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1 EXECUTIVE PUBLISHABLE SUMMARY

The MIRACLES project (Multi Initiative for Rationalised Accessibility and Clean Liveable Environments), 2002-2006 involved four European cities: Rome (I), Barcelona (E), Winchester (UK) and Cork (IRL). The four cities drew together a number of key organizations in order to form a Consortium capable of delivering MIRACLES.

The consortium included: Municipalities and County Councils, Transport Authorities, Transport Operators (both public and private), Universities and Research Organizations, Public Relations and Press Organizations (dissemination) and Technological Partners, all selected in order to apply the eight CIVITAS building blocks so as achieve the strategic goals of:

- o Reducing transport-related environmental impacts at the local level;
- o Increasing accessibility in cities;
- o Improving transport management;
- o Improving citizens' quality of life.

The implementation of **City Centre Clean Zones** is in force in all four cities. Access for private vehicles to historic and central areas has been increasingly limited. In some cases these areas have been totally closed, to the satisfaction of citizens and public transport users and with a good level of satisfaction amongst the retailers. Access Control to Clean Zones has also been achieved, through the appropriate technological support.

Parking and Pricing Policies are also an objective of the MIRACLES project in Rome and in Winchester, with different methods of application being assessed in the two cities.

The **bus fleets** have been renewed with low and zero emission vehicles such as the latest generation Compressed Natural Gas, Diesel (EURO III, EURO IV), electric and bi-modal trolleys. Innovative fuels are also under experimentation, such as vegetable oil (rapeseed oil).

New public transport lines both on free and fixed routes have been implemented, including a new tramway line inaugurated in 2004 in Barcelona, and a trolleybus line in March 2005 in Rome.

Park & Ride has been introduced both in Cork and Winchester integrated with the implementation of bicycle parking and shuttles, to facilitate alternatives to car use in the city and to connect the city centres to the park and ride car parks.

The **car-sharing** service has been implemented in Rome in February 2005, while new **cycling** opportunities have been further implemented in Cork and Winchester, including an innovative cycle loan scheme.

Information technology has been strongly implemented in all the sites addressing different purposes, such as: the control of the Public Transport Operator (PTO) fleet, the provision of public transport service information to end users both on-line (internet, WAP, PDA, SMAs) and on board; the provision of real-time traffic information to drivers, the payment of transport-related services through SMS (bus ticket in Rome and parking in Cork), the development of tools to predict pollution levels due to traffic, etc.

Freight delivery has also been undertaken in three of the cities. In Barcelona, the scheme of multi-use lanes has been improved and extended (+ 5kms of new lane). The same city has demonstrated other innovations; quiet night-time deliveries, and a pilot internet portal, developed in collaboration with more than a dozen goods operators to identify hot-spots and target illegal parking enforcement. Winchester and Rome are also active in developing innovative urban deliveries.

The final results have all been made available by the project partners through the CIVITAS web site and the Project Fact Sheets.

2 OBJECTIVES OF THE PROJECT

The present report describes the activities that have been carried out during the whole project duration; details are provided of the work carried out at each of the demonstration sites as well as the comparison between the planned and actual work, resources and objectives.

Each city has given a description of the general objectives and strategic aspects at the heart of their sustainable mobility policies.

ROME - The work performed in **Rome** has addressed all the key concepts and objectives that are the basis both of CIVITAS and of the Municipality Urban Traffic Plans.

All the MIRACLES measures in Rome apply to an area included in the “Rail Ring” cordon, which includes its world famous Historical Centre, with the objective of increasing the modal shift rate towards sustainable transport modes, through the closure to private traffic, and the improvement of transport management, the increased supply of PT services.

The achievement of this goal is also supported by the MIRACLES project in the following areas:

Travel Demand Management – through the improvement of the “pre-trip” and “on board” information for PT users, as well as the supply of new transport lines and telematics applications.

Reduction of harmful environmental effects of transport – achieved through the introduction of new Access Restriction and Parking Pricing Policies and the extension of the LTZs. On the other side through the renewal of the PT fleet towards low and zero emission standards.

Promoting alternatives to the use of private car – in Rome programmes for the implementation of car sharing and car pooling schemes are now in place as well as awareness campaigns addressed to mobility managers and to different categories of citizens.

The joint application of these policies will help the social inclusion through the provision of better quality Public Services and an improved protection of the urban environment and quality of life.

