has also had an external impact: four other biofuel stations (apart from the municipal station) were installed for the general use of the public. This means that Burgos offers the highest number of biofuel stations per inhabitant (Burgos has a population of around 180,000 inhabitants). Other external results included two awards received from the IDAE (National Institute for the Energy) and ATEGRUS (National Recycling Association) respectively for the work performed on incorporating biofuels during 2006. In the first case, the current Energy Minister gave the award to the Local Mobility Councillor.



I love cycling – after all these years it still keeps me in shape! It's also the cleanest and often – believe it or not – the fastest way to get around! However, the lack of safe cycle paths and bike padlocks in the city centre does not increase the use of bikes, that's clear! Luckily, in Burgos the situation has changed now.

Bike-loan Scheme and Increasing Bicycle Use

During the 1990s, cycling as a means of daily transport was virtually non-existent in Burgos. It was mainly regarded as a leisure activity at weekends. Nevertheless, the topography and layout of the city of Burgos is well adapted to the bicycle: it is flat, has plenty of wide avenues and green spaces. Some of the reasons for not using the bicycle for everyday journeys were pinpointed by a survey conducted in 2003: gaps in the bicycle lanes, cold temperatures (Burgos is located at an altitude of 856 m with average day temperatures in winter of about 5°C) and the idea that daily use of a bicycle was only for young people and students. A plan was therefore designed to increase the use of bicycles in the city.

1st step: 'BiCiBUR' the bike-loan system

The free bike-loan system BiCiBUR developed by Burgos City Council, has made 400 bicycles available for public use in the City of Burgos. The City Council was responsible for designing and developing the overall system including the smart-card-controlled bike-loan points with the help of the bike and neighbourhoods associations. They were also involved in the decision on the location of the loan points.

BiCiBUR started up in 2005 with an ambitious plan put forward by the City Council to offer the public the possibility of loaning a bicycle without charge for a couple of hours to travel around the city. This allowed them to leave their private vehicle at home and travel in a sustainable way, from one place to another, without polluting, and without causing noise or congestion in the city.

In August 2006, the bike-loan system was inaugurated by the Mayor of the City in the presence of other dignitaries and members



Some new developments of the bicycle lane, using soft measures to separate the bicycle and walking areas.

of the local community in the city and the region. The event was widely reported in the regional and even the national press, and echoed in various magazines and television programmes covering this unique project in Burgos to “loan” bicycles to the public.

The bike-loan system started with four installations around the city, each holding 15 bicycles and operating with software and equipment. Between 2006 and 2008, the system has registered over 3,100 members and has loaned out over 20,000 bikes. Thanks to its widespread success, the system has been extended considerably. Today, the public have access to sixteen bike-loan pick-up points, one for each area or neighbourhood in the City of Burgos. The system also offers 20 electric bicycles for longer trips mainly centred on travel to the industrial zones.

The citizens can use the service for a maximum of two hours (long enough to travel from any one point in the city to another).

Tourists are allowed to use the bike for three hours to travel in a sustainable way around the city and admire it.

The organisation in charge of maintaining the bicycles (repainting them if necessary, repairing wheels, brakes...) as well as putting them out and redistributing them during the day is a social organisation (Fundación Lesmes, also belonging to the city municipality) that is made up of socially excluded groups and people with disabilities.

2nd step: promoting BiCiBUR

A large-scale marketing campaign was launched with gifts for the first subscribers BiCiBUR. Detailed leaflets explained the system. In addition, a map of the city bike lanes was prepared to provide information on the safest routes for cyclists. The smart cards were given to citizens at a symbolic price of € 3 at three points around the city (the City Council, the ‘Río Vena’ Civic Centre and the public library,

Gonzalo de Berceo). In addition to the 3,100 citizen members, some 200 tourists have also benefited from the system.

The idea of promoting bicycle use among commuters is partly explained by the fact that cycles have traditionally been used in Burgos at the weekends and for sport. The city promoted everyday bicycle use by the public through posters showing a man riding to work, dressed in a suit and tie, riding a bike in the middle of the city as if it were the most normal activity in the world, and others depicting bicycle users and pedestrians respectfully sharing public spaces.

3rd step: increasing the use of bicycles

During recent years the city has made tremendous efforts to promote the bicycle as an alternative means of transport. 230 new bike racks have been installed and bicycle use has been encouraged and marketed as a normal means of transport (i.e. not only for the weekend). The mutual

Burgos

Inauguration of BiCiBUR system on August 2006 in the presence of the Lord Mayor and other regional and local authorities



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respect between pedestrians and cyclists has been addressed (i.e. mutually respecting the pedestrian and bicycle lanes) through a series of postcard campaigns.

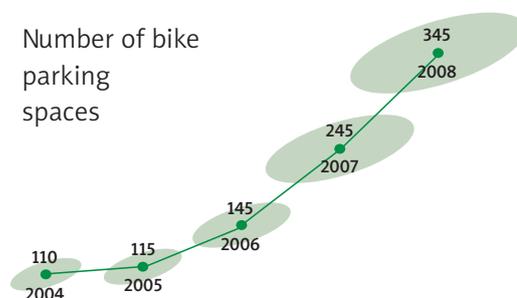
The system is also part of a global strategy of support for non-polluting, alternative transport, which was complemented by the construction of bike lanes in the new areas and the development of an additional 15 km of bike routes (48 km in total in the city, which means that Burgos is the fifth city in Spain in terms of kilometres of bike lanes, after Barcelona, Madrid, Valencia and

Vitoria and the first in terms of kilometres per inhabitant), the installation of bike parks, the provision of bike-lane maps and the marketing of the service and of bike use in general.



Promotional poster of the free bicycle-loan system

Number of bike parking spaces



TIME	IMPLEMENTATION
2004	Burgos has 33 km of unconnected bicycle lanes
2005-2006	8 km of new bicycle lanes in surrounding areas and new development areas with the emphasis placed on making cycling safe as some parts were dangerous.
2007	New lanes across the river, in total around 5 km. University (east) and the west part of the city completely connected.
2008	2 km of new lanes linking unconnected lanes supported by soft measures such as painting and posting. The action plan was developed by the City's bicycle association.
2009	Burgos now has a total 48 kilometres of safe bicycle lanes and paths

Did you know that...



...Burgos today has more kilometres of bicycle lane per inhabitant than any other city in Spain?

Results

The system has had such a positive reception that many cities have replicated the idea. Barcelona set up the same system but with different technology and other cities such as Jerez de la Frontera, Ponferrada, Logroño, San Vicente de Raspeig and various towns in Valencia and Andalucía (with a total of 17 cities replicating the system) have installed exactly the same system that was developed in Burgos, with the same idea of a free service offering a healthy transport alternative to the public. The transferability of the project's positive outcomes is also visible in the city of Krakow, a member of the CARAVEL project, where the implementation process has been inspired by the experiences in Burgos.

The users are young persons who use the bikes to go on errands and to travel around the city; mainly university students and workers and civil servants in the morning, and children and families for more leisure-related reasons, in the afternoon. The

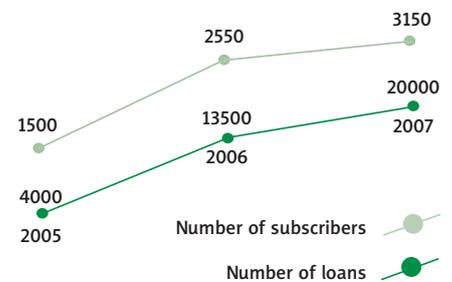
initiative has been greatly appreciated by tourists. Although the impact has not been so great these last two summers, in future it is expected that a far greater number of tourists will pluck up the courage to visit the city in this way. What the tourists valued most of all were the free service and its accessibility (no more than five minutes are needed to fill in the forms before taking out a bike). Full explanations of the scheme are available at the BiCiBUR website (www.bicibur.es).

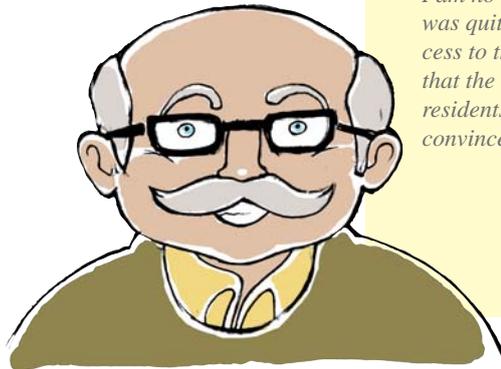
It is clear that BiCiBUR has been a success by the high numbers of cards requested by the public, but the number of trips is quite low in relation. One conclusion is that many people decided to ask for a card but only use the loan bicycle from time to time, as they also own their own bicycle. It can be said that BiCiBUR has been instrumental in advancing the use of this form of sustainable transport.

Bicycle use

Statistics are available on the number of users in the bicycle lane. Statistics for the San Pablo Bridge four years ago recorded about 15 bicycles per hour. The situation was very positive following the CARAVEL project implementation, showing that in the lunch time hours in spring 2008, 120-140 bicycles passed by per hour.

Development of BiCiBUR





I am no great fan of all this modern technical equipment and was quite sceptical when I first heard of plans to restrict access to the inner city and introduce cameras. But I must admit that the marketing campaign and the involvement of ordinary residents like myself in the decision-making process did finally convince me of their benefits and necessity.

Access Restriction and Infomobility Tools

Heavy traffic was identified as a key problem in the city centre, greatly detracting from what is otherwise an attractive area and preventing the general public from enjoying the city to the full. This was exacerbated by pollution and noise which impaired the quality of life in the historic centre. Its narrow streets were damaged by lorries driving close to historic monuments, and these suffered from pollution and vibration.

An earlier unsuccessful attempt was made to resolve this situation some years ago. It failed due to the negative responses of neighbourhood associations, shopkeepers and goods distribution companies. Nothing then happened until the CiViTAS CARAVEL project proposed a more promising plan that harnessed the combined energies of all external and internal stakeholders to formulate an acceptable planning process.

An action plan was also needed to deal with the new traffic flows resulting from the restricted access area. This involved installing a new traffic centre, re-routing traffic in the city centre and pro-

viding visual advice and alternative options for drivers.

Access restriction & pedestrianisation

The access restriction concept in Burgos began in 2003 with an ambitious plan put forward by the city council to change the layout of the city centre and offer the public more open spaces free from traffic, pollution and noise. Under the umbrella of both the CARAVEL project and a council initiative, work on the pedestrianisation system started in 2005 with the building of pavements and roads.

In 2006, 16 electronic bollards were installed and about 4 square kilometres of the city were pedestrianised. This radically changed the entire layout of the centre of Burgos. A new traffic control centre with cameras was established for 24/7 monitoring of the city centre and the general traffic situation. The bollards can be controlled remotely from the traffic control room. Where electronic bollards were inappropriate due to the needs of users or for aesthetic reasons, plants and other decorative elements were used instead.

Access restriction controlled by the traffic control center



The initiative began with stakeholder meetings: over 50 meetings have been organised with resident and neighbourhood associations, disabled groups, shopkeepers, hoteliers, goods distribution companies and various council departments including the police, fire service and health service. The aim was to discuss and agree on the principal features of the system and to ensure wide acceptance. To this end the system was explained during a series of meetings.

Two thousand cards were printed and distributed, authorising free access to residents with cars, the police, ambulances, taxis, the fire brigade, refuse collection vehicles and others such as social services. The introduction of the access restriction has been accompanied by a marketing campaign.

The new traffic control centre and the bollards system were inaugurated in September 2006. Every pedestrian zone subsequently introduced was inaugurated with a street party, children's games, music and dancing. The public was invited to celebrate the opening of one car-free zone after

the other. In total, four large events were organised with high levels of public participation. In addition to the general public, these inaugural celebrations were attended by local dignitaries including the city mayor, the president of the Federation of Burgos Firms, city councillors and the delegate of the Junta de Castilla y Leon for the City of Burgos.

All events were widely reported in the regional and even national press as an example both of a public initiative and, of course, a city centre free from cars, pollution and noise.

An agreement was signed with goods distribution companies to arrange various timetables for them to deliver merchandise and goods. The council voted to implement a highly sustainable goods distribution system (using electric vehicles) for day-to-day freight distribution designed within the CARAVEL project. The only distribution vehicles permitted to enter the restricted access area will therefore be electric vans and bicycles belonging to the future goods distribution system for the city centre.

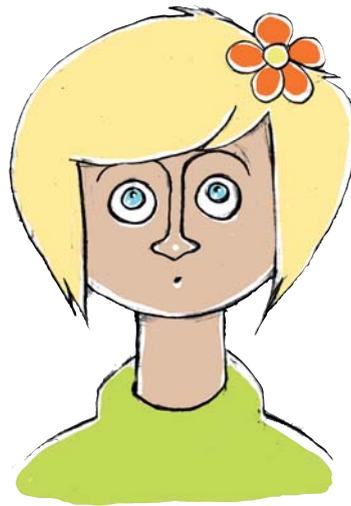
Infomobility tools

The new city layout has provided the public with further tools to improve traffic circulation.

The first step in terms of mobility information tools was to install panels displaying real time information about the traffic situation on the city's seven arterial roads (at the junctions to other main roads). Because they are connected to the traffic control room, these can offer drivers ways to avoid city centre congestion. They are especially useful when traffic is heavy (holidays), during parades or special events and during the rush hour when commuters are travelling from factories outside the city into the centre.

The next step was to install seven more panels on these arterial roads to indicate free off-road parking spaces and how to access them. At the same time, a marketing campaign was organised on the use of underground parking. Other instruments include touchscreens at bicycle service points (of which there are 16 in total) with information on mobility is-

Did you know that...



...in 2006 about 4 km² of the city centre were pedestrianised, this corresponding to 560 football pitches?

sues (public transport, the traffic situation, parking spaces and the bicycle hire system). Another useful feature uses the municipal e-panels to provide advice and information on sustainable urban transport; this includes public transport timetables, goods distribution timetables, bicycle systems, fuel saving tips and advice on safety and security. The same information is available for interactive use on the new mobility website. It contains advice on planning trips in the most sustainable manner and also offers a range of real-time images showing the traffic situation. There is also information on accessibility, bicycles and bicycle lanes, walks and all aspects of city mobility.

Successful implementation

There can be no doubt that success is chiefly attributable to the positive participation of all stakeholders. Widespread social acceptance was achieved by holding several meetings to explain the system and seek agreement on critical points (such as goods distribution). Marketing campaigns depicted

a new city centre free from cars. These invited the public to shop, enjoy the “tapas” bars and accompany their children in a safe and secure environment.

The data reflect the positive results. Shop rents in the area continue to be the most expensive in the city, suggesting that city centre business continues to thrive. Surveys conducted on the measures also indicate that they have been well received: 92% believe restricted access to the city centre was and is necessary.

These info-mobility tools usually get a good reaction from the public because they are practical and also save time and fuel, which means less pollution in the city.

Burgos has exported its participation concept to other cities (in Spain and abroad). The control centre and scheme have been visited by many people, ranging from children and university students to technicians from the USA and Japan.



Apart from the off street parking panels, some panels provide direct information about the fullness of car parks to help the citizens to park legally and sensibly.

Burgos Stays in Motion

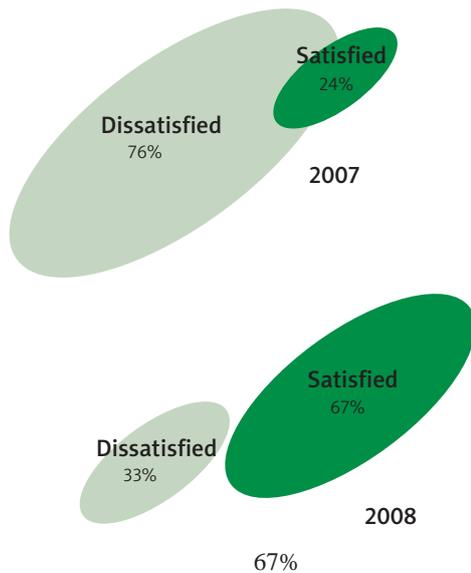
Parking strategy

Parking in Burgos was definitely a problem in the past. Parking was disorganised and unregulated with big trucks parking in the city centre. Off-street parking was not used due to inadequate signposting and (relative) high parking charges, and street

parking was free. The main aims of this measure were therefore to set up new parking schemes (charges per parking areas: blue zones for citizens, green zones for neighbourhoods), correct bad parking habits, adjust the pricing, implement good signposting for off-street parking and develop new areas for trucks to park in the suburbs. A comprehensive strategy was drawn up together with the relevant stakeholders such as neighbourhood associations, associations for the disabled and certain municipal departments. The implementation of a wide-range package of concrete measures has now significantly improved the parking situation in Burgos.

movement of lorries. Owing to the fact that companies decided to cancel the private bus services due the low usage, the additional congestion made mobility even more difficult. Highly motivated to change the situation, the Municipality designed a new transport management scheme in cooperation with the companies concerned. As a result there are now two agreements in operation involving 200 enterprises: large companies are sharing their buses and timetables, and the employees of SMEs are allowed to use the new collective service. Operating costs are now shared (and therefore reduced), the service is widely accepted and the congestion situation has been eased due to fewer unnecessary trips. As bus services do not correspond to all employees' needs, a short and long-distance car pooling scheme has been developed and implemented. The service has been inspired by the successful "Pendlernetz" system in operation in the partner city of Stuttgart. Today, the service is in operation for the convenience and to the satisfaction of more than 200 employees who have subscribed to the system.

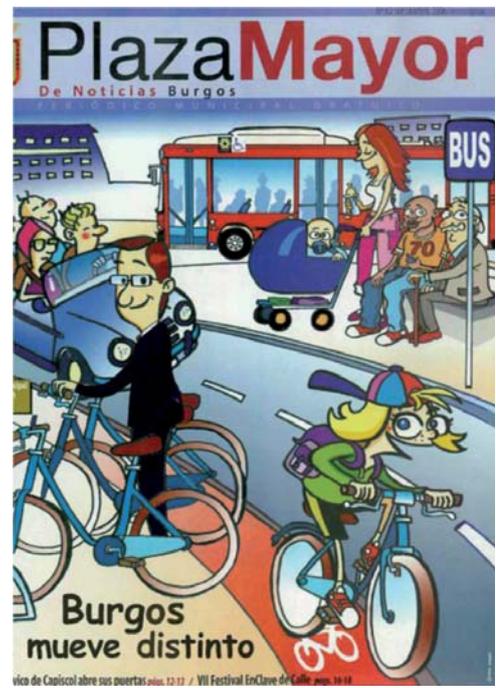
Satisfaction with the management of the public parking



The management of off-street parking received better marks from the citizens after the implementation of the new prices and the installation of parking panels in 2008

Collective private transport: shared buses and cars

The industrial area has always been served by multiple bus lines. However, the problem was that many employees used their cars to travel to work, which meant congestion in peak hours. The parked cars also clogged the streets impeding the free



The cover of the municipal magazine for September 2006 showing many of the Caravel measures.

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Introduction of the restricted access system as the first bollard goes into operation with the support of politicians.



Goods distribution

Two different problems were pinpointed with respect to the distribution of goods in the city centre. The first was that the city centre and pedestrian areas were full of large delivery vehicles following implementation of the restricted area during working hours. Citizens were worried about these fast vehicles and troubled by the pollution and noise they caused. Another problem was pinpointed in the zones surrounding the restricted areas where vehicles parked illegally to deliver freight off timetable. For these reasons, new areas around the clean zone were designated for unloading and a new scheme for distribution in the pedestrian areas was prepared, resulting in new clean, silent and slow vehicles that reduced pollution and noise, and a new logistics centre for freight to serve the respective area.

Involving, convincing and converting the unconverted

Sustainable mobility is first and foremost an awareness and understanding of the local mobility situation. This requires wide-spread and targeted information. Citizens must be informed about new measures, services and alternative modes of transport aiming to improve the mobility situation. Burgos realised a great number of initiatives in this context: thousands of postcards – each addressing a specific mobility issue – were distributed, many workshops were organised and two competitions held on sustainable mobility along with a wide range of promotions.

Some of the activities focused on involving tourists, providing information on walking tours and a sustainable way of visiting, promoting the bicycle system or the new tourist taxi system developed in the project.

Measures were publicised in newspapers, radio spots, the Mayor's press releases, the public inauguration of new services (access restriction zones, bike



The workshops organized with children about the safety of cycling and walking to school.

loan system, presentation of the new bike racks or presentation of the tourist taxi initiative) in the presence of the Lord Mayor and other important representatives from the private and public sector. The stakeholder meetings represented a completely new approach. The concerned groups (shop owners, hoteliers, private companies, citizens and their representative associations) were fully involved in the discussion of the mobility problems, the search for appropriate innovative solutions and in the consensus-building process for the implementation of concrete measures (e.g. access restrictions). All stages in the development of new services and the public discussions could be followed via a Mobility Forum web site where everyone was invited to comment on all subjects and to submit suggestions and proposals. The overall result, a 91 % level of satisfaction with the CARAVEL project and its results, is a fantastic success for Burgos and CARAVEL. 50% of citizens recognized the CARAVEL logo when it was showed in surveys, indicating the high profile nature of the project.