WINCHESTER - The work performed within MIRACLES in **Winchester** has helped to deliver the objectives and targets at the heart of Hampshire County Council’s first five year Local Transport Plan (LTP). The LTP aims to promote sustainable development, reduce the need to travel, improve accessibility for all regardless of mobility, and to improve the environment. As part of these objectives, the following targets have been set for the year 2020:

- (i) halve the rate of traffic growth;
- (ii) increase walking and cycling by 25%;
- (iii) increase public transport patronage by 25%, and;
- (iv) meet UK national air quality targets.

The second LTP (2006-11) also aims to protect the environment by promoting the principles of environmental sustainability; through the measures first demonstrated in MIRACLES the County Council is committed to ensuring that Hampshire continues to be a place where people want to live, work and visit.

In order to provide the information required to support these policies, a significant investment in infrastructure will be required. Within most of the MIRACLES WPs the use of *Intelligent Transport Systems (ITS)* to provide real time traffic and travel information to travellers is a core element. ITS are being utilised to create the ‘informed traveller’ who can make choices about when, how and whether to travel at all.

On a more local level, the Winchester Movement and Access Plan (WMAP) strategy exists in order to manage the demand for travel, to promote greater use of public transport, to improve pedestrian access and safety, and encourage cycling. Included within WMAP are objectives and targets to reduce traffic levels in Winchester by 20%. These WMAP objectives overlap with the measures being introduced as part of the MIRACLES project in the following areas:

Travel Demand Management – The objective here is to restrain traffic and provide Park and Ride features as an alternative. This is addressed in MIRACLES by the extension of the existing Park and Ride scheme within WP 7 and the overall parking policy and the environmentally linked parking charges being introduced as part of WP 6.

Reduction of harmful environmental effects of transport – This objective aimed to reduce all harmful environmental effects including noise and visual effects of transport in addition to the direct pollution effects. This was targeted in WP 5 through the detection of high polluting vehicles and measures designed to improve these vehicles. Following the declaration of the Air Quality Management Area in 2003 a detailed strategy for improving air quality was developed to form the Winchester Air Quality Action Plan. General awareness of polluting effects were also raised WPs 6 and 10. WP 9, which aimed to reduce the number of delivery vehicles and diesel-powered deliveries within the City, replacing these with cleaner quieter electric vehicles. WP 12 supported and promoted clean vehicles in both public transport and passenger car fleets.

Promote greater use of public transport – This objective was addressed by several measures being introduced within WPs 7 and 11, where a Quality Bus Partnerships was introduced and information provision of public transport services was increased.

Encourage Cycling – A Winchester cycle network is being developed by WMAP in line with the National Cycling Strategy aim of quadrupling the level of cycle use by 2012 (compared to the 1996 base). WP 8 addressed this objective by extending safe routes, bike hire schemes, and new cycle parking facilities.

The application of the initiatives through the different phases of the project whave had a cumulative effect on a number of headline transport objectives. These impacts support the underpinning transportation strategy for the City and help to achieve the wider social, environmental and economic policies for the area.

BARCELONA - Within the constraints of the MIRACLES contract, Barcelona has focussed upon four of the eight CIVITAS measures. This project is the first transport demonstration initiative to integrate actions by the three principal actors:

- Barcelona Municipality (leads on *access control restrictions* and *innovative goods deliveries*)
- ATM (promoting a *greater use of public transport*), and
- TMB (responsible for *extending the clean bus fleet*).

The MIRACLES demonstrations in Barcelona are localised, and yet extend beyond the city limits (for promotion of public transport).

The restriction of private vehicle access along the world-famous Ramblas boulevard is motivated by the City's commitment to improving pedestrian amenity; although pedestrian volumes far exceed those of vehicular traffic, controlling the latter (at 11,600 vpd) presents a series of challenges including controlling access to off-street car parks. Similar to pedestrians, the improvement of goods movements forms an aim of the Municipality's Mobility Pact.

Within MIRACLES, ATM's efforts to improve the use of public transport are focussed on two actions:

- Design and other actions related to the monitoring of key performance indicators for operation of the city's first modern tramway line, and
- Implementation of a common Automatic Vehicle Monitoring (AVM) system across the metropolitan area, combined with demonstration of the use of (multi-operator) real-time passenger information at bus stops.

TMB has worked primarily on the demonstration, and extension, of the Compressed Natural Gas (CNG) bus fleet, with a view to implementing a fleet of 250 CNG buses by the end of 2006. It has also undertaken research to improve bus information systems, and has collaborated with ATM in demonstrating integrated real-time passenger information.