Safe access for pedestrians

Suburban neighbourhoods are located some distance away from the city centre and citizens travel to and from it chiefly by car. Pedestrians were obliged to use roads but conditions were not always very safe. The goal of this measure was therefore to improve these conditions for pedestrians in peripheral neighbourhoods. New tools to guarantee pedestrian safety and accessibility were put in place such as paths and accessible pedestrian areas, bicycle lanes, 20 km/h zones, traffic light improvements. Other soft measures were also used to calm the traffic such as painting, posting, elements to divide the traffic and the pedestrian areas or obstacles in the road to force vehicles to slow down. There was also a pilot project with all these elements set up in a specific neighbourhood that was used to analyse the best conditions for urban mobility and pedestrian zones in such areas. These successful measures were then transferred to nine other areas of the city with similar circumstances.

Safety and accident prevention plan

In an effort to contribute to road safety it was firstly decided to collect relevant data and then to perform a global analysis of individual accidents before implementing a road-safety strategy. Accident incidence and locations were therefore examined to develop a model to help improve pedestrian safety. Following on from this the high-risk areas pinpointed were adapted by developing road-safety campaigns, improving road signs, introducing traffic calming measures, and traffic lights. New software for traffic lights was implemented as well as a database on accidents enabling action to be taken at recognised danger spots. Parallel to this several workshops on road safety for children were held to sensitize both younger and older children to a more considerate behaviour on the roads.



Genoa

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Referred to as “Genova La Superba” or Genoa the Proud, the city is the capital of the Ligurian region in Italy’s north-west. The city of 620,000 inhabitants is Italy’s busiest port and one of the largest historical centres in Europe. Designated as a UNESCO World Cultural Heritage site in July 2006, the city was also European Capital of Culture in 2004.

Genoa is located between the sea and the mountains with a comparatively long and narrow coastline stretching from east to west. The urban landscape is defined by the topography of the area with development mainly in the coastal area that slopes down to the sea. Despite a city area of 239 square km, the urban core covers just 28 square km, accommodating 285,000 inhabitants (10,153 inhabitants/square km). Due to the lack of space and the absence of alternative routes Genoa has a very difficult street layout. Its transport system is strongly influenced by the complex topography.



In the late 1990’s one of Genoa’s main urban problems was the ongoing overstepping of maximum allowable levels of environmental pollutants which was mainly attributable to traffic in central areas. The problem was exacerbated by the lack of alternative routes on the outskirts, causing high congestion levels, also in view of a public transport network that was not entirely efficient.

Many measures were taken in different areas of mobility to address this situation which were aimed both at private and public transport aspects. The results of these mobility policies were remarkable, manifested in a reduction in pollution and a shift in the modal split in favour of public transport.

In view of the important but not decisive results achieved, the city’s administration decided to continue its work to provide structural answers to mobility needs and to plan a future

harmonious development of the city using two main instruments. The Urban Lab is a planning body with the mission to define the future structure of the city by improving its quality, liveability and development. The Urban Mobility Plan (PUM), which aims to provide full-scale answers to the new mobility needs on a mid to long-term basis, is the result of a profound interaction of experience between different professional skills, coupled with an intense process of stakeholder involvement.

CARAVEL made a great contribution to defining mobility strategies in Genoa. All activities planned within this context became an integral part of the strategic PUM framework. Measures such as mobility credits, car sharing or reserved bus lane control are key elements of the PUM which will be taken further after CiViTAS has reached completion. At the same time they are increasingly developing into a new urban mobility culture.



For the City of Genoa participation in the CiViTAS programme, which coordinates the CARAVEL project, has represented a decisive step towards developing urban mobility strategies that are increasingly aimed at cleaner and more efficient sustainable transport.

Genoa has undergone radical changes over recent decades, moving from a city based on heavy industry and a declining port to a service economy whose more limited industrial presence focuses on hi-tech sectors (electronics, telecommunications and biomedical) providing a new important role for the commercial port.

This deindustrialisation process led to significant urban changes with a real impact on mobility needs. Therefore, while it created significant challenges, it also opened up enormous opportunities for development. Part of the commercial port was relocated from the centre, enabling the city to open itself out to the sea. This offered potential for major urban renewal projects and laid the foundations for further important changes which have been marked by high profile events (such as the Columbus celebrations in 1992, hosting of the G8 meeting in 2001, European Capital of Culture in 2004, nomination as a UNESCO World Heritage site in 2006) that are putting the city on the international map.

These profound changes necessitate a process of continuous action in terms of town planning. This must also take into account the need for sustainable transport that must be seen as a constituent element of such far-reaching urban development.

The Genoa Administration is working to provide structural solutions to these problems and to coordinate the development of the city. CiViTAS CARAVEL has played an important role in defining future mobility strategies, particularly with reference to fully integrating the strategic framework of the Urban Mobility Plan and the campaigns implemented within CARAVEL, which have now become an integral part of the city's mobility culture.

Marta Vincenzi
Lady Mayoress of Genoa



All the vehicles in the city centre were a real nuisance. They were loud and smelly and blocked the streets and pavements. They did not exactly contribute to a pleasant shopping experience! I was not a bit surprised that people tended to visit remote shopping centres on the outskirts. Now, with controlled access for all and improved freight distribution, the city has regained its appeal.



Genoa's Steps Towards a New Mobility

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Did you know that...



...all freight deliveries in the Genoa historical centre are subjected to a pricing scheme?

Demand Management Strategies

With the general objective of confronting high levels of congestion (and pollution), the city of Genoa has developed an integrated package of actions to deal with private transport demand management, taking into account citizens' need for mobility as well as goods distribution mechanisms. CARAVEL therefore contained two measures to consider both of these demand segments, each of which comprises several integrated interventions:

- » There has been comprehensive research activity into private demand management schemes with potential for application in Genoa's urban environment; this included options for congestion or pollution charges, a central goods distribution hub in the city centre as well as a study of the mobility credits concept. Although many of these studies stop at the design phase, they are important as they form the basis for the action actually taken.
- » Secondly, the new BLUAREA park pricing scheme has been

adopted, an access control scheme has been implemented for the "limited traffic zone" (LTZ) in the historical centre, and an innovative pricing scheme, based on the mobility credits model, has been applied to freight distribution in the historical centre "limited traffic zone". There have also been some smaller interventions such as van sharing or the development of a design for a proximity warehouse which aims to ease supply logistics for shopkeepers and commercial operators.

- » A congestion charge scheme to be applied in the city centre of Genoa has been designed in detail and evaluated using modelling. Potential outcomes are positive (20% reduction in traffic entering the target area; net income of € 19.5 million/year) but for several reasons (political commitment, changes in priorities, implementation scheduling times) it has been decided that the time is not right for implementation at present.

One typical narrow lane of Genoa's historical centre



BLUAREA park pricing scheme

The BLUAREA scheme (www.bluareagenova.it) applies a simple but very efficient pricing system. The city centre is subject to pricing and has been divided into a number of smaller areas. Within these areas residents pay a subscription for unlimited parking while non-residents have to pay according to time. As the areas involved are quite small, even relatively small trips within the central city area (and therefore not only from outside the city) are subject to payment, the amount of which depends on parking duration. The only trips that require no payment are those which cross the centre, but these have significantly decreased in number in any case due to reorganised traffic circulation resulting from application of the last Urban Traffic Plan.

The subscription paid by residents is lower for the first family car (€ 50/year) and much higher for any further cars (€ 300/year). All other users (including residents if they park in different areas from the one they live

in) pay parking fees projected at € 2/h for the duration of their stay. There is also a special rate called “speedy” (€ 0.20 for 20 minutes, not renewable) that permits short stops at a low parking tariff to enable people to run quick errands and to increase parking availability through high rotation. Street payments can be made to traffic wardens and using conventional ticket machines (although it is thought that innovations will be developed during 2009), while subscriptions can be paid to a contact centre or via the internet (for renewals only).

After an initial implementation phase during which the performance of the overall system has been evaluated, and given the excellent results recorded, the city authorities have decided to broaden the scheme beyond the inner city area to incorporate the wider city centre and the first semi-central belt. Reactions to the application of the BLUAREA scheme have been very positive in terms of reduced access to the centre (-5.1%), the availability of parking spaces (+6.5% for cars and +21.7% for motorbikes) and

improved use of public transport (+3.0%). After initial disagreement even citizens are now reacting quite positively (the acceptance rate has been evaluated and, based on positive and neutral opinions, now equates to 76.6% of residents). This was a decisive factor for the decision by the authorities to widen the scheme's application. In fact, despite the fact that the effects are not dissimilar to those of a more “traditional” road pricing scheme, this scheme has received much greater acceptance by citizens.



The new APNR access control equipment

Access control scheme

The historical centre LTZ was originally established in 1989 and was divided in two sectors (Sarzano and Banchi). However, prior to the start of the CARAVEL project this area was not supported by any electronic control system (with the exception of Via Garibaldi where a bollard had already been installed). CARAVEL has finally led to the introduction of automatic access control tools:

- » An access control system based on the APNR (Automatic Plate Number Recognition) technology has been installed in two gates (Via Ravasco and Via San Giorgio, covering the main part of the Sarzano sector) and was launched in December 2006.
- » Three gates (Via di Porta Soprana, Piazza Caricamento and Piazza Raibetta) access another section of the historical centre, and have been equipped with bollards to physically prevent access to the most sensitive part of the area. In a second stage additional bollards were installed in Via Cairoli and Via Lomellini.
- » Due to the decision to apply a uniform and homogeneous policy to the entire LTZ (and also in response to some technical

problems which occurred in the bollard system), nine additional APNR gates have been installed to cover the entire historical centre area.

The expected outcome (based on the results of the first implementation stage) of this uniform policy is a 12.4% reduction in vehicles accessing the whole historical centre LTZ.

Innovative freight distribution

The van sharing initiative has introduced a car sharing service especially dedicated to goods distribution; it therefore involves users of commercial vehicles. The van sharing service can be used in exactly the same way as car sharing (subscription and fee structure, the same parking areas). The aim of the initiative is to persuade shop owners to abandon the use of their private vehicles when restocking their shops, and instead to share vehicles when the use of professional transport is not possible. The principal results of van sharing use indicate a remarkable increase of 19% in the number of rides, 46% in kilometres covered and 69% in hours.





Did you know that...



...the application of the Mercurio scheme is the first ever test case for the mobility credits concept?

Mobility credits

This pricing scheme is based on the mobility credits concept; it is aimed at access to the historical centre LTZ by the freight distribution sector, and represents the first ever use of this approach. It is highly innovative at a European and global level, with a pricing scheme based on behavioural choices when it comes to spending credits. This scheme has been applied to a specific private mobility sector but, if the parameters were suitably set to regulate the system and the technological support system, the general criteria could, theoretically, be extended and applied to all elements of general mobility.

This initial application of the scheme for the freight distribution sector involves defining the mobility needs of shopkeepers, craftsmen, offices and generally every productive company operating in the historical centre. Each economic operator is given an initial credit budget in accordance with his requirements. The credits are spent on freight, either using vehicles owned by the business or those of professional carriers and couriers. When the

initial budget has been used in full the economic operators may buy additional credits from the city authorities.

The access control equipment records every entry to the zone and permits the implementation of a mixed pricing / enforcement scheme for different users. There are, in fact, four user categories:

- » Residents: with some restrictions these are entitled to enter after paying a yearly subscription.
- » Frequent-user goods vehicles: these will be allowed to enter at specified times and will be subjected to the mobility credits scheme. This means they need to collect credits from the businesses, as without sufficient credits they will be subjected to fines.
- » Occasional-user goods vehicles: these will be allowed to enter at specified times but will be subjected to a road charge scheme (about € 7 for a daily permit to enter the area).
- » Other users: are not allowed to enter and if they do so are subject to fines.

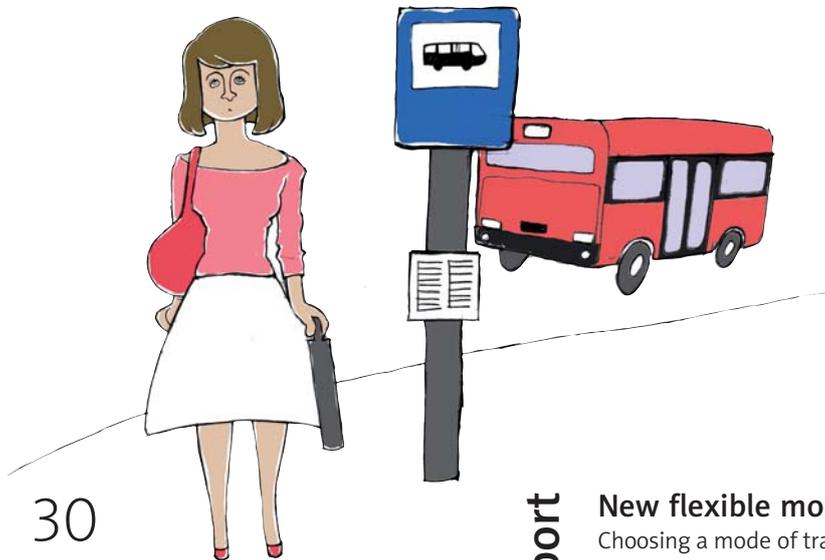
It must be underlined that all goods vehicles are subject to a pricing scheme, but that joining

the mobility credits scheme is completely voluntary, albeit with some conditions. Therefore if a commercial “frequent-user” operator elects not to join the scheme he will in any case have to pay the access charges applicable to private vehicles.

The name given to the mobility credits initiative is “Mercurio”, the Roman god of commerce and trade, but it also brings to mind “merci”, the Italian word for freight. There is a general need for more research and innovation-related activities when considering the mobility credits scheme compared to the congestion charge option because all design tasks need to be developed; this even applies to the technological support systems since no reference can be made to any existing cases.



Everybody has to be very flexible these days. Why shouldn't we expect this from public transport, too? Sometimes it's not easy to be on time in the morning, especially when, like me, you have young children – each day brings a new surprise! On that kind of day, and particularly when I am running late, I wouldn't like to be without the new flexible transport service anymore.



Did you know that...



...based on the Genoese model, 9 new flexible services have been developed in the Liguria Region, carrying about 100,000 passengers each year?

Agency for Flexible Transport

New flexible mobility
 Choosing a mode of transport for any kind of trip generally offers few alternatives: either it involves relatively low cost but rigid timetables and routes (traditional local public transport) or high costs but high quality and high comfort (taxi and private car). There is basically no service in between, which is one of the main constraints of the current local mobility system. Despite the fact that there is no free market, a regulated local mobility market could support and promote the formation and development of a flexible transport system.

This approach could offer a new level of quality and price somewhere between that of traditional local public transport and taxis, while at the same time being competitive for a broad range of mobility demands. This means a local mobility scheme can be designed which is not just suitable for a polycentric city like Genoa, but could also be applied to many other contexts. The idea is to combine the traditional strong features of local public transport (fixed timetables and routes) with “on demand”

services, such as (mini)bus “on demand” services, collective „door-to-door” taxi services, minibus fast services at fixed fares with seat booking, specific services fixed for particular transport needs and specific targets, car and bike sharing or car pooling services.

Obviously, the appropriate mix of the abovementioned systems – which will need to be defined according to the actual mobility needs – should be reassessed from time to time, but it is important to stress that all have a common structure based on three pillars: a) a service management centre (which has a similar technological and organisational model), b) a call centre for booking and trip management and c) the transport operator performing the service.

Genoa's Agency

The Flexible Services Agency in Genoa has been developed against this overall background, and has made the introduction of new mobility services possible.

The Agency is a coordination, organisational, technological



Drinbus

and management centre for intermediate services based on a mature ITS platform. Its aim is to demonstrate innovative flexible (demand responsive) services, “bridging the gap” between conventional large volume PT and new mobility demands. The focus is on introducing new mobility services in Genoa accompanied by targeted marketing campaigns and integrating these services into the framework of the Agency.

The Agency is able to provide “turnkey services” including feasibility, design, planning, implementation, management and maintenance with a dispatch centre for all flexible services, as well as the corresponding technology and systems. It uses an overall innovative ITS platform which shares some basic modules that are adapted to different services such as Demand Responsive Transport (DRT) bus services, DRT services for the disabled, collective taxis and car pooling. DRT on demand bus services are normally targeted at the people living in the defined areas, collective taxis are targeted at everybody, whilst

services for the disabled are targeted at people with reduced mobility. Car pooling is aimed both at the employees when it applies to a commuter service or at everybody when it applies to an open scheme.

Transfer of know-how

The Agency is also providing call and dispatch centre services for PT companies or on demand services located outside of Genoa (e.g. the Aurelio service in the Province of Savona). Together with the IT provider and CARAVEL project partner Softeco, AMI provides a full transfer of DRT services (transfer of technology + service know-how) both in Italy and abroad, as demonstrated by the Tele-bus service implemented in Krakow (see DRT Services in the Krakow section of this report).

Success story

With respect to innovative, unconventional passenger services AMT, the public transport operator in Genoa, launched the first two Demand Responsive Services in 2002 followed by a third in 2004 (substituting two fixed

routes). This took place with the support of an EU Life programme project called SIDDHARTA. The concept of the Agency has been further developed within CIVITAS CARAVEL and the following activities have been realised:

- » Framework design for the Agency;
- » Definition, design, revision and follow up of the overall ITS platform system;
- » Flexible Services Implementation Plan.

The first two years of the project have led to recognition of the Agency as a knowledge and management centre for all intermediate flexible services in the Liguria region. The success of the concept is also demonstrated by the fact that both the flexible services and the Agency itself have been acknowledged as European leader within the CIVITAS Thematic Leadership Programme initiative and also by virtue of the potential applications of the Agency that permit the realisation of other flexible services beyond Genoa’s boundary (i.e. PT companies in Savona, La Spezia and in the province of Genoa).



DRT services



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More flexibility for all

Thanks to the Agency, 9 new flexible services have been developed in the Liguria Region, involving 7 different transport operators; 100,000 passengers per year are now carried by flexible services.

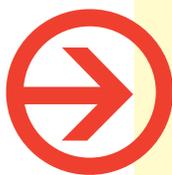
The main results achieved by the measure during the project are as follows:

- » The management of the three existing "DRIINBUS" PT on demand buses together with the launch of a dispatch centre and service operations provided by AMT (service operated during the whole CIVITAS CARAVEL period).
- » A management and dispatch centre for the Genoa Disabled Persons Flexible Transport Services was set up, with transport operations provided by three social cooperatives.
- » The Collective Taxi system was developed and implemented, with operations launched in autumn 2008.
- » Several flexible services connecting outlying coastal areas and the mountains with the City of Genoa were introduced (e.g. "Aurelio", "Escursionibus", "Pronotobus", "Alta Val Trebbia").

» A car pooling service for mobility management purposes for the San Martino Hospital of Genoa and a concept for a new car pooling service aimed at all residents and not only to companies or closed groups. It has been integrated into the "community" section of the infomobility portal. » As a result of a close transnational exchange, it has been possible to design and implement the flexible PT service in the form of the "Tele-bus" adopted by the Polish partner city of Krakow. Finally, the service has helped to reduce the gap between traditional local public transport and the use of taxis or private cars in Genoa.

Drinbus dispatch centre





There are times when you really do need a car. I wouldn't want one permanently but when I do the new car sharing system which was recently introduced in Genoa is a great help. It's flexible and you don't need to commit to anything.



Car Sharing

The operational objective of the measure was twofold: (i) to establish innovative solutions based on the proven car sharing (CS) service in Genoa and (ii) to improve and extend CS as a mobility service which is fully integrated within the urban transport system. The underlying aim was to combat congestion, contribute to limiting the use of private cars and reduce the ownership rate of private cars, especially in the city centre.

The measure focused on the use of hybrid or bi-fuel-powered vehicles (at least 25% of the fleet) and the introduction of a car sharing system for the combined use of private persons and public institutions, starting with the Municipality of Genoa. Moreover, one car was specially equipped for driving by the disabled, as an experiment to improve their degree of independency in mobility. All of this results in a more rational use of cars by the

citizens, and in an improvement of public fleet management too. The concept was also transferred to goods distribution in the historic centre and activities were accompanied by broad based promotion campaigns.

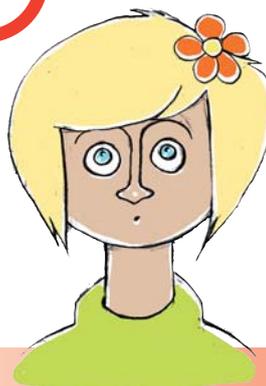
Rapid increase

The most important impact of the Urban Transport Plan in Genoa has been the increase in transport sustainability. As far as car sharing is concerned, the results achieved include the extension of the service into the urban area, with the provision of more parking zones and more car sharing vehicles. The bottom line is an increase in the number of car sharing users.

The measure enjoyed significant success in Genoa, as is also shown in the graph depicting the comparison between the growth of the users in Genoa compared to the average users in the "mean Italian city" (total number of users of the CS circuit/number of the cities in which the service is active).

Special services

A special car sharing service ("van sharing") was also implemented for goods distribution (see "Demand Management Strategies in Genoa"). Agreements were reached with several stakeholders (associations of shopkeepers and commercial operators) and 10 vehicles were in operation by the end of the project.