CORK - Increased *urban accessibility and an improvement of citizens' quality of life* have been achieved through the provision of extra cycle racks, seats and benches along St.Patrick's Street (the central thoroughfare in the WP5 Clean Zone) and through the installation of bicycle stands catering for over 200 bicycles parking in the city centre and the finalisation of the Cycle Network Strategy.

Further *reduction of transport-related environmental impacts* at the local level and promotion of a modal shift for trips having their origin or destination in the clean area have been achieved by extending the Clean Zone to adjacent streets.

To further help achieve a sustainable modal split there was intense promotion of the new Park and Ride site. Sustainable, affordable urban access for all was further catered for through the provision of Park and Ride parking spaces for disabled drivers and cyclists.

This measure also contributed to the objective to introduce *added-value integrated services* as the New Park and Ride service, which was integrated with measures to facilitate bus prioritization and the provision of Green Routes for safer use of public transport, cycling and walking, as well as the new pay by phone technology

Overall, the rapidly increasing patronage of the new Park and Ride service, lead to a significant *reduction in transport-related emissions and congestion*, it also enhanced regional cohesion by improving access to the city centre for employment, shopping and leisure pursuits for people in the greater Cork Region.

The *demonstration and uptake of clean transport vehicles*: continued with the ongoing use of Rapeseed Oil in 5% of City Council Fleet (12 vehicles). This measure continued to attract interest throughout the project lifetime from the general public, helping to spawn many more conversions of vehicles to run on bio-oils and even some project to convert such oils in to bio-diesel.

From a long-term perspective it the ripple effect of this measure should help to improve citizens' quality of life and result in a significant reduction in transport-related emissions.

3 SCIENTIFIC AND TECHNICAL RESULTS

Work has been performed according to the Plans and to the Objectives, as detailed below, both in the Horizontal and in the Demonstration WPs.

The project structure is represented in the following picture.