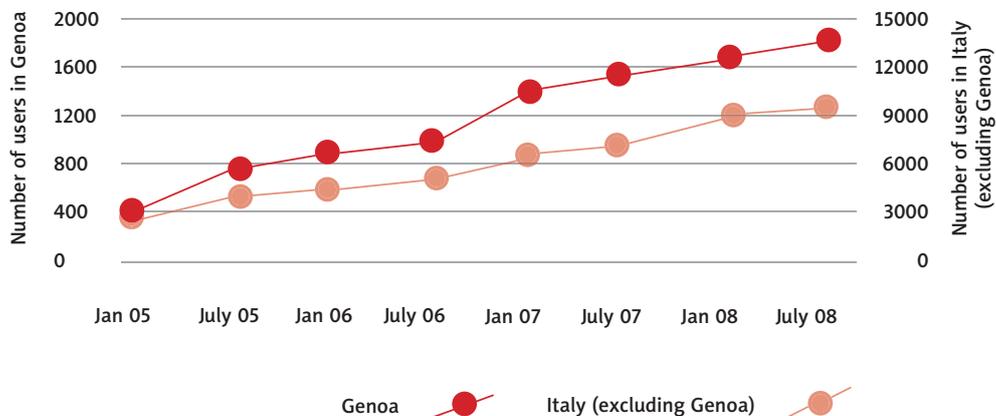
Special car sharing services for goods distribution and the disabled; that's really innovative!

Car sharing for the disabled



Genoa

Development of car sharing users in Genoa and Italy



Car sharing stand

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A special CS service aimed at the disabled was developed by specially equipping cars to enable them to be driven by disabled persons, thereby increasing their degree of freedom. The idea was developed with the associations of disabled persons and was received positively by the City Council.

Several promotional activities were organised with the aim of achieving a wide acceptance of CS. These included communication and advertising such as campaigns for citizens, direct marketing activities, information campaigns through direct information and media.

The use of car sharing was introduced in the Municipality of Genoa. It replaced a part of the proprietary fleet. 13 vehicles were deployed during the working days and hours, which were then released for use by other users during the non-working hours and the weekends.

Changes in habits

A direct survey conducted with the customers pointed out that the use of the CS service leads to a deep change in mobility habits with a consistent reduction in the number of kilometres driven (per car per user). Under consideration of the level of use in July 2008, this represents an overall saving of 6,000,000 km/year, or the equivalent of around 17.2% of kilometres driven before the adoption of car sharing.

This saving in terms of kilometres corresponds to a saving in fuel consumption of about 477,000 litres per year. Under consideration of the emissions from Genoese private vehicles, an annual reduction of 1,067 tons of CO₂ emissions has been achieved (2008 data).

Did you know that...



...Genoa's growth rate for the car sharing service is Italy's highest?





Van sharing

The survey also indicated that the adoption of the car sharing service has so far led to a reduction of 1,060 cars. In fact the study outcome is that, on average, each shared car substitutes 13 private cars (88 CS vehicles compared to 1,148 private cars).

The good results obtained are mainly attributable to a good distribution of the service over the entire city, to a good communication and promotion strategy, and to the set of policies adopted by the Municipality to limit the impact of private car circulation (such as parking pricing policies, limited traffic areas, etc.) and promote car sharing use.

Service indicators

The service indicators clearly show the impact of CS on the mobility habits of users. While the overall mileage of the whole CS fleet increases with the number of users and of cars, the mileage driven by each user and the frequency of use of CS is decreasing. This means that a progressively increasing share of the mobility of CS users is shifted towards other modes, away from the car and mainly towards public transport.

The increase in number of lower energy consumption vehicles has led to a lower average consumption by the car sharing fleet. For example, a saving of 0,58 MJ/km per car circulating in the urban area has been achieved.

Assessment

Users are very satisfied about the service: an average rating of 7,9 out of 10 was given during a special direct survey on customer satisfaction (June 2008).

The comparison of perceived costs and benefits shows a very positive evaluation by the users: 50% think benefits outweigh costs and 33% think that they are balanced, while only 13% perceive the service to be too expensive in relationship to the benefits.

From a user's point of view, advantages include savings on time and resources, as access to Limited Traffic Zones is permitted, public transport reserved lanes may be used, cars parked free of charge in the BLUAREA spaces, and generally special fares exist to use other city services (museums, theatres, etc.).

From the city's point of view, car sharing permits private and public transport systems to be integrated, traffic and parking better managed in the urban centre (because, as already explained, each car sharing vehicle replaces about 12 private cars) and reduces the polluting effects of vehicles (less kilometres travelled on average and technological compliance of vehicles with the most advanced European anti-pollution standards).

In conclusion, the car sharing service in Genoa has an important role in creating an integrated urban transport system (the yearly subscription for the service is combined with the annual public transport ticket); car sharing has become an integral part of the City's mission to develop a more sustainable range of public transport facilities.



Mobi – the sustainable mobility laboratory

Further Steps taken by Genoa

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Intermodal infomobility platform

While some mainly conventional services existed in the City of Genoa to provide traffic and travel information prior to the implementation of the Infomobility Platform (Have a quick look at www.mobilitypoint.it), these were not integrated and dealt solely with problems of traffic congestion. Thanks to CARAVEL, Genoa now has an effective online tool (web 2.0) that is also available in a mobile version for PDA and mobile phone users. The platform is a very comprehensive instrument that permits real time confirmation of mobility and transport information in Genoa. It therefore provides information on public transport (including trains and taxis), car sharing, parking space availability and conditions on the road networks with dynamic traffic information on main routes, and even checks dedicated webcams. Extra “information pages” have been published when special events take place (e.g., the Nautical Trade Fair), and these attract around 1,000 hits per day.

Ecopoints

Beside good quality services and comfortable public transport, communication with users must take place in a modern and appropriate way and must address the psychological and economic aspects of PT. The new fare policy and mobility marketing plan therefore makes use of loyalty schemes and “micro marketing strategies”. The Ecopoints Programme is a customer loyalty programme that offers rewards for using PT. The basic idea is that people using PT or other mobility services (e.g. car sharing) instead of their private car can receive rewards (such as a free annual ticket). In fact, the number of loyal public transport customers (with annual tickets) increased by around +36% thanks to relevant marketing campaigns at the end of 2007. The analysis of data for annual ticket holders revealed that approximately 2,800 households hold at least two annual tickets. These households were then targeted by the Ecopoints Programme.

Ecopoints wallpaper



Zero emissions
trolley bus



Traffic and environmental impact assessment

The main objective was to produce an integrated set of tools based on simulation packages and models for the purpose of evaluating the environmental impact of traffic planning measures. These enable decision makers to select ideal solutions for reducing traffic congestion and alleviating the impact on citizens' health. The activities comprised a comprehensive examination of all aspects concerned with the integration of traffic and environmental data, such as outlining general methodologies to define appropriate parameters (e.g. vehicle fleet composition) and developing the interfaces between the diverse traffic, pollutant emission and pollutant diffusion models.

Monitoring of road safety

A Monitoring Centre has been created, providing an innovative system for analysing road accidents with a method which synthesises scientific indicators. This makes it possible to plan and pre-evaluate interventions and strategies to reduce risk. The data collection methods were improved and computerised: it is now possible for agent patrols to enter data directly on site in digital format. Last but not least, the database has been interfaced with the GIS system of the Municipal Territorial Information Office, so that incident data may now be presented on thematic maps. The result is an open, interconnected system that has developed into a comprehensive multi-source data warehouse system for road safety in Genoa.

Clean fleet, clean air

The objective of the measure was to implement a transition strategy towards a more eco-compatible fleet (and clean public transport services). It simultaneously promoted the use of a multimodal public transport system as an ecologically favourable alternative that would reduce private traffic, pollution and congestion in the city and the surrounding area. The carefully developed strategy includes replacing the bus fleet with Euro IV and Enhanced Environmentally Friendly Vehicle (EEV) buses, installing particulate filters and expanding the use of Zero Emission Vehicles (ZEV) such as trolley buses and metro trains. In total 104 new clean vehicles have been purchased within the CARAVEL framework and have ultimately contributed to the creation of a clean fleet in Genoa.



High mobility corridor

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Clean high mobility corridors and bus lane control

This measure was primarily designed to increase the quality, accessibility and attractiveness of public transport (PT) by introducing a Clean High Mobility Corridor Network throughout the entire city. Greater bus reliability, increased average speed and high quality information improve services for PT customers and contribute to sustainable mobility and reductions in pollution. Reserved lanes with bus prioritisation, real time information at bus stops combined with improved access and road management have transformed the existing PT situation into fully integrated, quality bus corridors.

The problem of unauthorised use of bus lanes by private cars has been addressed by a specific bus lane control system. Two monitoring devices have been installed as have relevant warning signs. The system ensures that bus lanes are monitored and administers fines for illegal use. This results in increased bus lane efficiency in terms of bus speed and reliability. In addition, a public information campaign was launched in which mail was directly targeted at specific groups of drivers. More than 50,000 fines were imposed in 2007 for illegal journeys on bus lanes, identified by the two fixed gates in operation; illegal use of bus lanes decreased by 71% during 2007

New information at bus stops



The chief outcomes include the creation of 5 km of new mobility corridor, real time passenger information at over 100 stops (including 56 new smart devices for real time information), and an upgrading of the AVM (Automatic Vehicle Monitoring) system in 131 vehicles.



Infomobility bus

Mobility Forum

Ever increasing traffic congestion compelled public administrations to devise and experiment with new mobility control methodologies aimed at reducing pollution and improving air quality. In view of the fact that their intended effects are to restrict and/or deter private traffic, these measures are frequently unpopular among citizens who are insufficiently aware of public transport alternatives and the strong environmental impact of their traditional mobility behaviours. The Mobility Forum in Genoa has all the resources required to plan, organise and promote new measures and innovative transport behaviours. The Forum, which is situated in the Palazzo Ducale, is open to all citizens. The Mobility Forum has also set up a mobile service using the CARAVEL Infomobility Bus; this acts as a promotional tool in the different city areas where the CIVITAS measures are implemented.

Mobility strategies for trade fairs

This measure was designed to extend mobility management activities to specific target groups such as tourists and visitors, and to help them make more sustainable travel choices. A further aspect was to apply a comprehensive mobility plan to the Genoa exhibition area to make it more accessible, cause fewer problems for citizens and reduce its traffic impact. For this reason a mobility plan was established for significant temporary events and tests were carried out on the other new services to be implemented. The project focused mainly on parking management, traffic flow and circulation schemes, ticket integration, pedestrian routes, public transport and integrated information; together these contributed to improved accessibility of the area, as confirmed by more than 40% of visitors.

Hospital Mobility Plan

The San Martino Hospital is one of the biggest in Italy, providing some 4,500 jobs. It is located along one of the main streets that connects the eastern part of the city to the centre and experiences critical morning peak hour traffic flows. The general objectives of the measure were to improve accessibility to the hospital zone and the general mobility behaviour of employees and visitors alike. With these aims in mind a General Mobility Plan (GMP) and a Home Work Trip Plan (HWTP) were drawn up for employees, providing for a number of different and integrated measures. These include a car pooling system for the employees, special connections from critical points in the city to the hospital, the extension of the public transport system inside the hospital zone, an info-mobility platform and the use of non-pollutant vehicles for movements within the hospital zone.



Krakow

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Located in southern Poland and with ca. 760,000 inhabitants, Krakow is one of the largest cities in the country. Its unique historical, cultural and scientific character still dominates the city's economic and tourism development. Krakow is listed as a UNESCO World Heritage site and was the Cultural Capital of Europe in 2000. It welcomes around 8 million tourists each year and the Jagiellonian University, with some 140,000 students, is one of the oldest universities in Central and Eastern Europe.

For several years the focus of rigorous industrial restructuring has been to reduce the environmental footprint, to stimulate the transition towards innovative and more efficient technologies and to decrease production costs. The development strategy operated by the city sets out to reinforce Krakow's metropolitan functions as a European centre for culture, the arts, science, tourism, services and modern industry as well as to continue to improve the quality of life for its residents.



Despite growing car ownership, Krakow still demonstrates a very positive modal split with approx. 60% of journeys being made by public transport (trams and buses). However, city growth, increasing vehicle numbers, the desire for greater mobility and years of neglecting road maintenance have made road infrastructure and public transport the most challenging policy areas in Krakow. The city centre has already introduced a limited traffic zone and restricted areas for pedestrians and cyclists. Approximately 18,000 parking spaces, mainly on streets and pavements, make life difficult for pedestrians and cyclists alike. Parking on these spaces costs around 1 €/h, while commercial off-street parking costs 2.30 €/h. There are plans to extend the restricted traffic and parking zones and introduce underground car parks to give pedestrians more room.

The public transport operator MPK (Miejskie Przedsiębiorstwo Komunikacyjne SA w Krakowie) owns 493 city buses (most of

which are modern, low-floor buses whose engines satisfy the highest European emissions standards) and 424 trams which serve 153 lines in total. These carry around 350 million passengers each year. About 50% of the 84 km tramway network is separated from road traffic.

The city's transport policy, updated in July 2007, aims to create an efficient, safe, economical and environmentally friendly transport system for passengers and goods. It acts as a framework for a comprehensive master plan which encompasses the transport concept, project management and considerable investment in road and PT infrastructure. Key priorities for this policy are bus lanes, tramway tracks, efficient traffic control ensuring priority for and punctuality of public transport and access restrictions to the old city centre. The CARAVEL project has made considerable contributions to the achievement of these objectives and has undertaken the task of working towards sustainable, clean and better transport.



The City of Krakow's entry to the CIVITAS Initiative and the CARAVEL Project in 2005 enabled us to test a number of tools of sustainable urban development within the context of a modern transport policy. Krakow was the first city in Poland to adopt a policy of this nature in 1993, and implemented a series of programs and measures that referred to the use of space and the availability for different transport modes: pedestrian zones and zones with limited access for cars have been introduced and the infrastructure and public transport fleets have been modernised.

The realisation of the CARAVEL project in Krakow therefore represented a logical continuation of our own transport policy. Ambitious targets were outlined and a large number of technological and organizational measures implemented, moving towards sustainable urban transport. The Tele-bus service, the city's own bicycle renting scheme, marketing campaigns and educational activities in particular were very successful. All these measures encouraged a change in the behaviour of the population towards a greater use of public transport, walking and cycling. The Technical University of Krakow developed the country's first professional Mobility Plan.

As a result of the very broad range of activities covering all CIVITAS policy fields, we were able to reduce congestion, improve public transport and promote alternative transport modes, such as bicycles and walking. Most of the measures will be continued or even extended after the formal completion of the project (e.g. the integration of tickets and fares between urban public transport and rail transport). Where measures have not been fully implemented according to plan, their realisation is only a matter of time as they are key elements of the city's mobility policy.

Krakow continues to be fully involved in and committed to the CIVITAS Initiative through participation in the CATALIST Project and the organisation of the next CIVITAS Forum in 2009.

Prof. Wiesław Starowicz
Deputy Mayor of Krakow



Tele-Bus stop



Krakow’s Urban Transport Policy for the 21st Century

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Demand Responsive Transport Services

The Tele-Bus is an on-demand “many to many” public transport (PT) service with fixed stop points but flexible routes and timetables which operates every day in the south-eastern area of the city and during defined operating hours. The service is available in three districts with low-density residential and industrial areas where a conventional PT service is inappropriate.

The Tele-Bus service was launched in summer 2007 after several months of preparation and close co-operation between the CARAVEL project partners Genoa (Italy) and Krakow. The inhabitants of Krakow were given the possibility to use an innovative demand responsive transport (DRT) service: the Tele-Bus. This joint initiative of Polish and Italian partners is a pioneering DRT solution in Poland and an example of technology and know-how transfer in public transport on a trans-national scale.

The main objectives of launching this service were as follows:

- » to better attune PT to the needs of the citizens
- » to provide the link to those bus

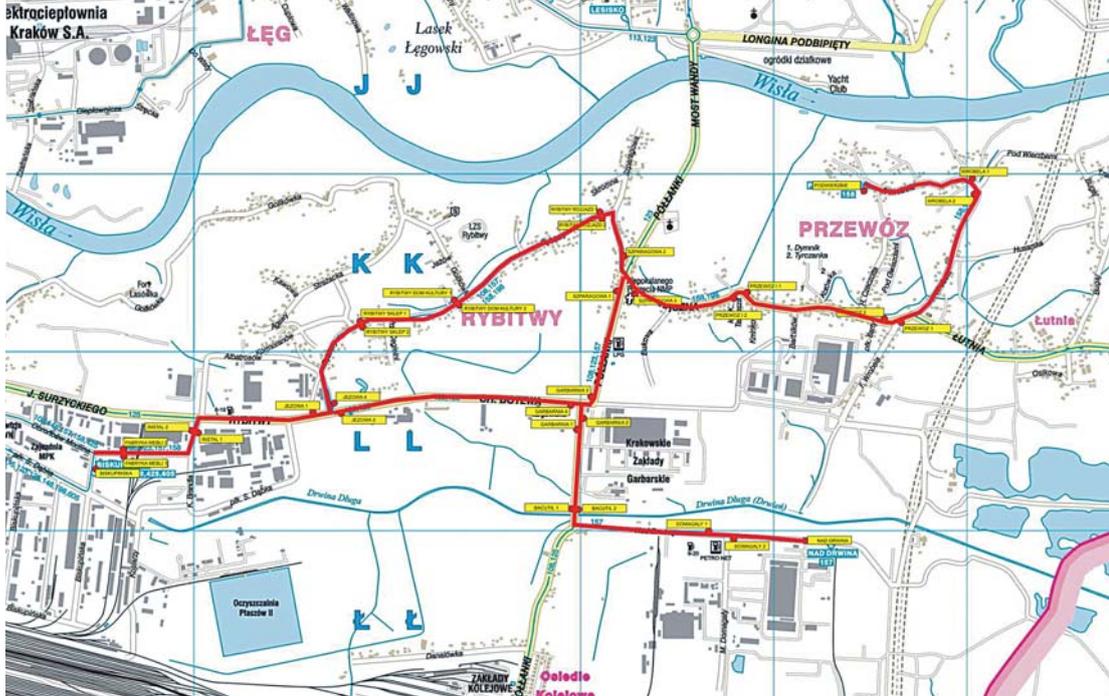
lines running to the city centre

- » to manage the PT fleet in a more effective manner
- » to extend the existing PT system within the framework of current pricing and service regulations
- » and finally to increase the number of PT users.

Operation

Dedicated to DRT only, the daily service operation is managed by the transport dispatch centre (TDC) which belongs to the Tele-Bus operator – Miejskie Przedsiębiorstwo Komunikacyjne SA MPK (Public Transport Operator in Krakow). Customers book the service via TDC using a special free phone number. The online booking must be made at least 30 minutes before the planned start of the trip.

The Tele-Bus visualisation concept is based on a special corporate identification system applicable to all elements of the service, i.e. vehicles, bus stops, and customer information material. Corporate blue and green colours of the Tele-Bus distinguish the flexible service from conventional PT.



The road plan of the Tele-Bus

Technology and know-how transfer

The Tele-Bus service is a result of a successful transfer of technology and know-how between two European cities. It is based on the DRINBUS on-demand PT service in Genoa. Krakow has adapted this model to the City's local needs and requirements, and has implemented PERSONALBUS software to manage the flexible transport services developed by the CARAVEL project partner "Softeco Sismat" from Genoa. Polish staff responsible for the Tele-Bus introduction were supported by Italian colleagues at virtually every stage of the service implementation process: from choosing the Tele-Bus area and developing the service operation design, through the software adaptation and training of staff, to the preparation of the marketing campaign targeted at potential customers. This is a successful example of trans-national co-operation.

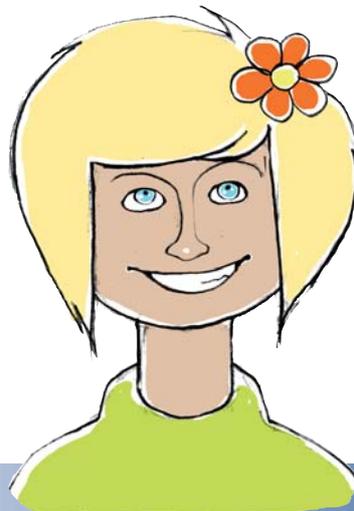
Future plans

The new DRT service launched in Krakow developed gradually during its first year, starting with 300 customers per month in the first quarter, exceeding 2000 passengers served in January 2008 and finally reaching a stable monthly average of 1900 Tele-Bus users. The people in the Tele-Bus operation area were sceptical about the idea of a flexible PT service before it was introduced, but eventually accepted this innovative solution and now cannot imagine PT without the Tele-Bus. What is more, they actively participate in the further development of the service by making sugges-

tions about the extension of the service network. In the very near future it is planned to extend the Tele-Bus availability areas and the existing network to meet customer demand.

This successful project has been watched by other Polish cities, and some of them are giving consideration to the Tele-Bus flexible lines as an alternative to the conventional service in new areas not yet covered by PT. This means that there is a real chance for the further development of DRT services in Poland.

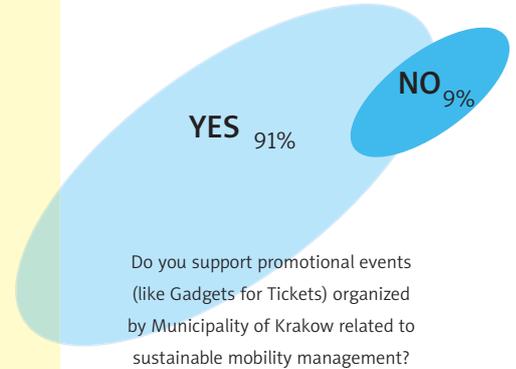
Did you know that...



...in summer 2008 Krakow ran a successful transfer workshop for other Polish cities dealing in particular with the Tele-Bus?



The easiest way for me to travel was always using my car. It's flexible, quick and keeps me independent. But I also have to confess that I didn't know much about public transport and all the different easy and reliable options it offers.



Sustainable Mobility Marketing

As many other cities in Central and Eastern Europe, Krakow still has a remarkable modal split since most trips are made by public transport. However, the trend towards more private car use is becoming evident. One of the actions designed to counter this trend was the modernisation of the fleet of MPK, the public transport operator, and the improvement of the services it provides to the citizens, such as integrated tickets and demand responsive transport to serve less sparsely populated districts.

It is one thing to improve infrastructure and services; it is another to communicate it. The city of Krakow therefore developed and implemented an integrated and comprehensive marketing scheme for sustainable urban mobility. The overall goal of the scheme was to establish a "new mobility culture". Involving the citizens and businesses in discussions and developments about public transport heightens their awareness about sustainable and alternative transport modes. As soon they recognize that these transport modes meet their individual and organisational mobil-

ity needs, they will be ready to change their behaviours, and this in turn will improve the quality of life in the entire city. The marketing activities addressed the car owners, passengers of public transport, cyclers, shopkeepers and pedestrians. Special focus was placed on young people in view of their importance for the future.

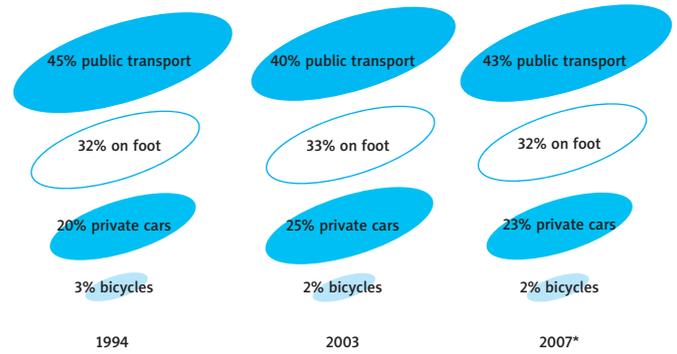
Seminars for schools and universities

Fifteen seminars were organised in elementary and secondary schools as well as in universities. The idea was to encourage young people to discuss transport-related issues. Each seminar was composed of three stages

Firstly, the mobility-related issues to be found in any big city were presented. Examples of good practice, modern vehicles and intelligent infrastructures illustrating potential solution paths were also discussed. The presentations in the seminars were adjusted to the stage of life and interests of the participants for maximum interest.



Modal Split in Krakow



Source: Traffic models for Krakow for the years 2015 to 2025, ALTRANS - Pracownia Planowania i Projektowania Systemow Transportu, Krakow - December 2007; Comprehensive Traffic Studies for Krakow for the years 1975, 1985, 1994 and 2003. * estimate on the basis of extrapolation

Secondly, in a moderated discussion, the young people put forward their positions, shared their remarks and developed their own solutions.

Finally, the seminars were concluded with a competition in which the pupils and the students answered a series of questions related to the initial presentations. The winners were given prizes in the form of gadget sets such as T-shirts, watches, sport bags, alarm clocks, flashlights and small school accessories.

“Gadgets for tickets” loyalty programme

Loyalty programmes already have a long tradition in transport, but not in public transport. Krakow therefore launched the first loyalty programme for public transport in Poland: the exchange of validated public transport tickets in return for a prize in accordance with a set “price list”. The prizes included watches, mobile radios, flashlights, sports bags and backpacks, T-shirts and many small keepsakes. All prizes were labelled with the CARAVEL logo.

The action was widely promoted, for example, by advertising posters at bus stops, leaflets distributed at kiosks, spots on the LCD screens in the city buses and press releases for newspapers and radio stations. Detailed information was also provided on the official website. The programme was very successful. Individual participants, schools and entire companies were engaged in collecting tickets. More than 1,000 persons were given prizes during the three month term of the programme.

Following on from this, a children’s competition was organised. The first one hundred persons (parents or children themselves) sending an email to a given address could receive children’s T-shirts - of course, in exchange for a set number of validated tickets.

There are two important issues as far as these campaigns are concerned. The first refers to the acceptance level among the population. In view of the questionnaires conducted during the course of the programme and after its completion it became clear

that citizens are highly supportive of activities of this nature. The second question is related to the effects of the campaigns. Will the people who participated actually give thought to their everyday travel choices? Are such events just fun and entertaining for the citizens or are they actually able to change transport-related behaviours? One objective of the project was most certainly achieved: we brought the attention of the population to the subject of public transport not only in terms of punctuality but also with respect to the standard of the services offered. People

It’s important to involve pupils like me since we are the potential car users of the future!





Children competing in drawing mobility-related pictures during EMW 2007



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accepted the loyalty programme and there was great interest about whether the programme will be continued.

Competitions addressing public transport

Events or happenings that attract a great many people are also suitable to bring “public transport” into the limelight. A competition was organised during the Recycling Festival with the aim of finding slogans to promote public transport. Several interesting entries were made and the winner was: “Give your car a holiday too: change to public transport”.

During the European Mobility Week primary school children were asked to send in their work on the subject of “Travelling by public transport, bus or foot instead of using a private vehicle”. Several hundred entries were sent in. The winning school was given sound equipment.

Professionals were also invited to design posters promoting environmentally friendly transport. Concepts and design proposals from artwork special-

ists and amateurs were reviewed by a competition jury which approved the work of three candidates. The winners were given a network city transport ticket valid for 6 months.

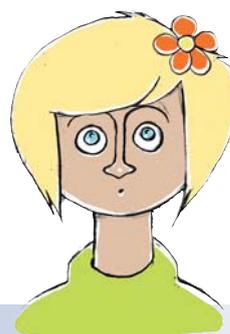
As a result...

it has been established that infrastructure and service improvements go hand in hand with the marketing and the dissemination of information on the issues, the impacts and the solutions for a sustainable urban mobility. It has been shown that the inhabitants are very interested in sustainable urban mobility. This is an incentive to implement comprehensive mobility programmes as well as dedicated activities that are focused on reducing private vehicle traffic within the city. The high motivation of the very young to discuss mobility issues and to give thought to a better world with less pollution indicates that the number of persons who are aware of the impacts and opportunities associated with transport

will increase. In the long-term perspective, the modal shift towards public transport will ensure that the negative aspects of traffic jams on Krakow’s roads will be reduced. Mobility-related events are easily transferable to other cities and regions because the activities can easily be replicated. A prerequisite of success is close cooperation between the public transport operator(s) involved, the city municipalities, schools and universities. The contribution made by key players and their commitment to sustainable mobility targets is of crucial importance.

Did you know that...

...the winner slogan of their public competition was “Give your car a holiday too: change to public transport?”





Did you know that...

...you can plan your trips in Krakow with an online planner and you also may ask the mobility consultant?



Before CARAVEL the overall traffic situation at the University was horrible – not to mention the daily battle to find a parking space. The creation of the Mobility Plan turned out to be much more useful than I initially thought. now I share my car thanks to the Internet-based car pooling system, which is sometimes a real help.



Integrated Mobility Plan for the Technical University

The Krakow University of Technology (PK) is affected by the increasing number of cars in the city: ever more employees and students use private cars to get to the campus sites and to travel between the campus sites which are distributed across the city. Alternative modes of transport are considered less up-market, are not as secure or simply do not exist. The parking situation will become even more critical when the building of a new library further reduces the number of parking places.

This was the point when the PK authorities decided to do something to improve the intolerable situation. They asked the Institute of Road and Railway Engineering to come up with easy yet efficient solutions. Thus the idea of an integrated mobility plan for Krakow University of Technology was born.

Firstly, an analysis was carried out on the present transport situation at the University. This produced a list of targets and proposed a series of schemes and solutions to reduce car

journeys and promote ecologically friendly transport among employees and students. The mobility plan identified the following ambitious objectives:

- » to change the behaviour of employees and students in favour of sustainable modes of transport;
- » to reduce the space required for car parking at University campuses;
- » to reduce traffic congestion in the vicinity of the Warszawska St campus.

Various activities have been implemented. Their aim is to raise the general awareness of sustainable modes of mobility such as cycling, public transport and walking as well as promote alternative modes of car use. The activities were also intended to create good conditions for those using ecologically friendly means of transport.

All in all, the following seven elements of the mobility plan have been achieved:

1. Travel behaviour and travel opportunities

2,000 students and employees responded to a questionnaire on their travel and mobility patterns. The project team also analysed the car and cycle parking spaces as well as the bus and tram lines serving the University (timetables, frequency).

2. New transport connections between the University campuses

According to the concept improved public transport connections between the University campuses, the route of one of the two chosen bus services operating between the Student Village and Warszawska St. Campus will be changed, resulting in shorter operation times. Moreover the terminus will move onto the Czynny campus so that students and employees travelling between the Student village, Czynny Campus and Warszawska St. Campus can complete their journey using just one bus. Alongside this, a new tram line has started operating between the main two campus sites.



One of the new bike parking lots at the University

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3. Design of concept for cycle paths between University campuses

Based on employees and student suggestions, a concept has been prepared to provide cycle paths between University campuses. It contains two alternative approaches: (i) a provisional solution which involves merely changes to traffic organisation on a number of streets and (ii) a complete solution that also involves construction work on roads. The Krakow Road and Transport Authority has decided to implement the provisional solution.

4. New information website concerning sustainable transport modes

A new website “Info.Komunikacja” (www.info-komunikacja.one.pl) has been set up to provide information on and arguments in favour of more sustainable mobility. The website includes useful data for those travelling around Krakow using different modes of transport. It also contains a travel planner, which enables journeys by public transport or car to be precisely planned. The user keys

in the means of transport, starting location and destination, and a route map with travel times is then printed. Over 1300 people had visited the website by the end of November 2008.

5. Personal support: mobility consultant, training, events

The analysis of the interviews revealed that employees and students are prepared to modify their travel behaviour. However, it emerged during intensive discussions with them that to do this they need greater support. This is now provided at the special Mobility Consultant Point, where a mobility consultant informs employees and students about alternative modes of transport and options, mobility impacts, future transport development plans etc.

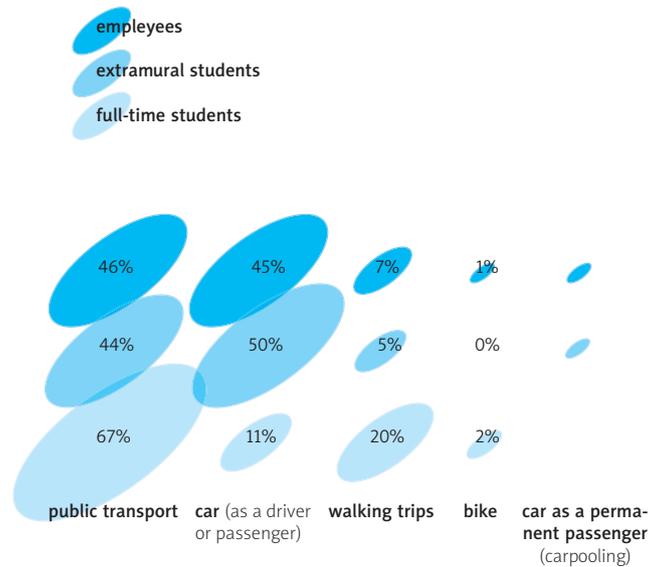
In addition, dedicated training courses and marketing campaigns designed for maximum impact have been organised. The most successful of these was “The Days of Transport” when students (not only from PK but also from other technical universities in Poland) and employees were able to

familiarise themselves with the measures implemented in Krakow and in other CIVITAS cities.

First year students are given a brochure containing relevant information on Krakow’s public transport services (ticket prices, Krakow’s City Card, etc.), and addressing the issue of sustainable mobility. The slogan of the brochure is: “Let’s get top marks, let’s travel by tram and bus”. Since most PK students come from other towns and cities, the brochure provides excellent and comprehensive information on how to travel by PT in Krakow. This includes information on night travel, which is a very important factor for young people.

Motivated by the promise of gadgets and prizes, many students responded to the Book of Cyclists questionnaire on their current bicycle use. 250 students and 20 employees signed the University Cyclist Declaration, which sets out the rights and duties of cyclists. Students were also given an opportunity to ask for a cycle check at free bike maintenance points, and the police marked bicycles to reduce theft.

Mobility consultant office



Modal split of Krakow in trips to and from Krakow University of Technology (in 2006, before mobility plan activities implementation).

The car pooling concept for employees and students of the Krakow University of Technology was introduced through a competition which involved getting the maximum number of people into a car. The record here was 27 students in one car! Since then, Krakow's car pooling scheme goes under the logo "Let's drive together". The objective is to reduce the number of car journeys. The system has made it possible to increase the occupancy rate in private cars. To achieve this, a new Internet-based data information service on free car spaces had to be introduced. A car pooling database has been set up at the University, and there are plans to extend it to all residents via the local authority's new main mobility information website. The introduction of this measure demonstrates the effects possible even with relatively low investment costs: several hundred users have registered and some now travel together using this more environmentally friendly mode of transport.

6. Car parking policy

As part of the new parking policy at Krakow University of Technology, parking charges at PK campuses were doubled in 2007. A questionnaire conducted in October 2008 following the increased charges showed that 5% of employees and 9% of extramural students declared that they intend their travel behaviour in favour of more sustainable modes of mobility.

7. New bike policy

As a result of the analysis of the cycling situation, 23 new cycle racks have been newly installed. This represents an increase in cycle parking spaces from 60 to 180. Also the barriers on entry gates have been shortened to make life easier for cyclists. Information boards have been installed with maps showing the location of University buildings, cycle racks and the office of the mobility consultant.

Results

The Technical University of Krakow is the first institution in Poland to implement a mobility plan and create a post for a mobility consultant. Moreover,

thanks to mobility plan activities, the occupancy rates in cars travelling to PK campuses have increased - by 4% in the case of employees and 20% in the case of extramural students. This is a significant achievement, which has come about through a change from car journeys with a driver only to carpoled journeys. The share of car pooling trips has increased by 4% in the case of employees, by 7% for full-time students and by 16% in the case of extramural students. Car pooling has therefore become a very popular means of travel for the University community. The level of acceptance for car pooling is as follows: 79% for employees, 93% for full-time students and 93% for extramural students (among respondents who have heard about the system). There has, however, been a simultaneous reduction in the percentage of PT travel to University campuses: this is 4% for employees and 2% for full-time students. It can be explained by increases in car ownership and an informal car park near the PK campus at Warszawska St. where it is possible to park free of charge.

CNG bus at modernised crossroad in Krakow



Other Elements of the Policy

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Improving Public Transport (PT)

In order to maintain the public’s positive perception of the current public transport services and retain the modal split in Krakow, new vehicles with alternative fuels (e.g. CNG buses) and buses meeting European emissions standards have been introduced. In addition, plans for further interventions have focused on selected municipal bus and tram corridors (mainly in the city centre): new combined bus/tram stops have been erected, oral and visual information has been installed in trams and buses, real time information is now provided at selected bus/tram stops, and public transport has been granted greater priority in city traffic. All of this has led to significant improvements in PT

quality. The interventions have helped improve the image of Krakow’s public transport network as safe, economically efficient and environmentally friendly. “Clean high mobility” is an apt way to describe this means of transport. As safety and security are also crucial factors in transport systems and for the behaviour of citizens, a specific integrated public transport security concept has been developed in Krakow. The security audit initially focused on tram stops on the 1st ring road, where travellers have to disembark on the road. An in-depth analysis of accidents and interviews with users revealed that more user-friendly bus and trams stops must be installed in the city centre over the lifetime of the project.

CNG bus





Bike transportation facilities

New leisure-related mobility services

This measure installed innovative bicycle carrying facilities on 15 buses in order to encourage the combined use of PT and private bicycles. The new service has enabled people to access cycling routes in recreation areas, including those near Krakow. There has been widespread distribution of maps and route information, and bus drivers have received training in installing the equipment and supporting passengers using it. As a result of this innovative seasonal offer, which is available from April to October, cyclists attracted by it now represent a new group of customers for PT in Krakow.

Car sharing: an option for Krakow?

As is the case in all places, there are some people whose mobility needs are not (sufficiently) met by public transport. They therefore choose to use their own private cars. In such cases car sharing may be viewed as an alternative and complementary means of transport. As no car sharing system had yet been put in place in Krakow, a feasibility study was conducted which looked at the lessons learned by other European cities as well as the results of the car pooling system developed by the Technical University of Krakow. The study comprised an analysis of socio-economic and political conditions for setting-up a car sharing system, an analysis of target groups and user requirements, an appropriate marketing strategy, a detailed analysis of potential locations of car sharing vehicles and a business and organisational plan for a possible car sharing operation. The study has recommended that a car sharing system be developed and implemented in coming years as a real new mode of transport for Krakow.

New goods distribution scheme

Goods distribution caused considerable disruption to the pedestrian and restricted area of Krakow's historical city centre. In order to improve the situation for pedestrians, especially in the main market square, a new goods distribution scheme has been developed which utilises clean and more environmentally friendly vehicles. As a first step, the time window for access was curtailed from 7 p.m. – 10 a.m. to 9.30 a.m.; this reduces noise and air pollution and makes the historic city centre more attractive for tourists and residents. Additionally, a feasibility study was conducted on a goods distribution system, applying the experiences in Genoa of using a mobility points scheme. The scheme has initially been implemented on the Main Square area. As a result it has been possible to achieve greater regulation of access to the inner city area by commercial vehicles.



New comfortable and safer bus/tram stop in clean high mobility corridor

Krakow students felt in love with common travels



Car pooling system

The objective behind this measure was the implementation of a car pooling scheme for employees and students of the Krakow University of Technology to reduce the number of car journeys. Thanks to this system it has been possible to increase the occupancy rate in private cars. Its introduction necessitated a new Internet service providing information on car parking availability. A car pooling database has been implemented at the University and it is planned to make it available to all residents via the city authority's principal new mobility information website. The experience of implementing this measure has demonstrated that, even with relatively little investment, several hundred users have registered and some are now travelling together and making use of this environmentally friendly mode of transport.

First integrated ticket and tariff

In order to start seamless and intermodal connections in Krakow through the use of common tickets and tariffs, something that has not previously been available, an integrated ticketing solution has been tested for the national railway and local public transport. Krakow has also examined various solutions already operated in Polish urban agglomerations. The first test focused on one corridor from Krzeszowice to Krakow. Motivated by the high acceptance rate after a short first trial (the integrated ticket reached a 10% market share), a new agreement has been signed to widen the system to a number of different corridors. This trial has now become a fully commercial service, and all organisations involved in it, including the national railway, local public transport operator and the Krakow local authorities, are extremely confident about this successful partnership and historic cooperation.



The BikeOne
bicycle

First public bicycle (renting) service in Poland

Cycling is gaining importance as an alternative means of urban transport. However, it can also be considered as complementary to public transport. For this reason a bicycle renting system has been established with cycle racks installed near bus/tram stops. This integrated multi-modal approach promotes the combined use of different modes of transport, especially within the historical city centre. The Bike-One system started with 100 city-owned bicycles and 12 renting stations. The system is available to everyone with Internet access (only for initial registration and pre-payment). Despite the fact that the system only started in autumn 2008, several hundred users have already registered and started using the public bicycles for their trips. These “early users” made suggestions for improvements to the system which will be introduced in spring 2009. There are already plans to extend the system so it becomes a real alternative means of public transport in Krakow.

Mobility and the Information and Involvement of the public

A Mobility Forum has been established in Krakow as a platform for discussing solutions to specific problems concerning the city’s transport system. This approach improves communication with and the involvement of the public and important stakeholders in the decision-making process of urban transport planning activities. The Forum includes the following groups: city authority departments, public transport companies, associations of public transport passengers and bicycle users, district councillors, shopkeepers’ associations, and NGOs. It takes place every two months and the outcomes of each meeting are published. Thanks to the Forum, wide discussions on

many mobility-related subjects have begun, and significant changes have taken place; these include changes to the organisation of night public transport and instigating cooperation with local businesses in terms of mobility plans and mobility education for their personnel.

A dedicated Internet site providing information on the services of the public transport company (bus and tram stops, timetables, interchanges etc.) represents an additional channel of communication with the public. In order to increase the public’s awareness, environmental impacts and the costs of public transport and car travel are highlighted; webcams also display the current traffic situation. Today it is possible to reach ever more (Internet) users with extensive information on local mobility issues.