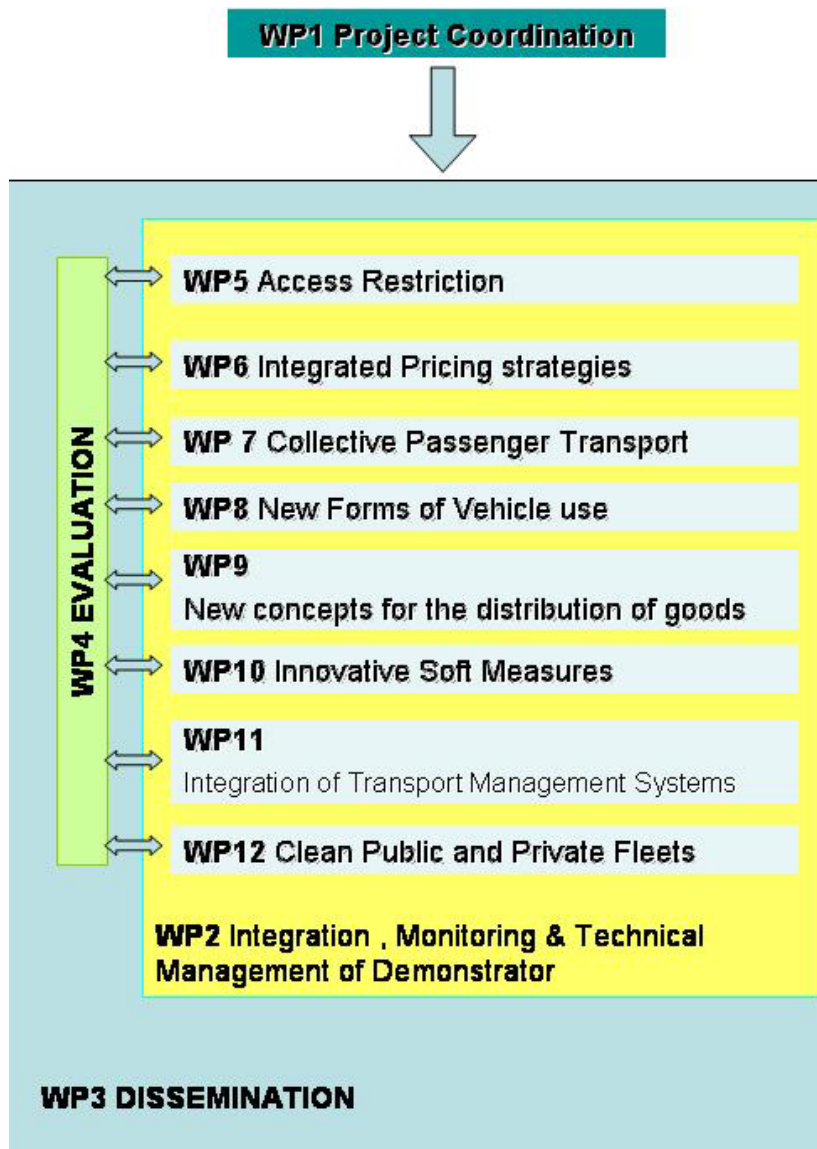


Fig1 – MIRACLES Project structure

From the picture above it is clear that the project has been structured in order to provide the highest level of integration to the demonstration activities, which have applied to WP 5-12.

Both WP 4 and WP2 have allowed managing, assessing, integrating and providing a common basis for monitoring to the implementation of measures.

3.1 Results from the Horizontal Work Packages

This part presents mainly summarised results from the management approach, policy approach, evaluation approach and dissemination approach. Specific initiatives at city level have been highlighted here.

3.1.1 WP 1 - Project Management and Coordination

The review of the management and co-ordination includes an overview of the work performed during the four years of the project as well as the performance of the consortium and the individual partners in terms of dedication to the project, motivation and contribution, including supply of deliverables, relevant organisation, management and communication aspects.

At the bottom of the chapter, as requested by the EC name and contact details of the persons who may be contacted concerning the follow-up of the project are also provided.

The work performed and the individual partner's dedication to the WP.

Work Package 1 has guaranteed the Project coordination as well as the Technical and the Financial Management.

At local level each city has set up a steering committee/management group, headed by the appointed "Site Manager". The Site Manager has had a key role, since has been responsible for the development, implementation, management, and monitoring of the site activities, and has been in charge of coordinating the local partners and actors in the provision of reports and passing information to the Project Coordinator and Project Office.

During the project lifetime two main Contract Amendments have been submitted, the first in the mid stage of the project, due to the shift of activities, and personnel between two partners in Rome; a revision of the Description of work and of the budget has been also submitted and for approval. The second amendment has been submitted in the final phase of the project mainly due to the merger of STA into ATAC in December 2005, and to the withdrawn of the partner Peopleservice on 31st December 2004.

MIRACLES partners have met on quarterly basis during the four years, in 13 Technical Management meetings; the Dissemination Manager and the Evaluation Manager have taken part to all the Liaison Group meetings arranged by METEOR when necessary; the partners have also taken part to the international Workshop on different issues arranged by the twinning projects (Trandsetter, Vivaldi, Tellus); further all the CIVITAS Fora have been attended by the MIRACLES cities delgates and political representatives.

The following partners have played an active role in WP1:

Municipality of Rome, ATAC SpA, (Rome); Hampshire County Council (HCC) (Winchester); DSD/BTSA (Barcelona); Cork City Council (CCC) (Cork)

The WP achievements have been detailed in all the Reports to the Commission. The performances of individual partners in terms of dedication to WP1 are briefly summarised below:

- The **Municipality of Rome** has acted as the **Project Coordinator**, taking the responsibility for the coordination of all political matters at the European level and acting as a link between the Project Steering Committee and representatives of the European Commission.
- **ATAC** have acted as **Project Manager (PM)** and the **Financial Co-ordinator** - has been in charge of the technical supervision of the activities according to the project schedule. Furthermore ATAC has acted as the project link with the European Commission on all financial issues; has administered the project financial plan and monitored partners

expenditure against forecast spend, according to the activities declared, giving support to the consortium in the presentation of the individual Cost Statements.

A **Project Office**, managed by ATAC, has also been established, in order to guarantee appropriate and efficient Management Coordination and communication within the Project and between the Consortium and the EC.

ATAC have acted as **Financial Coordinator** of the project, guaranteeing the reception and distribution of money to all the partners; have supported the project partners in completing their Cost Statements, have provided support also in completing the shifts of budget etc.

ATAC have also coordinated all the **Contract Amendment** procedures during the period October 03 – February 04, and during the period November 05 – March 06 until September/October 2006;

Since March 03 ATAC has replaced the partner STA, in their role as **Site Manager** for Rome.

ATAC have managed the process for the production and signature of the **Memorandum of Understanding** with METEOR as well as the production and signature of the **Consortium Agreement**.