Priority system for public transport

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Transition to clean vehicle fleets

A major problem in Krakow is air pollution caused by cars. There are several cultural monuments in the area served by public transport (PT), and these are protected by national law. The main goals of the transition were to directly and indirectly reduce the environmental impact of PT and test new clean bus technologies to discover the best solution for larger-scale introduction in the future. 2008 saw the completion of the process to withdraw old buses which have gradually been substituted by clean vehicles that

satisfy EURO standards. Moreover, a one-year operation tests carried out on 5 brand new CNG buses in real operational conditions provided valuable technical and economic information on the performance of this kind of bus fleet. Based on these data as well as on the results of short test drives using hybrid and ethanol-powered vehicles, the decision was finally made to introduce EURO V diesel cars (starting with 35 vehicles in 2008); this proved to be the optimal solution from an operational and financial point of view. One consequence of modernising the bus fleet has been to reduce noise and energy consumption. The tram fleet has also been modernised with the purchase of low floor trams that are equipped with an innovative recuperation system.

Public transport priority system

In view of increasing traffic it is important to expand the priority facilities afforded to public transport (e.g. separate lanes for buses and trams, priority at junctions etc.), especially in the city centre. New solutions aimed at improving passenger comfort and overall service quality are needed if public transport is to compete with private car use which continues to grow. The principal achievement of the measure has been to create a high quality, passenger-friendly public transport system. The measurements recorded prove that the solutions implemented produce positive effects for passengers and citizens in both transport corridors (tram-bus and bus). These are shorter intervals between services, greater speeds and more reliable operating times. As a result, journey times have been reduced and passenger numbers are up. Shared tram-bus and bus lanes can be implemented in additional transport corridors in Krakow and in other cities.



Integrated access control and enforcement strategy

Krakow was one of the first cities in the country to implement severe access restrictions in inner-city areas (A, B and C zones). Put plainly, greater restrictions on the access of private cars to certain areas and streets improve conditions for public transport, pedestrians and cyclists. As part of CARAVEL, Krakow has therefore developed a new access regime for its B Zone. The main advantage of this concept is that it has already existed for many years and is therefore familiar to residents. A new parking management scheme has been linked to access restriction; this has eliminated parking places in inner-city streets and other public places. Acceptance surveys have produced clear indications that residents and shopkeepers are unenthusiastic about further restrictions if no modern parking facilities are put in place. Due to delays in the development of new underground car parks, it has not yet been possible to

finally implement the new access restrictions as planned; this will now take place in line with the completion of new underground parking.

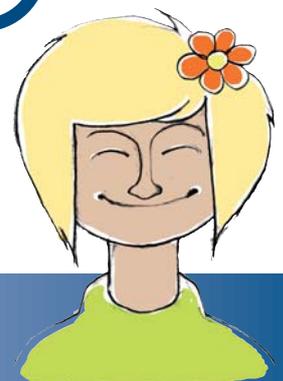
Long-term observations have shown that on-street enforcement by city guards and police officers is not sufficient to prevent car users illegally entering restricted access zones. An electronic access control system has therefore been installed at one important city gate. It has cameras to recognise number plates and the driver's face and an ITS application able to recognise illegal access and to automatically issue the appropriate fines. This led to a fall in the number of illegal journeys into the zone while transit trips likewise fell by several percent, helping to reduce the unwanted car traffic in the historic city centre. A feasibility study has been developed to consider extending the system based on these encouraging results.

Road safety and accident prevention

Data collection on road accidents and incidents and use of data affect our safety and reduce the number of accidents. In Krakow good cooperation exists between different stakeholders, resulting in good quality data being obtained. Year for year a special report is prepared on road safety, emphasising situations and conditions requiring improvement. New police resources such as mobile palmtops and laptops, and new software for collating data have helped improve this process and also overall road accident safety factors. Krakow has set up a Monitoring Centre for Road Safety and Accident Prevention and developed methodologies for data collection, analysis and representation.



Sometimes car drivers are too reckless. A Security Action Plan was long overdue!





Stuttgart

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Stuttgart is the capital of Baden-Wuerttemberg and centre of one of the most important economic areas in Germany. With around 592,000 inhabitants, the city forms the “Stuttgart Region” conurbation totalling 2.6 million inhabitants and 1.3 million employed persons. The Stuttgart Region has 179 municipalities and covers an approximate area of 3,654 km² with a population density of 720 inhabitants/km². The strongest region in Europe in terms of exports is founded on automotive and mechanical engineering. Companies such as Daimler and Porsche have a world-wide reputation. Stuttgart has two universities, 19 technical colleges and numerous highly ranked research institutes.

In view of the fact that Stuttgart is situated in the centre of one of the most dense conurbations of Germany, it is well acquainted with all the problems resulting from the high mobility demands of its citizens, but also with solution approaches for urban mobility that are aimed at decoupling economic growth from traffic growth in order to increase the quality of life and reduce the environmental impact.

Some of the very important tasks of Stuttgart’s transport policy are aimed at supporting sustainable mobility, keeping traffic moving, and reducing the traffic-related impact on noise and air quality. Due to the specific location of Stuttgart and the corresponding road network, all tasks require enhanced solutions, as have been developed and implemented in part within the framework of the CARAVEL project.

While the day-to-day road traffic situation in Stuttgart is quite good, the road network carries the risk that small incidents on crucial parts of the network can lead to dramatic results. Some years ago, for example, a fire at one road section led to a complete collapse of traffic in the whole city. This vulnerability of the road network, which also affects both rail- and road-bound public transport, is one of the main concerns in Stuttgart transport planning.

Stuttgart is also faced with high levels of air and noise pollution at heavy traffic sites. Its geographical location in combination with specific weather conditions,

the densely built-up city centre and the high amount of pollutant road traffic lead to levels of several air-borne pollutants which are far above the national and European thresholds. However, Stuttgart has great experience in several types of access restrictions and within CARAVEL sought adapted and optimised solutions for the future.

Transport policy continues to be clearly committed to achieving very good accessibility as the prime factor in municipal and regional transport planning. Traffic and mobility management that is able to balance the needs of the travellers on the one hand and of the municipality on the other is therefore gaining increasing importance, as has been demonstrated in several ways as part of the CARAVEL initiative.



Large cities and metropolitan areas are growing and are increasingly becoming the motor and guarantor of economic development. Life is becoming faster and more individualistic. The movement of people and goods in cities is changing in line with these technological, economic and social developments. This is particularly noticeable in Stuttgart, the city of the first automobile. A city cannot function without mobility. In contrast to the philosophy of the sixties, town planning is no longer dominated by car mobility. While mobility demands must, of course, be met, these also need to be environmentally friendly and take social interests into account.

Sustainable action means that we consider all aspects of mobility, instead of focussing only on how to get from A to B as quickly and conveniently as possible. Mobility is only sustainable when it is protecting the environment and resources, and when people of all social classes and age groups can access and afford it. But on the other hand we also have to bear in mind the acknowledged need of an export-oriented economy for efficient transport systems. Environmental protection aims to avoid car journeys through integrated town and transport planning and also reduce the environmental impact of such journeys by traffic management, the introduction of low-emission vehicles and the promotion of non-motorised traffic.

The Stuttgart Transport Development Plan is an integral component of the Town Development

Plan. One of its core mission statements has been the consistent development of public transport and the setting-up of the integrated traffic management and control centre. Currently there are plans to provide a new parking management concept for Stuttgart West (the most densely populated residential area in Germany), optimise traffic flows in the main road network, promote both cycling and pedestrian traffic – after all, one third of all trips are by foot.

As part of the CiViTAS Initiative the CARAVEL project supported Stuttgart in developing and implementing measures and processes designed to alleviate diverse transport problems. In particular these concerned the development of integrated approaches applicable for a broad range of transport-related measures. At the same time there was an opportunity to exchange experiences and promote ideas beyond national borders. This is important for Stuttgart, as can be seen from the URB-AL international network developed to manage and control urban mobility. This was initially supported by the European Union, but subsequently pursued on Stuttgart's own initiative. Based on all of these experiences, Stuttgart finally initiated the "Cities for Mobility" network, a world-wide platform open to all towns and cities for the exchange of ideas and experience and for the development of innovative projects in the broad field of sustainable urban transport.

Dr. Wolfgang Schuster
Mayor of Stuttgart

Stuttgart



After my children left home I moved back to the city centre so as to take advantage of the short distances and having everything very close by. Now that the traffic-calming measures have been realized it's turned into a better and cleaner living space!

Keep Stuttgart Moving

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Policy Options for Access Restriction

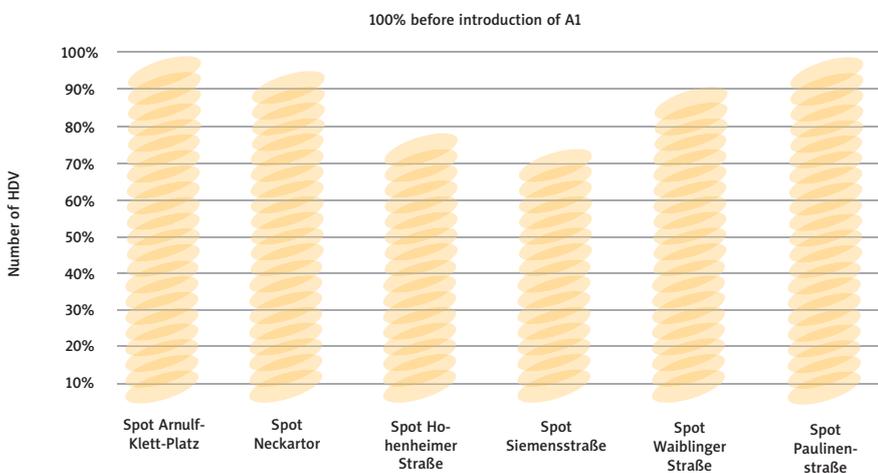
In view of the topography of Stuttgart in the urban basin, ambient air conditions have always been an important topic for the city. Since 1980 the state of Baden-Wuerttemberg has been operating a monitoring network to measure the air quality continuously. Monitoring sites operated by the Environmental Protection Office check the air quality in the city. Unlike traffic emissions, air pollution from non-traffic sources has continuously decreased in

recent years. Traffic-related emissions (PM_{10} and NO_x) continue at a high level, however.

Although advanced vehicle technology and improved fuels promise a reduction in vehicle-based emissions, motorized traffic is still the main air polluter today. The European limits for PM_{10} and NO_2 in the ambient air are exceeded on some roads in Stuttgart with a high traffic volume.

Clean air programmes are necessary for cities and urban areas in which the limit values defined by EU Directives on PM_{10} and NO_2 are exceeded. This is why the government of the State of Baden-Wuerttemberg launched a Clean Air Programme and an Action Plan at the end of December

Reduction of HDV (heavy duty vehicles > 3.5 tonnes) after introduction of A1 – the ban on heavy through-traffic.





Poster of the public awareness campaign to raise the awareness on air pollution prevention

2005 to implement long-term and short-term measures designed to reduce the ambient air concentrations. Access restrictions are the most effective measures to permanently reduce traffic and therefore the number of vehicles entering or passing through a city and emitting air pollutants.

In Stuttgart three different types of access restrictions have been tested within CARAVEL:

- » A1: Ban of heavy traffic passing through Stuttgart.
- » A2: Environmental zone
- » A3: On grade pedestrian crossing at an urban motorway.

The City of Stuttgart covers an area of 207 km². A1 (with two exceptions) and A2 are valid for the total city area. A3 is a local measure in one “test road” with heavy traffic in the city centre. A ban on heavy traffic passing through Stuttgart (Action 1

– A1) was introduced in January 2006 (for all heavy duty vehicles – HDV - with a total weight of more than 3.5 tonnes). This is an important measure of the Clean Air Programme. All vehicles with a weight of more than 3.5 tonnes were not allowed to pass through the city area of Stuttgart. Exceptions were made on two national roads B10/B14 (partly). However, the measure was limited to the introduction of Measure A2 - the Environmental Zone introduced in March 2008 and has been suspended since then. Traffic investigations proved that it was one of the most effective measures.

The emission factors for NO_x and PM₁₀ for heavy duty vehicles (HDV) are 20 to 30 times higher than for light duty vehicles. The reduction in one HDV has the same effect of reducing 20 to 30 LDVs.

On average there was a reduction in heavy duty vehicles of approx. 10% for the entire city area. At some sites (air quality hotspots)

in the city, the reduction varied between 5% to almost 30%. The same order of magnitude in reduction of HDV (-11.5%) on the “test road” B 14 could be proved by extensive traffic counts before and after the introduction of the traffic ban. The results are presented in the figure on page 58.

Reduction of pollution levels

Traffic counts and model simulations of the traffic on a “test road” in Stuttgart were performed before and after the introduction of Action A1. The test road was a 2 kilometre stretch on the heavy traffic road B14.

Number of kilometres driven per day by HDV on the “test road” decreased from 9,570 to 8,471 kilometres. This is a reduction of 11.5%, while the number of kilometres driven by LDV remained almost constant. The calculated emission reduction was approx. 8% for PM₁₀ and NO_x. This is further proof that the ban on heavy through-traffic was an effective measure to keep traffic out of the city and to reduce air pollution.



New and first pedestrian crossing at an urban motorway (B10)

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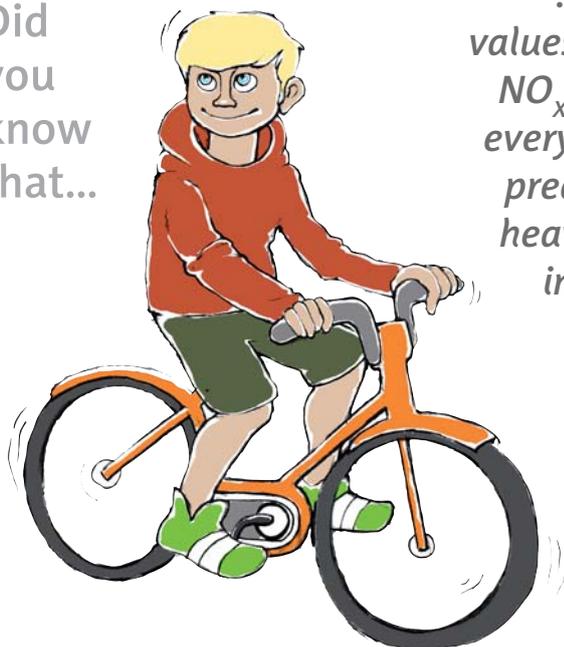
Acceptance of the measures among citizens

The implementation process has been supported by different actions to achieve wide acceptance of the measures: comprehensive PR activities were carried out:

- » a “Round Table on Clean Air and Noise Reduction” was introduced in 2005;
- » a public awareness campaign was conducted in 2006 to raise awareness of the topic of PM_{10} and the possibilities of reducing it by environmentally friendly transport modes such as cycling, public transport and car pooling;
- » a public-opinion poll was conducted among the citizens of Stuttgart on the measures of the Clean Air Programme in 2007.



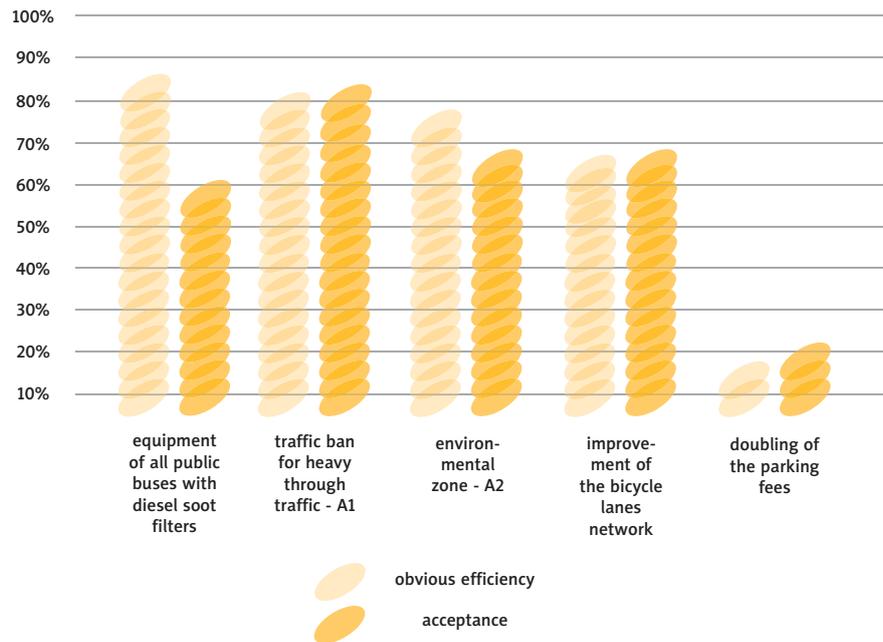
Did you know that...



...the emission values for PM_{10} and NO_x are exceeded every 2nd to 3rd day predominantly at heavy traffic sites in the centre of Stuttgart?

Altogether 409 Stuttgart citizens were interviewed in the public opinion poll. 95% of the people knew about the problem of air pollution concerning PM_{10} in their city. 65% of the interview partners knew that a Clean Air Programme had been established in their city as a consequence of the air pollution (Clean Air Programme published in January 2006, interviews from March to May 2007). The acceptance survey was very successful and serves as a model for a similar study in connection with an Action Plan on noise reduction.

Level of acceptance and correlation with obvious efficiency of different measures of the Clean Air Programme.



The citizens were asked how the air pollution situation could be improved. At 79 %, the ban on heavy traffic through Stuttgart met with great acceptance. Citizens also welcomed the upgrading of the bicycle network (66%) and the traffic ban in the new environmental zone (65%). There is a strong correlation between the level of acceptance and obvious efficiency.

Additional measures were proposed beyond the measures of the Clean Air Programme. With the exception of road tolls, which obtained only about 30%, most other measures obtained a good level of acceptance and obvious efficiency. Even very “hard” measures like the introduction of a traffic-free zone in the city centre or a traffic ban on all vehicles during the days in which pollutant limits were exceeded (every 2nd to 3rd day in Stuttgart!) met with high acceptance.

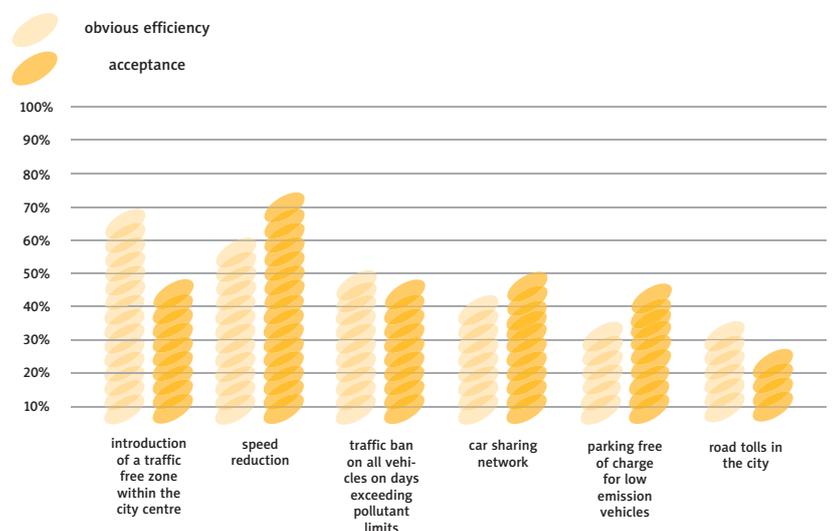
Round Table on Clean Air and Noise Reduction

A “Round Table on Clean Air and Noise Reduction” was installed as an expert committee to support the decision makers on

measure acceptance and implementation and to help to avoid critical situations in advance. At the end of 2004 the Round Table for the Noise Reduction Plan was established in Stuttgart and extended in 2005 to include the implementation of the measures contained in the Clean Air Programme. Noise reduction and air quality had been managed separately before, but experts proposed a common strategy as many measures are common to both areas. Stuttgart is one of

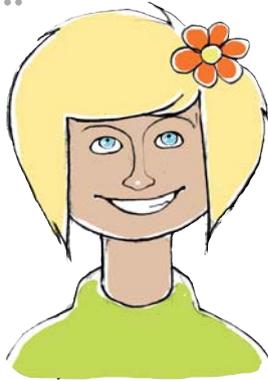
the first cities to apply this innovative concept within CARAVEL. The round table involves a broad spectrum of local stakeholders such as representatives from the Stuttgart Region, the Baden-Wuerttemberg government, from municipal departments, public transport operators, chambers of commerce, automobile associations, bicycle associations, environmental associations as well as scientists from the University of Stuttgart.

Level of acceptance and correlation with obvious efficiency of different proposed measures beyond the measures of the Clean Air Programme.



Stuttgart

Did you know that...



...in Stuttgart on average each car is occupied by only 1.3 people per car?



I agree that some people may really need a car, but why drive around with four empty seats? Why don't at least 2 people share one car? This definitely saves a lot of money and time. To say nothing of taking the strain off the traffic and protecting the environment for the good of us all. The car pooling introduced here in Stuttgart is a great deal. Other people should use it like I do!



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Car pooling System

Every day there are around 750,000 commuters in the Stuttgart region; 205,000 cars enter Stuttgart city each day while approximately 58,000 commuters drive from Stuttgart to the surrounding region. On average there are 1.3 people in each car. www.stuttgart.de/pendlernetz offers all commuters a regional portal to find and create car pools so they can get to work in a better, more relaxed and environmentally friendly way. Just one less car on the road during congested rush hour traffic contributes to better traffic flow and therefore relieves the environment and the climate. Of course, it also helps to save money. The primary aims of car pooling are to both reduce the number of private cars and increase the occupancy rate in the cars. This applies not only to commuters but also to tourists arriving for events such as premier league football matches at VfB Stuttgart. The Stuttgart Pendlernetz portal also provides information and advice on questions of insurance, taxes and how to calculate and share costs between car pooling partners.

The Stuttgart car pooling system is able to organise door-to-door car pools. The service, which is free of charge, is operated by the Stuttgart Mobility Centre. It is designed to improve the mobility of all residents of and visitors to Stuttgart city and the surrounding region. It is very simple to access the system, but users of the website must register and provide some personal details. If the system finds a suitable partner it automatically generates information which is sent out by email or SMS. If no match can be found a direct link to the public transport information system enables an alternative option to be found. The system has a 100 km radius around the regional capital of Stuttgart. The number of hits indicates the positive reactions to the system; there have been around 75,000 hits per month, and this number is on the increase.

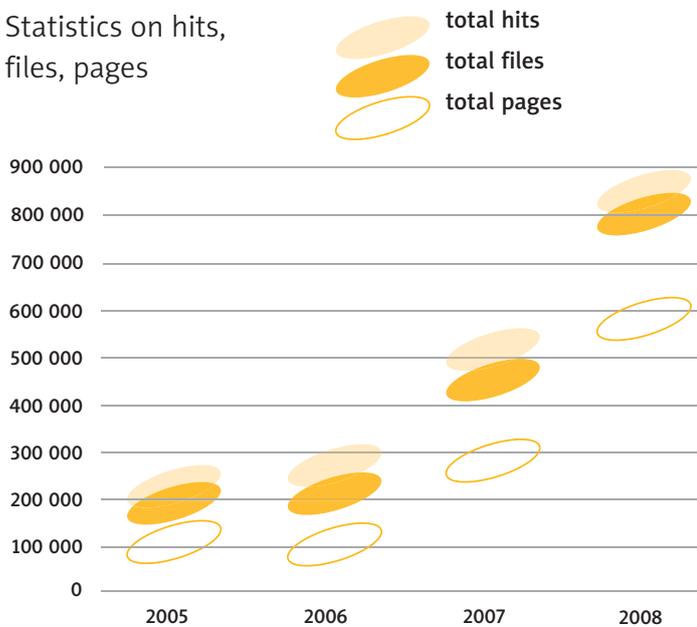
New conceptual approach

The innovative concept represents an alternative to the way vehicles are conventionally used; it promotes inter-modality and involves several companies in new, organised campaigns promoting commuter mobility.

Promotion of car pooling



Statistics on hits,
files, pages



Usage statistics of stuttgart.pendlernetz.de 2005 – 2008

“Pendlernetz Stuttgart” is one of the most innovative car pooling systems in the EU. Especially designed for commuters, it incorporates many innovative features as can be seen in the box above.

The service was improved and enlarged during CARAVEL to include new features and encourage event-oriented car pooling (e.g. football matches, concerts etc.). Activities concentrated on integrating and administering an event data pool into the car pooling system, integrating inter-modal information (information on public transport) and finally integrating regional access to the “Pendlernetz Stuttgart” online system. The Stuttgart Pendlernetz website has been continuously upgraded to provide new features and services, increased user-friendliness, and a function enabling users to feedback their (technical and service-related) criticism of the system.

Addressing specific user groups

Expansion of the car pooling scheme from commuter traffic to also include event traffic. “Let’s drive to the football match together!” This environmentally

friendly attitude to mobility was promoted in the Stuttgart region in 2007 and was relaunched in mid-2008; it is an Internet-based car pooling platform with a special added feature for major events. This new event-oriented car pooling feature makes it much easier to organise car pools for big events. The new service is especially aimed at visitors to the home games of VfB Stuttgart football club. Since around 50,000 visitors are expected at each match, there is a high demand for travel to the same destination at the same time. The event car pooling scheme was relaunched in 2008 together with VfB Stuttgart and was accompanied by promotion in the stadium newsletter and on the stadium screen. The new event-oriented car pooling feature provided by Pendlernetz Stuttgart on the Internet gives visitors an opportunity to reach the stadium quickly, cheaply and in an environmentally friendly way.

New economic instrument

There has been growing interest in car pools in the face of constantly rising fuel prices, and this trend is set to continue.

Innovative features of car pooling

- » Geographical referenced maps
- » Route planning from door to door
- » Automatically generated response via email or SMS if a matching partner is found
- » Data transfer to public transport timetable
- » Free of charge service for users
- » Event data pool

Soft policy instrument

A car pooling portal available to everybody free of charge.

The level of awareness among private companies in Stuttgart and the Stuttgart region has been raised considerably during the CARAVEL Project. For example, large companies such as Daimler, Bosch, SONY Deutschland and Hewlett Packard, all located in Stuttgart, have integrated the system straight into their Intranets and supported promotional campaigns with flyers, presentations, posters etc. in their companies. Currently around 35 companies in Stuttgart and the region have added a link to Stuttgart Pendlernetz on their websites.

The level of awareness at public institutions has also increased considerably: around 30 cities and communities have now created a Pendlernetz link on their websites. A car pooling system across the whole of Baden-Wuerttemberg is envisaged as a next step in the near future.



Mobility Centre's 10th anniversary

Mobility Information Centre and its Marketing Activities

The main areas covered by the Stuttgart Mobility Information Centre are providing friendly, personal information on all means of public transport as well as route planning for cars, cycles and pedestrians. The Centre is located near the main station in the tourist information building, and is organised by the Environmental Protection Office of the City of Stuttgart. A chief objective is to organise mobility in Stuttgart in a manner that is as environmentally friendly and as efficient as possible. And it is surprising just how many ways there are to do just this.

Around 60,000 clients seek mobility information each year. One third of enquiries involve public transport, one third involve city tourism and one third ecologically friendly modes of transport. The figure on page 65 shows the items of highest interest.

All information is given personally either on-site, by telephone, fax, post or email, in German or in other European languages (English, French, Spanish and Italian).

With CARAVEL came improvements to the Mobility Information Centre and the adding of new services:

» Establishing the Mobility Information Centre as a competence centre for all types of individual route planning using all modes of transport.

Activities comprise general mobility information, promoting the online car pooling system (Pendlernetz Stuttgart), organising car sharing, car pooling and driving courses to save fuel, demonstrating the car pooling system to regional authorities and enterprises, managing mobility services, individual route planning for all modes of transport (incl. pedestrians) and indoor workshops.

» Increasing the use of environmentally friendly mobility services (and especially the car pooling system) among private users (residents, tourists), companies, public bodies and institutions. The number of responses to enquiries to the Mobility Information Centre Stuttgart between 1999 and 2007 is documented in the figure on page 65. The requests are differentiated according to the nature of infor-

Mobility Centre's 10th anniversary



Mobility Information Centre Stuttgart
Information given during 1999 - 2007



Mobility information provided by the Mobility Information Centre Stuttgart between 1999 and 2007

- » Individual mobility information concerning all means of public transport
- » Car sharing programs
- » Route planning for car drivers, cyclists and pedestrians
- » Training courses for drivers on how to save fuel
- » Organisation of the Pendlernetz Stuttgart
- » Information on parking facilities
- » Information for the disabled and blind
- » Rental of bicycle boxes

mation required each year. The number of requests concerning eco-friendly services has grown consistently over the past eight years, with a significant increase evident since 2005. A communication and marketing concept was developed and implemented when CARAVEL was introduced; this not only involved launching an Internet site, logo and general redesigning of the advice counter, but also designing and producing promotional material such as flyers, banners and videos. The centre extended its opening hours both for regular business and for special events such as the Football World Cup in 2006, when it remained open until late in the evening.

» Designing and implementing measures to generate public awareness. Public awareness measures help to change the behaviour of road users in favour of new forms of vehicle use and ecologically friendly modes of transport, for example car pooling and public transport. A great number of public campaigns have been conducted during the project. These include the large, illuminated “city lights” posters, regular

bulletins on the local 107.7 radio station, advertising on video screens at various nerve centres (busy arterial roads in Stuttgart) and at underground urban rail stations. Several press releases were published both in local newspapers and in electronic form (online edition of the newspaper, podcasts) between 2005 and 2009.

» New eco-friendly service: bicycle boxes for hire. This service was successfully launched in spring 2007. A total of 30 bicycle boxes are now in use (hired permanently). The service has a very high acceptance among users. However, the maintenance expenses are higher than expected due to problems associated with legal concerns, misuse etc.



Clever to place the mobility information centre close to the main station in the tourist information centre!





I take the car in extremely rare cases and if I do I share one just for special, far-away events. In the past I can remember thousand of cars, confusing signs and dead ends when leaving the event area. Today, thanks to CARAVEL, there are far fewer traffic jams after big events and the time taken to travel home has halved!



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It's much more fun to go and watch a VfB Stuttgart football match now that we don't spend hours stuck in traffic jams. This is all thanks to the dynamic lane allocation and guidance on parking!



Event Oriented Traffic Management

Due to its location in a river basin and the limited number of access roads, Stuttgart has specific capacity-related problems and demands with respect to road transport. The city has a heavily burdened arterial road network, where small incidents result in considerable disruption to traffic. In particular this affects the times travelling to and from big events (such as concerts or football matches). Major roadworks in the city, whether spontaneous or planned, also have a serious impact on traffic flow. Consequently traffic control and traffic management must not only focus on traffic volume but, more importantly, also take into account events and projections.

Around 22,600 accidents occur every year in Stuttgart. In addition there are 1,800 events (on public property), 200 events in

congress centres, concerts, stadiums etc. Finally, there are around 12,000 cases of roadworks (on main roads). But the size of an event is less relevant than its specific impact, which must be analysed in terms of both public transport and private or personalised transport. On around 90 days per year a number of events occur simultaneously, resulting in uncontrollable and unacceptable traffic conditions. For this reason the Integrated Traffic Management Centre has been established to ensure better control of traffic and traffic information in Stuttgart.

The main objectives of this measure were to improve the traffic situation during events and traffic disturbances (incidents), to integrate diverse current traffic information sources into one system and to promote intermodality when major events are taking place. Providing the right information and guidance to road users is designed to reduce the traffic congestion resulting from major events as well as emissions and journey times.



The new lane control system (Talstraße)

Use of new technology/ITS

The Integrated Traffic Management Centre (IVLZ) was the first big step towards an event-oriented management of traffic. It links information on urban traffic with that on regional traffic including motorway exits. It also pools data on events and roadworks.

New physical infrastructure solutions and organisational arrangements

The inauguration in May 2006 of the new Security and Mobility Management Centre (SIMOS), which includes the IVLZ, represents a unique approach in Germany: It integrates diverse urban authorities such as city traffic management, the headquarters of the police traffic

department, fire department and ambulance services (e.g. Red Cross) and the Stuttgart public transport operator SSB under the same roof. These partners cooperate at a strategic and operational level; coordinating information and taking concerted action permits rapid, direct crisis management.

Considerable extensions were made to the NeckarPark event area prior to the FIFA World Championships in 2006. Before this there was regular significant congestion on the road network and at junctions when major events took place at the stadium or when several events were taking place at the three locations. It used to take around 2 hours to empty the large P10 car park, resulting in long waiting times for those in the 3,500 vehicles involved who wanted to drive home.

To improve this situation to actions have been taken:

1. Control scenarios: the modules of the "Bad Cannstatt incident management system" and "NeckarPark parking and traffic guidance system (PVLS)" were developed.
2. The Bad Cannstatt incident management system was set up as an IVLZ module and includes the installation of roadside display systems to direct traffic in the event of a major incident. The dynamic display systems and traffic signals all switch, so that the diversion route is more efficient than in the past when everybody tried to circumvent traffic jams independently, causing still larger logjams in surrounding areas. The IVLZ has developed fixed scenarios for different areas, which come into effect in case of a major incident. This shortens the time required to determine the best diversion.

The new Security and Mobility Management Centre (SIMOS)



3. The PVLS was established on the basis of a data collection system for the roads and multi-storey car parks. It integrates different sources of data on traffic control and traffic information.

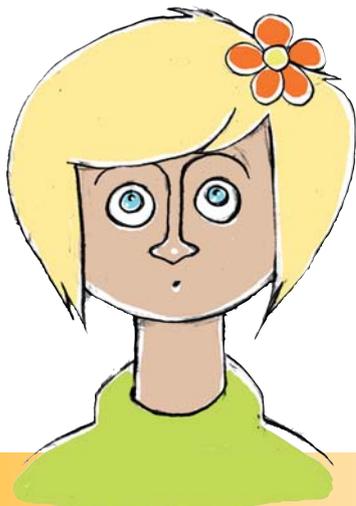
4. Last but not least, a lane control system was implemented in the Talstrasse. This provides traffic-related control of incoming and outgoing traffic in the NeckarPark event area.

The PVLS and the dynamic lane control on Gaisburger Brücke started in spring 2006 and enabled the FIFA Championships to run smoothly without major traffic jams.

In detail there have been considerable improvements in traffic in terms of reduced waiting times and lengths of tailbacks due to the reorganisation of signalling and the dynamic lane allocation:

» Reduction in congestion and faster emptying of parking facilities:
Traffic can now leave car parks after a football match much faster because the number of lanes has been extended from two to three. Meanwhile the fourth lane for incoming traffic is now reserved exclusively for pedestrians leaving the area. This has halved the time needed to empty car parks.

Did you know that...



...it took up to 2 hours to empty the big car park at the NeckarPark after football games?



The NeckarPark pedestrian guidance system

The considerable reduction of congestion and the faster emptying of the parking facilities substantially contribute to increasing the acceptance of the control systems and in particular the comfort of journeys for motorised visitors.

» Reduction in journey times and emissions caused by traffic congestion during major events in the NeckarPark area: Apart from temporarily releasing a third lane, the release time allocated was reorganised in special programs to take the capacity demands on the

Talstrasse into account. This has also enabled real changes to be observed for incoming traffic on the Talstrasse: the main approach route from the B 10 used to be regularly congested due to inadequate exit capacity. Operation of the signalling program now prevents this situation and has produced a corresponding reduction in congestion for this access point.

There has been a reduction in the severe traffic impact resulting from traffic disturbances (e.g. capacity constraints, incidents) to the urban network of Stuttgart and reduction in traffic disturbances caused by major events (areas of roadworks, concerts, etc.) of 30% during peak hours and even up to 50% for those using the car park in the vicinity of the investigation area.

A comparison of emission values

during a peak hour revealed a reduction of between 10.2 and 53.0% during the six 10-minute periods. This could equate to an hourly average reduction of approximately 38.1% of CO and NOx for traffic leaving Talstrasse after a football match. These levels will only be partially achievable for other types of major event since noticeably fewer vehicles leave the car park at the same time.

» Improved journey comfort: There is a close correlation between improvements in journey comfort and travel speed and journey times. The faster and shorter the times required to enter and leave the area of a major event, the more comfortable the journey is perceived to be. Long congestion times and heavy traffic reinforce a negative perception of journey comfort. The analysis of the traffic time graphs on significant routes has shown that it is possible to achieve a temporary reduction in

Stuttgart

Control room of the Integrated Traffic Management Centre (IVLZ)



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peak load. The control measures and the related increase in capacity for the most relevant route in the area of Cannstatter Wasen (the Talstrasse) enable improved journey comfort to be derived. Increase in trip accuracy by guiding drivers reliably and quickly to their destination (e.g. car park), thereby also giving them a little spare time.

The implementation of the Internet information platform in August 2008 now provides road users with up-to-date information on the traffic conditions on main roads and the parking situation in Stuttgart (www.stuttgart.de/verkehrslage). It enables users to focus on the traffic conditions in the city centre, on specific points of interest or routes.

CARAVEL has therefore contributed to creating improved, event-oriented traffic management in Stuttgart using a system that can also be applied to other cities.



NeckarPark parking and traffic guidance system (PVLS)

Modern station of the suburban railway in Greater Stuttgart



Security Action Plan

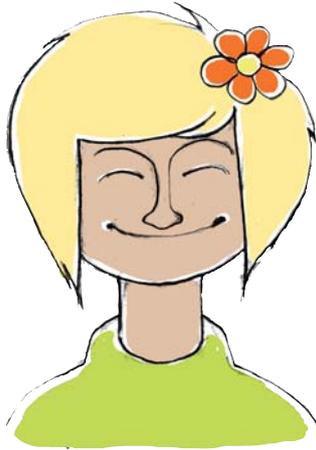
The safety and the security of passengers using public transport is a major priority for Stuttgart's public transport system. While the needs of passengers in terms of health and well-being were treated in the same way as in all other public spaces, there had been no integrated safety and security plan for the public transport system prior to the CARAVEL project.

The main aim of this measure was therefore
a) to improve security in public transport through an integrated transport security concept for the suburban railway in Greater Stuttgart;
b) to substantially improve the subjective feeling of safety and security, especially for specific public transport user groups such as youths, women and the elderly; and finally

c) to implement measures ensuring that a high degree of safety and security is achieved on a permanent basis. The key measures initiated by the Verband Region Stuttgart to achieve this comprehensive strategy were continuous monitoring of quality factors, installing video cameras at each station, improvements to the technology that permits dialogue between passengers and train or bus drivers and setting up workshops for specific passenger groups such as youths, women and the elderly.



Train driver observing the closing of doors at a suburban railway



In theory, there is no difference between theory and practice. But, in practice, there is.

Stakeholder Involvement

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Promotion poster
for CARAVEL
Summer University



Citizen and stakeholder participation – CARAVEL’s secret strength

“The idea of citizen participation is a little like caring for spinach: no one is against it in principle because it is good for you.” It was the US political scientist Sherry Arnstein in her famous 1969 article “A ladder of citizen participation” who made this a bit far-fetched, but nevertheless valid comparison. She went on to say that “participation of the governed in their government is, in theory, the cornerstone of democracy – a revered idea that is vigorously applauded by virtually everyone.”

Yet, in practice, the participation of citizens and other stakeholders in the decision-making process is even today viewed as something which is innovative rather than a standard procedure. The common agreement with the idea and the benefits of participation (as stated some 40 years ago by Arnstein) remains mostly undisputed.

CARAVEL’s step from theory to practice

From the outset of CARAVEL, its partner organisations had the ambition to promote and “apply” citizen and stakeholder participation. In all four CARAVEL cities, this participatory approach was followed for the majority of the measures implemented (see examples below).

CARAVEL also approached the topic also from a more theoretical point of view. It made “citizen and stakeholder involvement in urban mobility” the theme of its first Summer University in Burgos in July of 2007. In this academic setting, theoretic approaches alongside practical examples from CARAVEL and other urban mobility projects were presented to an international audience of young professionals and students of urban planning.

Often, and CARAVEL is no exception, the terms participation and involvement are used synonymously. The same is true for the terms stakeholder and citizen. There are fine distinctions between these terms and the academic discussions are abundant.



Stakeholder meeting

It is of practical relevance to know that individuals and organisations can take part in the decision making process during a particular stage or during all stages of the planning and implementation process (of a measure).

Who do we mean by “stakeholders”?

Any individual and any organisation involved in or affected (positively or negatively) by the planning and implementation of a measure is considered a stakeholder.

Examples of stakeholders are therefore citizens, shopkeepers, enterprises, schools or hospitals which are often directly affected by a measure implementation. Other stakeholder examples are public transport and infrastructure operators, freight operators, chambers (of commerce), professional associations, universities, consultancies, and the media who could be considered “intermediary stakeholders” and “multipliers”. Finally, also politicians, city administrations, and developers, i.e. those organisations and individuals with a strong position and major influence due

to their political responsibility, financial resources, authority, skills and/or expertise are considered to be stakeholders.

Forms of stakeholder participation

The actual involvement of stakeholders in a given process can vary from information, via consultation, to actual citizen control.

Not surprisingly, the list of involvement tools and techniques is also a long one. Depending on the envisaged level of stakeholder participation/involvement, but also depending on the type of measure and the types of stakeholders, various tools and techniques could be considered. The Internet, newsletters, brochures, fact sheets, etc. are typical means of information provision. Tools and techniques for the gathering of information from stakeholders include questionnaires (surveys) and personal interviews as well as interactive engagement tools such as stakeholder conferences, thematic workshops, focus group meetings – all of which can be combined with site visits or study tours.

Advantages

CARAVEL cities employed all of these techniques. They made a specific effort to make use of the interactive engagement tools in order to liaise with the respective stakeholders. In terms of workshops and meetings, CARAVEL cities, where possible, followed a focus group meeting style. In other words, they organised focus group meetings with a relatively small number of stakeholders (ideally 6-8 people), moderated by a professional and independent moderator, and focussing on a small number (perhaps even only one) of specific topics. This focus group meeting style has proven to be particularly effective in exploring in-depth views, attitudes, aspirations and concerns of the participants.