ATAC have also coordinated the production of the 4 Progress Reports, the 4 Management Reports the Mid Term report and the 4 sets of Cost Statements, contributing to drafting the technical parts of the mentioned reports for Rome, by collecting contribution from the local partners.

ATAC have coordinated the production of the 2 Inception Reports, of Implementation Report n° 1 contributing to drafting the technical part for Rome, by collecting contribution from the local partners. ATAC have contributed to the drafting of Evaluation Plan (Del 4.1) Report on Evaluation Results (Del 4.2) and Implementation Report n°2 (Del 2.2).

ATAC have coordinated all Project consortium meetings, Project Steering Committee meetings, and have attended all the CIVITAS Forum meetings, by organising workshops and presenting in the technical sessions.

- **HCC** – Hampshire County Council (HCC) was the site leader for Winchester, and have been responsible for the development, implementation, management, and monitoring of the site activities. HCC have managed local partners on a day-to-day basis, and through monthly meetings of the local Winchester Technical Management Committee. HCC have completed all necessary reports, including three-monthly, six-monthly and annual progress reports, and annual cost statements. HCC contributed to the drafting of the Inception Report and key project deliverables and has submitted required documentation for the Contract Amendment. HCC have attended and contributed to all Project consortium meetings, Project Steering Committee meetings, and CIVITAS Forum meetings, and also made a significant contribution to the CIVITAS Forum meetings and final conference by organising workshops and presenting in the technical sessions.
- **DSD** – – The Barcelona site was managed by BTSA during the first year and, following the advice obtained from the EC in response to the 1st Year Report, by DSD during the following years. In terms of the management of the Barcelona site, the main achievements (apart from report preparation and submission) have concerned the re-organisation of the activities of BTSA and DSD, efforts to maintain the vertical WP actions following various elections and

subsequent changes in key staff, the preparation of the work presented at the Site Technical Review held in late 2004, work revisions to implement Reviewer's recommendations, and the preparation of documents for the related amendments to the contract, to prepare Cost Statement submissions, and to follow-up and deal with the consequences of delayed payments.

DSD have attended and contributed to all Project consortium meetings, Project Steering Committee meetings, and CIVITAS Forum meetings presenting in the technical sessions.

- **CCC** – Cork City Council is the Site Leader in Cork and during the reporting period the council established a Local Steering Group for the MIRACLES project. This consisted primarily of council staff from the Traffic Division, Plant and Machinery and Cork City Energy Agency. The UCC team also occasionally participated in the steering group meetings. The group met regularly to discuss progress on each of the work packages and to oversee the development, implementation, management, and monitoring of the site activities, meeting once or twice a month on average, to begin with and then tapering off to meet on an as needs basis after the summer of 2005 in accordance with the plans for diminishing WP 1 resources. For example towards the end of the project meetings were convened to appraise all local task leaders of the current financial situation and to remind everyone of the need to properly submit legitimate MIRACLES expenses before the end of the project. The differing financial needs of each task area were also discussed amongst the team in order to reach agreement about the most appropriate way to share the remaining available resources.

Throughout the project, CCC have attended and contributed to all Project consortium meetings, Project Steering Committee meetings, and CIVITAS Forum meetings. CCC also contributed to the drafting of the Inception Report and submitted all the required documentation for the Contract Amendment.

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3.1.2 WP 2 - Integration, Monitoring and Technical Mngt of Demonstrators

Work Package 2 was led by the partner ATAC.

Work Package 2 has represented the core part of the project because it has provided a detailed description of the measures implemented by each City, aiming at achieving synergies between CIVITAS categories and Project measures, and aiming at integrating common key issues.

In details, WP2 has provided a preliminary description of: objectives, technical content and interactions among measures specified during the implementation and the demonstration phase.

WP2 has presented a complex structure and has been designed in order to guarantee a correct and efficient coordination of the Demonstration activities, taking advantage of management tools, specific for the monitoring purpose.

The WP structure has been designed in order to respond to the objectives; five tasks have been performed in WP2:

- Task 2.1 Design of measures
- Task 2.2 Action scheme for implementation
- Task 2.3 Monitoring Framework: data collection plan
- Task 2.4 Political and institutional issues
- Task 2.5 Conclusion and recommendations

A considerable effort has been made by all the MIRACLES Partners in this Work Package with particular reference to the first two tasks.