In general terms, the participation of stakeholders in the measure planning and implementation process offers the opportunity to more clearly identify problems. Within CARAVEL, it has been observed that stakeholders turned scepticism (or even mistrust) about other stakeholders into trust. Hence, stakeholder participation can be viewed as a means to develop a common ground for actions and for a durable coop-



Examples of stakeholder participation in CARAVEL

Krakow

The new goods distribution scheme in Krakow was introduced step by step with broad based co-operation between city logistics experts, the municipality and all shopkeepers concerned who, at the very outset of the process, had demonstrated strong opposition to the new scheme because it was considered to be unprofitable and bad for business. The involvement of an additional actor in the stakeholder process, an independent scientific, nationally recognized expert in logistics who belonged neither to the municipality nor to the shopkeepers, turned out to be the “softening agent”. He was recognised as an independent authority and was thus perceived as trustworthy by all stakeholders. This created the necessary base of trust for discussions among all involved parties and for the agreements that followed.

Burgos

Several attempts in the 1990s to establish traffic-free zones in the historic centre of Burgos and to reorganise the local traffic around the city centre failed due to severe protests and opposition from residents, hotel and restaurant owners, local business associations, delivery services.

In CARAVEL, the city administration organised many meetings with these stakeholders. Separate meetings were organised to avoid conflicts between stakeholder groups. Participation was by invitation only. Fears expressed by the stakeholders could be removed by constructive discussions and good arguments of the civil servants. They always looked for win-win situations that could satisfy all stakeholders’ needs.

The particular barrier of “the Spanish car mentality” was tackled through street parties and media communications to address the issue.

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eration between stakeholders. In this sense, the legitimacy of the planning (and implementation) process is ensured.

Limitations and challenges

There are limitations to potentially complex and costly means of stakeholder participation, in particular in a project setting where time and resources are typical constraints. But even the very idea of involving a range of stakeholders may prove counter-productive under certain circumstances, for example in cases where decisions have already been made and are no longer negotiable.

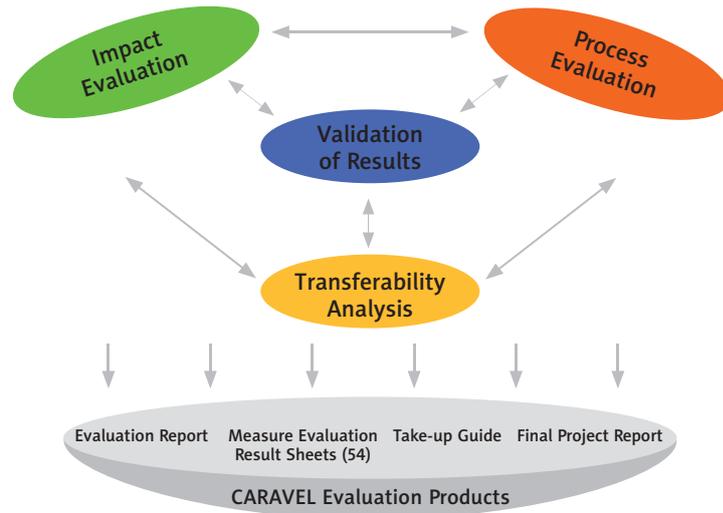
Depending on the specific city or measure contexts, organising stakeholder participation events may be a big challenge. For example, it may not be advisable to bring together stakeholders with very opposing opinions if there is

a danger of creating a battleground rather than a discussion platform.

The selection of the “right” stakeholders is another challenge, i.e. to involve those citizens who actually have a concrete “stake” in the specific issue. The stakeholder identification process is crucial in this regard. Here, it is a challenge to involve those stakeholders that are perhaps less articulate (perhaps being somewhat shy, but also in cases of language deficits) or less involved in community affairs in order to offer all stakeholders the possibility to adequately voice their opinions.



Bollard with CIVITAS logo



Evaluation: CARAVEL as a Driver for Change

Within CARAVEL, 54 innovative sustainable urban transport measures were implemented in Burgos, Genoa, Krakow and Stuttgart. A large number of data and information has been gathered from a broad variety of surveys, measurements, interviews etc. The analysis and interpretation of the CARAVEL measures has shown many interesting results from which a selected few are presented here.

The CARAVEL evaluation produced an abundance of specific quantifiable results. It also allowed for a better understanding of the processes involved in planning and implementing sustainable urban transport measures as well as their transferability from one urban context to another.

One of the most striking results of CARAVEL is that this project – our project – was a driver for change in the four cities of Burgos, Genoa, Krakow and Stuttgart. Factors such as modernisation, new solutions, exchange and pilot experience contributed to a new way of thinking about urban mobility. Successful measure implementations, but also

valuable lessons learned – especially when problems had to be overcome, have led to deeper analyses, more activities, more financial resources invested and often to a change of priorities on the local level. One could say that each CARAVEL euro has generated new euros for innovative actions. Thus, CARAVEL has acted as a driver for change.

Evaluation framework

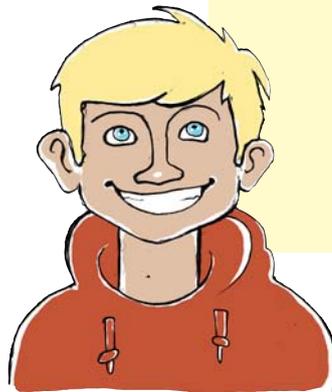
Evaluation in CARAVEL is based on three pillars as shown in the illustration:

- » the **impact evaluation** includes the analysis of a wide range of measure-related impacts regarding urban transport, economy, energy, environment and society; the impacts achieved in the key topic areas of demand management, alternative transport modes, improvement of PT, mobility plans and traffic management are presented in the present overview of the CARAVEL evaluation results;
- » the **process evaluation** observes and assesses the implementation process of the measures and searches for bar-

riers and drivers which hinder or push the actual implementation; » the **transferability analysis** looks for indications as to whether a specific measure or concept could be transferred to another urban context and under which conditions.

For all three areas, objectives, methods, tools, indicators and content have been agreed within CARAVEL in order to facilitate the comparison and to allow the analysis on aggregated levels. Initial results have been validated in a common workshop in Bertinoro, Italy, in November 2008. The detailed evaluation results have been presented in 54 so-called Measure Evaluation Result Sheets.

The CARAVEL Evaluation Report compiles the results and summarises the overall impacts on the city level as well as the lessons learned during the planning and implementation processes. Transferability results are the subject of a take-up guide intended in particular for those cities interested in benefiting from the experiences made in CARAVEL.



CARAVEL has supported a lot of transport measures.

Did these measures have an impact on the level of pollution in the cities?

Did they help to reduce the number of private vehicles?

Impact Evaluation Results

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Demand Management

General overview

The activities concerning “demand management” have reached the following general objectives: a rationalisation of goods distribution through an increase in the load coefficients and a reduction in the displacement of empty vehicles and favouring integration between operators in the goods transportation sector. These measures also restricted the circulation and access of private vehicles through the use of charges and bans (in absolute terms or by using time bands), and through the creation of pedestrian zones with limited traffic and access.

The main environmental effect of these measures is the decrease of vehicle emissions in the specific areas involved.

Detailed results

The measures related to access restriction have proved to be rather complicated in their implementation. This is particularly due to the fact that they must have strong political support if they are to be put into practice properly. However, these meas-

ures have been able to make a truly significant impact.

One of these policies was the ban on heavy through traffic in Stuttgart. This ban was introduced in January 2006 for all heavy duty vehicles (HDV) with a total weight of more than 3.5 tonnes.

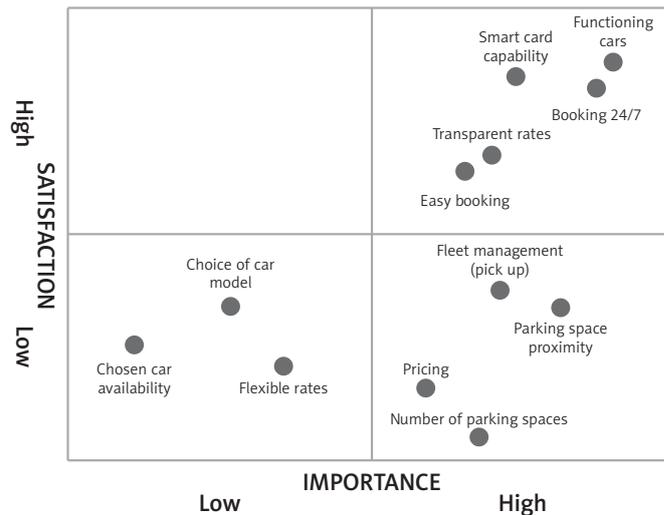
The reduction varied between 5% to almost 30% of the number of HDVs at different places in the city of Stuttgart. On average, there was a reduction in heavy traffic vehicles of roughly 10% for the entire city area.

The emission reduction calculated as a result of this measure was approximately 8% for PM10 and NOx. This is further proof that the ban on heavy through traffic was an effective measure to keep traffic out of the city and to reduce air pollution.

In Burgos, the implementation of the integrated access restriction strategy resulted in a drastic reduction in the number of vehicles crossing the city center. In 2008, only about 10% of the car trips recorded in 2004 were observed.

Access restriction of HDV in Stuttgart





Genoa car sharing survey results: satisfaction of and importance for users

General overview

The general results of these measures have been the stimulation of private collective transport (on behalf of companies for their employees, for example) and the increase in the occupation and use rate of individual vehicles as a result of the joint (car pooling, collective taxi) or sequential (car sharing) use. Another important impact has been the reduction in the emissions of individual vehicles through policies that sustain and promote the use of different means of transport.

Detailed results

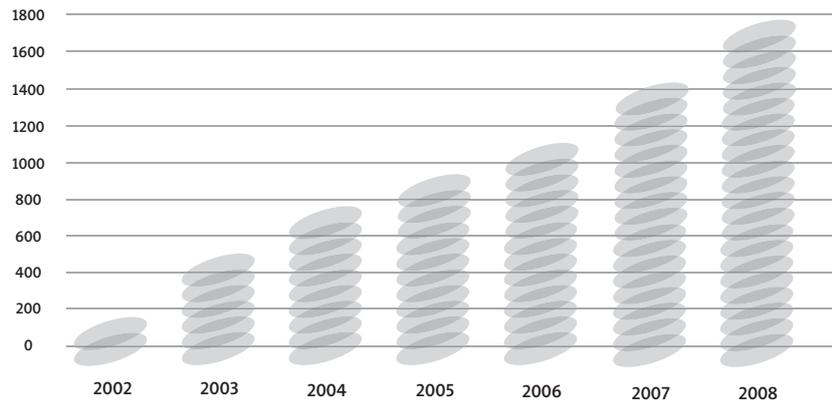
One of the main reasons people stated in favour of using private cars in cities is the associated flexibility. In the four CARAVEL cities, this flexibility is countered by a huge element of discomfort as expressed in the difficulty to find an appropriate parking space. In this sense all the flexible mobility services implemented in CARAVEL (demand responsive transport (DRT), car sharing, car pooling, collective taxis, biking) possess this element of flexibility and can be seen as an alternative particularly to using private cars; they eliminate the parking problem and ultimately cost less.

Car sharing has shown a growth rate in Genoa which is beyond the growth rate of Italy as a whole (see graph on page 34). During the four-year CARAVEL lifetime, the number of registered users increased sharply from 500 to over 2,200 in 2008. The adoption of car sharing led to a reduction of about 1,000 cars in Genoa and to the achievement of significant positive environmental impacts. The success of this Genovese

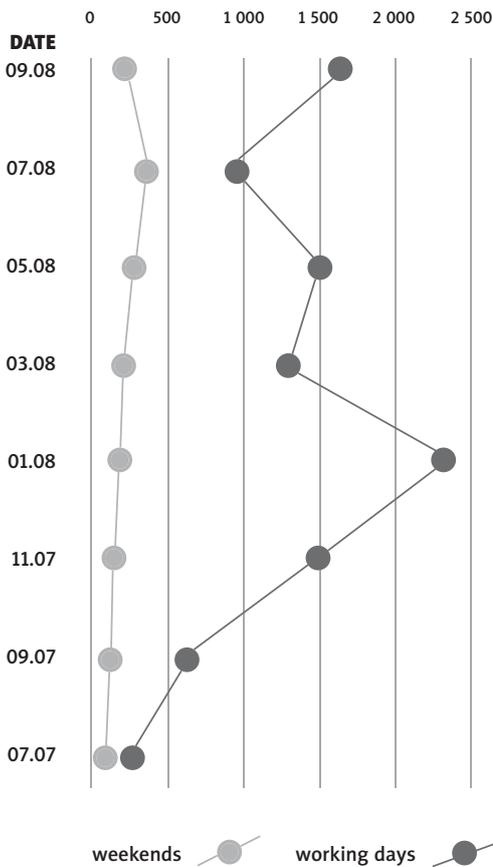
measure is even more remarkable as it can be considered a financially sustainable service – no longer relying on public funds after having reached the economic break-even point.

Extensive investigations and surveys were conducted in Genoa to determine the strengths and weaknesses of car sharing so as to be able to react accordingly. As depicted in the graph, booking and support services as well as the functionality of the cars are perceived as very important to the users. In Genoa, it was possible to reach high satisfaction rates among users which will need to be maintained in the future. Equally important, but much lower satisfaction levels were observed for parking (nearness, number and accessibility of parking places). Clearly, this is a difficult challenge to tackle for the dense Genovese city areas.

The Stuttgart car pooling already established several years ago grew considerably thanks to a series of innovative build-in features and very specific targeted marketing activities (see pages 62-63).



Number of registered car pooling users in Stuttgart



Clients transported by the Tele-Bus (DRT) in Krakow

Krakow, Burgos and Genoa benefited from these experiences while preparing and implementing their own car pooling services: the innovative service attracted many people and will most likely become bigger in the future.

Demand responsive transport (DRT) services shaped up very well in Genoa and Krakow (see page 42-43). The number of users of the DrinBus in Genoa as well as of the Tele-Bus in Krakow, as seen in the graph below, increased considerably while these measures were implemented in CARAVEL.

In general, public transport operators show a very high interest in flexible services as they can provide an efficient solution where traditional bus services are not able to respond to citizens' needs. Local media support and specific promotional material delivered in the whole target area are the best instruments to increase the awareness level of a flexible service in the launch stage. Over the years, the awareness level continues to grow thanks to decorated vehi-

cles circulating on the road and users passing the word. Moreover, a flexible service is usually perceived by users as having a very high quality level service, and it has an appeal to citizens that is higher than traditional public transport services.

The introduction of biking schemes and services was another huge success: the use of bikes as an alternative means of transport has proven to be successful in Burgos (see pages 14-15) and Krakow (page 53). In the past, bikes were only used for leisure activities in these two cities, while after CARAVEL it has been proved that people started using bicycles as a means of every day transport. In Krakow, this is the first public bike system of its kind in Poland. These two measures were flanked by an improvement in the cycle path infrastructure and marketing campaigns that promoted biking for all user groups and also in particular for the less likely target groups of businessmen, for example. This has resulted in a distinct rise in the use of the bicycle in a car-oriented society.

General overview

CARAVEL's public transport measures have contributed to an increase in the speed of collective public transport as a consequence of separate lanes and adequate technical innovations. They also introduced integrated ticketing for different public means of transport (sub-regional railroads, subways, bus lines, etc.). Furthermore, the measures have significantly contributed to the reduction in the emissions of all vehicles through regulations and incentives for the use of alternative means.

New technical solutions in public transport that are focussed on facilitating use have led to an improved user acceptance. Separate bus lanes and priority systems have reduced travel times. Audio-visual information systems in the public transport vehicles as well as at the stops have improved passenger information. Modern bus and tram stops have made it easier to get on and off, in particular for the disabled or parents with small children; they have also increased safety in situations in which public transport



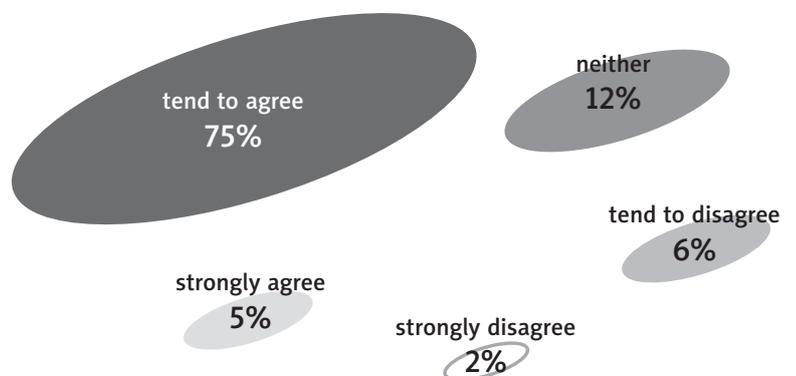
Did they improve the quality of the overall PT system?

and car traffic must share the traffic routes.

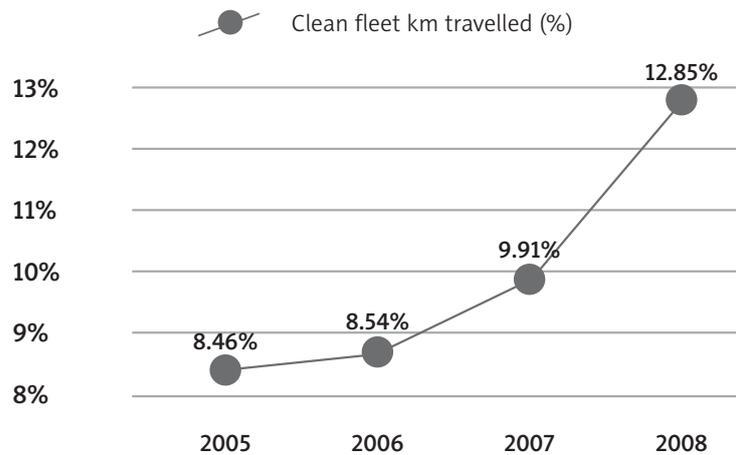
Detailed results

Several policies were introduced with respect to improving public transport and transforming it into an alternative to using private vehicles. There was a huge need to make the service more comfortable and accessible to all citizens. In this sense Burgos has managed to modify the buses so as to enable people with reduced mobility to use them on

a regular basis. In doing so this they have "convinced" families with small children in pushchairs that buses are a feasible option for moving around the city (see also page 13). The determination to establish more efficient routes in Burgos, and eliminate useless stops has proved to be an intelligent tactic to improve public transport timekeeping. All in all, the perception of the quality of public transport has reached a consistent level of acceptance, as shown in the graph below.

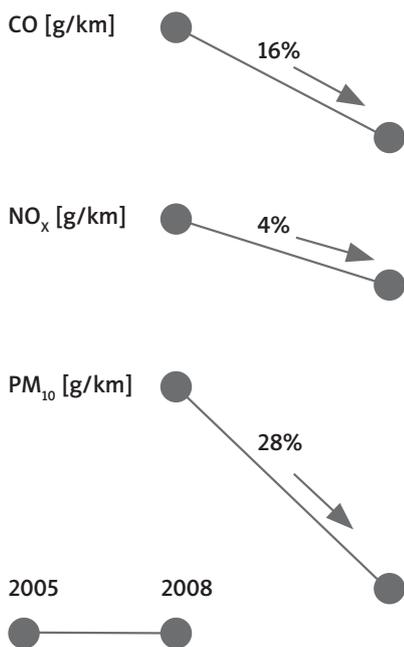


Acceptance of public transport service



Kilometres travelled by clean fleet in Genoa

Reduction of emissions in the clean public transport fleet in Genoa between 2005 and 2008



Surveys revealed that the public transport services in Burgos were perceived to have a high quality. While 80% of the users agreed that public transport in Burgos has achieved a good level of quality, only 8% thought that this was not the case.

The public transport operators in the four cities have been at great effort to provide their citizens with better and more information that guarantees real time information inside the buses and at bus stops. In terms of safety, the surveys carried out in the cities show that users have perceived that there has been a change and currently feel safer in using public transport even at night.

These policies and activities have made public transport in the four CARAVEL cities more attractive: they have not only “convinced” citizens that it is possible to use public means instead of the private car, but have actually “converted” them to users of modern public transport.

The introduction of new cleaner vehicles and the substitution of old and polluting buses produced a reduction in the emissions from public transport. Within the fleet transition measure in Genoa, 104 new vehicles (Euro IV buses and trolley buses as well as Enhanced Environmentally-Friendly Vehicles, EEV) have been implemented in the new fleet, achieving 12.85% of the total km driven with clean vehicles. Thanks to this more eco-compatible fleet, the emissions have been significantly reduced.



CIVITAS
CARAVEL
Puzzle

General overview

Generally speaking, the activities associated with this group of measures have contributed to developing and implementing specific mobility plans. Furthermore, they supported the use of telecommunications and telematics to shorten and optimise the displacements and trips (information on the transport systems).

Detailed results

Traffic was a big problem in Genoa during the Salone Nautico (International Boat Fair that takes place every October). Thanks to the new mobility plan developed within CARAVEL, there was a considerable reduction in congestion and traffic in the “hot areas” and it consequently received a positive reaction from residents and visitors alike.

In Krakow, the integrated mobility plan for the Technical University of Krakow contains strategies for the promotion of sustainable mobility forms in one integrated and consistent plan, such as the creation of better connections among campuses, creation of bike paths, new car parking policy, etc. It was possible to reduce the number of car trips by 20% for extramural students as a result of this measure.

The evaluation of results with respect to a reduction in travel time was also very positive in Stuttgart. The waiting times after a big soccer event at Mercedes-Benz Arena have been reduced from 80-90 minutes to 35-45 minutes.

In general terms, it is important

to point out that measures are often strongly dependent on local political commitment. However, Urban Mobility Plans can play a strategic role to ensure continuity in policies and actions.

Mobility marketing in Krakow



Process Evaluation Results

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Governance – I hear this word all the time, but what does it actually mean?



Governance in the implementation process

The sustainable urban transport measures of CiViTAS are innovative by definition and offer solutions to contemporary urban mobility problems which are often perceived to be radical or restrictive. They are usually and in many respects complex. Their planning and implementation is rarely a smooth ride. Hence, coordinated efforts are required to ultimately achieve a successful measure implementation.

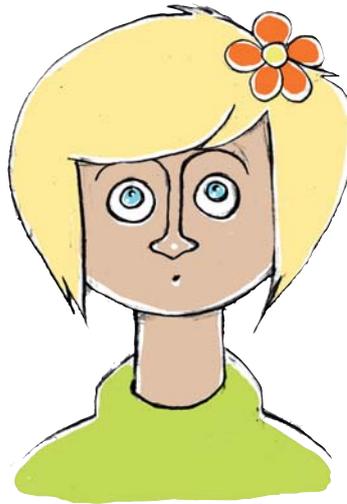
The buzz word that is then often thrown into the ring is “governance”. In the absence of a short and widely accepted definition, CARAVEL understands “governance” as the coordination of people and institutions as well as the management of processes which are part of the planning and implementation of CARAVEL’s sustainable urban transport measures.

The role and responsibilities of a Measure Implementer

But who is responsible for such “governance” and who is going to take on these coordination and management tasks? It is clear that a European, partly EU-funded project such as CARAVEL, is a special construct. Good communication has to be ensured with the EC, but also with the numerous partners within the project and within a city. Project and Site Managers are in place and special roles for managers of, for example, evaluation or dissemination tasks exist. However, the key role in the actual measure implementation is the role of the Measure Implementer. Generally speaking, measures in which the Measure Implementer was solely responsible for the coordination of stakeholders and implementation processes were the more successful measures. Furthermore - to add a rather obvious point – CARAVEL confirmed that measures which are related (integrated package of measures) are most efficiently led by one and the same Measure Implementer.



Did
you
know
that...



*... as a consequence
of sustainable
mobility marketing
in Stuttgart around
60,000 more clients
per year are seeking
mobility information?*

What the EC should do to better involve Measure Implementers

All CARAVEL cities had regular local meetings between Measure Implementers which proved to be valuable opportunities to exchange experiences and discuss common issues. It is highly recommended that the EC facilitates the exchange of Measure Implementer across cities and projects. There are two main obstacles that stand in the way of such exchanges. The one is language, the other money.

With 20+ official EU languages alone, the language barrier is obvious. English is usually referred to as the only suitable language for a wider exchange – so to speak the common denominator language of European project affairs. However, only 49% of all EU citizens are able to communicate in English. While this qualifies English as the most important language, there is a need for more exchange opportunities where other languages are being offered via translation services. This can be a quite costly task; however, the cost of not offering

such opportunities is higher since about half of all Measure Implementers would not have a chance to participate directly in such experience exchanges. Other alternatives in this regard are local exchange events where Measure Implementers (and depending on the event, other interested parties) from one specific country or language area get together.

In addition to the language problem, only insufficient resources are often foreseen for Measure Implementers to travel to project meetings or European-wide exchange events. Saving on the travel budget for Measure Implementers means saving at the wrong place.

Another and probably the most intense and in-depth means of experience exchange is the actual exchange of staff (between organisations of different cities and countries). If organised and as a true exchange, the cost for the EC would not even need to be very high.

Good governance – what does it take?

Good governance significantly increases the chances for a successful measure implementation. And the experience of CARAVEL showed that good governance requires all of the following:

- » Proper stakeholder involvement
- » Good cooperation between institutions
- » Efficient means of communication and marketing

Proper stakeholder involvement

In any measure implementation, individuals and often also organisations are somehow involved or affected. The views of these individuals and organisations – commonly referred to as stakeholders – can be and are quite often contrary. CARAVEL implementers quickly

Did you know that...



... thanks to CARAVEL more than 900,000 litres of used oil have been collected in Burgos to prepare bio diesel?



Access control in Burgos



realised that whenever stakeholders were incorporated in the development and decision-making processes, fewer problems arose and the measures could be implemented more rapidly. And even if a measure may not have been implemented as originally foreseen, CARAVEL repeatedly showed that an important benefit of a good involvement process was that the different stakeholder groups overcame their animosities towards each other and started to build trust between them.

It has furthermore been observed that citizens and other stakeholders are not necessarily opposed even to restrictive measures. Quite the contrary can be true. If they become part of the solution by adopting a pioneering role, then they can become the true drivers for a particular measure. This positive stakeholder experience is one of the most valuable obtained by the CARAVEL cities. In this context, see also the stakeholder involvement chapter of this report (pages 72-74).

Good cooperation between and within institutions

Enabling communication between stakeholders can break down boundaries. CARAVEL also showed (or confirmed) that tremendous benefits can result from good communication between the involved institutions – so to speak, as a first and good cooperation between, but also within institutions (organisations, authorities, etc.). Blinkered views and antiquated administrative structures need to be replaced by a general cooperative mindset which allows for constant experience and knowledge exchange between institutions. In certain cases this also includes the exchange across scientific disciplines – from engineering, to economics, sociology, political science, etc. – potentially involved in the implementation of sustainable urban transport measures.

Promotion of integrated ticketing in Krakow



Communication, marketing and public awareness

During the four years of CARAVEL, awareness campaigns have been assessed as fundamental for the planning and implementation of transport and mobility related policies in a city. It is highly advisable to start informing the public as soon as possible in order to be able to see their opinions and reactions and consequently to consider their proposals for the further implementation process. The overall goal of the CARAVEL measures was the improvement of the quality of life; thus the consideration of the citizens' opinion led to better solutions and a higher acceptance, in particular in case of temporal or permanent restrictions.

The CARAVEL logo has quickly been associated with policies aiming at improving urban mobility, making public transport more available and safer to all citizens and promoting sustainable solutions. Diverse methods were employed to promote sustainable transport options including

demonstration days, cycle safety training, advertisements, competitions, leaflets, posters, website promotion etc. It was generally found that a mixture of methods was best at reaching a range of different audiences. Burgos and Krakow have identified students as a very important target group. Students also proved to be a major driving force in the acceptance of sustainable mobility policies.

It can be stated without any doubt that mobility fora and mobility offices have turned out to be the places to exchange opinions, address and discuss concerns and in general to make citizens participate in the decision making process.

Political support and commitment

Permanent political support and commitment greatly facilitates the daily implementation work of the Measure Leaders. There may be a considerable mismatch between the (political and administrative) election cycles and the implementation of such a major research and demonstration project: positive results often arise after the

completion of a project (after the election period) whilst any necessary restrictions lead to negative moods in the present (against the political leadership), thereby directly threatening the projects.

This is why on the one hand ambitious projects require committed politicians; they can more easily push through implementation of even radical measures (in which temporary or permanent restrictions are to be expected) through clear and continuous communication with the public on the policy aims and expected impacts of even controversial measures. This increases the acceptance of the general public. On the other hand, long term plans are required that facilitate a certain degree of stability and planning security independent of election cycles.

Ideally, there should be a basic consensus beyond the ruling parties that sustainable transport is beneficial for all citizens. When clean urban transport is an objective "above the parties", it is easier to achieve support for concrete measures.

The Mayors of the four CARAVEL cities actively support the project



Main Barriers and Drivers observed in CARAVEL

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The evaluations of the measure planning and implementation processes revealed many - what have been called among CiViTAS evaluators – barriers to be overcome and drivers to be utilised to successfully implement a measure. The most common and influential ones observed in CARAVEL are listed below. Recommendations to overcome barriers and utilise drivers are offered below.

The CARAVEL tram in Krakow



Stakeholders

Barriers: Disruptions due differences and even conflicts between stakeholders which have not been correctly moderated or not moderated at all.

Drivers: Communication with stakeholders and their early involvement in the planning and implementation process.

Recommendation: Analysis of the needs of the various stakeholders; involvement of stakeholders from all stakeholder groups in professionally moderated focus group/stakeholder meetings (on the condition that the measure planning, implementation can still be influenced); communication with and information to stakeholders to raise awareness of the urban mobility problem and the measure; creation of a sense of measure ownership among stakeholders.

Mobility Culture / People's Mindsets

Barriers: Fear and unwillingness of stakeholders to change old habits.

Drivers: Appreciation of innovation and a pioneering position/situation as well as a sense of (measure) ownership among stakeholders.

Recommendation: Recognition that the change of mobility culture or even just of old habits does not happen over night. Working in small (but crucial) steps towards changing people's mind and attitudes through information campaigns. By means of marketing campaigns and the involvement of stakeholders, gaining appreciation among them that they and the city they live in is viewed as a pioneer to approach urban mobility problems.

Governance / Institutional Cooperation

Barriers: Narrow-mindedness, blinkered view and antiquated/inflexible administrative structures.

Drivers: Clear roles & responsibilities, communication/exchange within and between institutions, motivated implementers.

Recommendation: Assigning clear roles and responsibilities to Measure Implementers and others involved in the measure planning and implementation; analysis of communication and working structures within and between involved institutions (organisations, departments, authorities, etc.); organisation of regular intra- and inter-institutional meetings to exchange information and experience and to approach issues in a coordinated and cooperative way. Staff exchange.

Planning (strategic; technical; economic; time; human resources, etc.)

Barriers: Inappropriate short-term thinking and unpreparedness for unforeseen or external (beyond own influence) developments.

Drivers: Wider and long-term strategic planning; detailed organisational planning; risk planning and analyses; integration of measures.

Recommendation: Thorough planning (on strategic, technical, economic, time, human resource, and other levels) of the measure implementation; establish a risk and contingency plan which is regularly reviewed and, if necessary, revised; Setting of clear and achievable objectives – allowing objectives to be revised within reason in the case of new developments; carry out a mid-term review with external experts to get unbiased and fresh views.

Political Support / Commitment

Barriers: Political opposition to formerly agreed plans; change in political power and associated loss of political commitment.

Drivers: Long-term strategies with above-party support; communication, information and involvement of key politicians; media coverage and support.

Recommendation: Striving for a long-term commitment beyond the party level; regularly updating of (key) politicians about the measure implementation developments; inviting politicians to national and international events; ensuring wide media coverage.



The above list is only a sketch of the numerous barriers and drivers that have been documented within CARAVEL. The vast majority of these barriers and drivers could be influenced by the implementers and the stakeholders of the measures. However, it is important to be aware that external factors can have a significant effect on the measure planning and implementation. Some examples are high congestion levels in city centres (such problem pressure is considered a driver for sustainable urban transport measures), increased fuel prices which make it comparably less expensive to use alternative transport modes, but also legislation which has been observed both as a driver or a barrier.



The logos from the three car pooling services in Stuttgart, Krakow and Burgos

Transferability

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One of the CiViTAS key objectives is to encourage cities across Europe to adopt measures which will result in cleaner and better transport. It is therefore important to identify and understand the factors and conditions which enable cities to transfer a specific measure or a mobility concept from another city. In this context, CARAVEL applied a twofold approach to the analysis of the actual transfer and the potential transferability of its measures:

» A checklist provides a series of items/factors an implementer should consider before transferring a measure to a new location. Checklists of this nature have been produced for measures considered as transferable; considering them strengthens the basis for the decision-making process in interested cities about the implementation of a measure.

» Three different cases underwent a deeper analysis: firstly, the actual transfer of the demand responsive transport (DRT) service from Genoa to Krakow; secondly the transfer of Stuttgart's well-established car pooling concept to Krakow, Burgos and Genoa; and thirdly, the comparison of a sensitive theme – access restriction – implemented independently in Stuttgart, Krakow and Genoa.

The actual DRT transfer from Genoa and Krakow can be regarded as exemplary. It is full of worthwhile recommendations for any city interested in replicating this innovative measure. The learning curve for the Public Transport Operator MPK has considerably shortened due to a trustful and close cooperation



Did you know that...



... in the summer of 2008 Krakow ran a successful transfer workshop for other Polish cities dealing in particular with the telebus?

with the Genoese developer and operator; the Italian colleagues gave clear and straightforward guidance in the planning, designing, implementation and operation of Krakow's Tele-Bus; they also trained the staff in Krakow (for more information about the service see pages 42-43). The above-mentioned language obstacle has been turned into an added value: both partners decided to jointly develop an English version of the Italian software which will facilitate further transfers to other cities. The framework of CARAVEL certainly eased the cooperation and transfer; licence negotiations were conducted without problem, development and design costs were reduced as a result of close cooperation and the financial contribution from the EU – factors which cannot be taken for granted in “normal” contractual situations of a technology transfer.

A one-to-one transfer of the car pooling system from Stuttgart to the other cities in the same way as the DRT transfer was not possible as Stuttgart was not the owner of the system. Nevertheless, the other three project cities were largely inspired by the Stuttgart system. Several meetings took place and a lot of information was exchanged, enabling the three cities to benefit from the Stuttgart experience. The responsible person in Stuttgart was always available to advise the implementers in Genoa, Burgos and Krakow on the proper set-up of services which were well adapted to the local conditions. An implementer should, however, remember that despite the fact that a measure is considered as transferable, the actual development and implementation is influenced by barriers and drivers as mentioned before. For example, “behaviours (old habits)” slowed down the development while well selected target groups and interested media pushed the popularity of car pooling in Krakow. Burgos followed the checklist and care-

fully analysed likely barriers and drivers so that it was able to establish a targeted car pooling service with a high development potential.

The result is that serious transferability analysis and discussions are useful. However, the results need to be communicated and interested cities and implementers have to have the opportunity to meet each other. CARAVEL therefore recommends the establishment of a Sustainable Transportation Transferability Centre. Under the responsibility of the Krakow University of Technology, a preliminary office was launched in January 2009. The main objectives of the STTC are focused on the organization of workshops and conferences for self-government's decision makers, transportation professionals, politicians, students and provision of professional knowledge for stakeholders about successful implementation of measures which improve quality of transportation according to the sustainable mobility rules.

Please let us give you some practical advice for your projects:

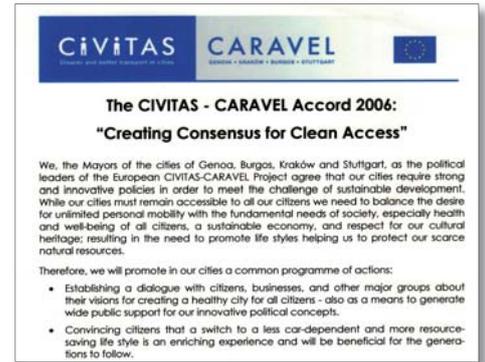
- » *Quickly identify the most relevant stakeholders – champions, pioneers*
- » *Identify the benefits for each stakeholder group and create win-win situations*
- » *Communicate, communicate, communicate – in an attractive, convincing and comprehensive way – and start as early as possible*
- » *Balance personal benefits and restrictive policies*
- » *Make sure that you have strong political leadership and support – ideally from all parties*





The CARAVEL team

The CARAVEL Accord 2006 signed by the four mayors of the CARAVEL cities



CARAVEL – A Six Year Co-operation Experience

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During the 2002 CIVITAS Forum in Brussels, the European Commission announced a second CIVITAS call for June 2003. This was the incentive for many cities to analyse their current urban transport situation and to develop specific measures designed to test new approaches, new services and new technologies aimed at overcoming existing problems and achieving sustainable urban mobility.

The urban transport situation is similar in all European cities, whether they are large or small. Joint research, development and testing as well as exchange of experience are therefore suitable ways of combating the problems associated with urban transport, such as congestion, pollution, noise and economic competitiveness.

In 2003, Stuttgart and Burgos on the one hand, and Genoa and Krakow on the other, started to prepare two projects with integrated packages of technical and non-technical measures that addressed the urban transport problems and responded to the policy fields of the CIVITAS II call. The project proposals were

submitted on 17 December 2003. After a positive evaluation the four cities were invited for negotiations. The negotiations ended in the merging of the two projects into one integrated project: CARAVEL was born. It began on 1 February 2005 and ran for four years.

CARAVEL was a four-year R&D and demonstration project, consisting of 54 measures to address the problems of urban transport in Burgos, Genoa, Krakow and Stuttgart. The measures represent an investment of € 29 million, supported by EU funding of € 13 million. The Municipality of Genoa co-ordinated the work of the 23 CARAVEL partners, including public and private organisations in charge of urban transport development. The core team – the Technical Management Board TMB – consisting of Project Manager, Technical Co-ordinator, Dissemination Manager, Evaluation Manager and Site Coordinators was responsible for the overall work management and control as well as for monitoring the implementation of measures. The TMB met four times a year to discuss any open questions, review and

appraise the work performed and to agree on common approaches of evaluation and dissemination, for example.

In the **first project year**, local teams responsible for the actual implementation of the measures were set up and the administrative and financial procedures and structures necessary for the realisation of a project of this magnitude put in place. For many civil servants and organisations, this was their first ever EU-funded research project. This meant that EU reporting, monitoring and accounting were new and required specific training and advice which was provided by the Project Manager and the Technical Co-ordinator during site visits in the first months of the project. In most cases work was started on actually implementing the measures in the very first year.

The **second year** saw the implementation of the remaining measures and the start of actual co-operation between the cities, such as the transfer of the demand responsive transport application from Genoa to Krakow. The cities also launched the first promotion and dissemination



CiViTAS – cleaner and better transport in cities – stands for City-VITAlity-Sustainability. With the CiViTAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that are to make a real difference to the welfare of the European citizen. CiViTAS is a programme by cities for cities, providing a framework for living “laboratories”, for learning and evaluating new approaches and concepts of sustainable urban mobility. CiViTAS projects are characterized by a strong local political commitment.

The fields of interest – the policy fields – of the CiViTAS Initiative are as follows:

- » Energy-efficient, cost-effective and clean vehicle fleets
- » Demand management: access restrictions, integrated pricing strategies
- » Collective passenger transport
- » New forms of vehicle use & ownership
- » New concepts for the distribution of goods
- » Innovative “soft” measures for managing mobility demand
- » Transport management systems & traveller services

campaigns to inform the public about the CARAVEL project, its overall objectives as well as the actual project measures. The CARAVEL project received increasing support and commitment from local politicians and scientists who closely accompanied and followed the implementation and progress of work.

The second project year ended with a review of the overall project status. The Project Manager, the Technical Co-ordinator and the local teams discussed issues and achievements measure by measure and decided any overall modifications.

During the continued implementation in the **third year**, the proposed modifications along with the results achieved were discussed with the European Commission in the mid-term review process. The overall status was qualified as very good and in line with plan. Nevertheless, some measures had to be modified in order to cater to political, organisational, financial and technical considerations, the majority of which could not be addressed directly by the project. These modifications were the subject of a contract amendment which was approved by the

Commission in 2007. The “hot” evaluation phase started in the third year, with the discussion of and agreement on the evaluation procedures, methods and indicators.

The main body of evaluation data was collected in the **fourth year**. Numerous indicators were measured several times during the operation of new services and new equipment. The data was analysed in the last months of the project; the detailed results formed the subject of the evaluation report. Interviews and analyses were also conducted during the fourth year to describe the implementation processes. The lessons learned provide an insight into drivers and barriers which push or hinder implementation. This will help project managers, technicians and politicians alike to better handle the implementation of complex measures in the future.

There were widespread dissemination activities at a local and project level. While on the local level, the focal emphasis of activities was placed on the citizens, the project level aimed to reach politicians, professionals and students involved in urban sustainable mobility. The

dissemination activities resulted in three brochures. The first introduced the project. The second, published in 2007, showed first lighthouse measures, and this third brochure – the final activity report – presents the overall results and achievements of the four years. CARAVEL also published regular project newsletters and organised four units of the CiViTAS CARAVEL Summer University. These seminars took place in Burgos, Stuttgart, Genoa and Budapest to explain the specific experience and knowledge gained within the project to students and young professionals. The four years of close co-operation and extended exchange, preceded by two years of preparation and negotiation, have built a real CARAVEL family. Consortium meetings as well as bilateral collaborations have created personal and organisational partnerships which will persist into the future, forming the basis for further joint initiatives and projects. Two cities are involved in the long-term evaluation of the CiViTAS results, and Krakow is engaged in setting up a transfer centre; it will be hosting the next CiViTAS Forum in 2009, as did Burgos in 2006.

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