WP2 has been designed in order to guarantee an “**Integrated Approach**”, where measure design, implementation and monitoring are carried out together within the same WP. Further to this WP2 has also provided the coordination of the political initiatives, as well as the final conclusions and recommendations, in order to provide best practice guidance to be disseminated across Europe through the CIVITAS initiative

The “Integrated Approach” has allowed having a step-by-step activity monitoring, starting from the measure design until the final implementation phase. Within this approach the demonstration Work Packages (WP5 to WP12) have performed the planned activities, providing WP2 with the outputs for the final integrated analysis and presentation of the results.

The key outputs of WP 2 (and of the Project) have been **Implementation Report n°1 [Del 2.1]**, issued in April 2004, and **Implementation Report n°2 [Del 2.2]**, accompanying the Report on Evaluation results [ref .WP4 chapt], issued in March 2006.

The first Implementation Report, issued at the mid term stage of the project, was focuses mainly on the design of the measures and on the first implementations performed, following the guidelines provided by METEOR in order to give uniformity to the work of the four projects. Implementation Report n° 2, according to an agreement with the Project Officers, has been presented as annex of the Report on Evaluation results (four different annexes one for each city have presented).

The implementation of Del 2.1 and Del 2.2 has demanded a great dedication from the partners. Work started in autumn 2002, and has been progressing over the whole project lifetime.

The objective of setting up the Implementation Report has been performed by all the partners according to the schedule provided by the WP leader. The Site Managers have been in charge of

coordinating the contribution at a local level and providing ATAC and HCC with their inputs. HCC in particular has coordinated the chapter on Design of Measures of Del2.1. The implementation of Del2.2 has been performed in strict coordination with the Evaluation Manager, University of Southampton (TRG).

As mentioned above, an objective of WP2 is also to support the Project Management to monitor the implementation status of the measures, in respect of the declared milestones. For this purpose specific software has been developed dedicated to this activity.

Political issues both at the Consortium and at the CIVITAS level have also been dealt in WP2. The political representation of the four cities has been monitored and supported as a task of this WP, according to the following specific city level initiatives.

Specific initiatives at city level are highlighted here:

Rome: the political support in Rome has been guaranteed by the presence in the consortium of the Municipality and specifically the 2 key Council Departments: “Policies for mobility (Dipartimento VII)” and “Policies for the Environment (Dipartimento X)”. A level of uncertainty has been affecting the project development in Rome due to several electoral deadlines to renew the Province and the City Council respectively in 2004 and in 2006.

The local activities in **Rome** have suffered some delays due to the shifts of responsibilities, between STA and ATAC, the two agencies for mobility (respectively private and public). The merger between them has been a decision of high political level, aimed at guaranteeing a more efficient management of the mobility issues in Rome. The changes have happened in two steps during the project lifetime and have affected the drafting of both the Implementation Reports.

In fact at the outset of the project the two companies ATAC and STA, both controlled and owned by the Municipality of Rome, managed respectively the Public Transport and the private mobility issues (including Sustainable Mobility). In 2003 a first merger has occurred between the two companies, thus the competencies on “Sustainable Mobility” have been shifted to ATAC.

On 12th December 2005 the **merger between the two companies has been completed**, now all the competencies and employees of STA have been incorporated into ATAC, which is the only Agency for Mobility in Rome. This process has led to the **integration** and concentration of all the competencies and activities on mobility in one only actor.

In Rome the Implementation of some measures has heavily suffered the influence of the political involvement. Actually the “strategic” measures are those dealing with the access restrictions and parking/road pricing. These kinds of measures largely depend on national funds, coming mainly from the Ministry of Environment, which passes the budget to the Municipality and then money is transferred to the operative agency, in these cases formerly STA, then ATAC.

Winchester Overall the design, integration and implementation of the measures were managed successfully at the city level, with the monitoring and technical management being a joint effort with the project coordinator ATAC. The County Council worked closely with UK project partners TRG on the planning and execution of a comprehensive monitoring and evaluation programme.

Political support in Winchester from elected Members of the County Council remained strong throughout the life of the project despite changes of Executive Member for Environment and senior managers in Transport Policy. Strong support was also provided by Winchester City Council elected members, in particular in connection with air quality and off-street parking matters, for which the City Council are responsible. Considerable support was also received from

Stagecoach, the main local public transport operator. With their assistance the success of the public transport measures was assured through a partnership involving all three parties.

Key events essential to the success of the project were, the declaration of the Air Quality Management Area for Winchester city centre, the opening of the extended Park and Ride car park at St Catherine's on the outskirts of the city, signing up to a Quality Bus Partnership and a the full review of parking in the city; which led to the City Council adopting discounted parking, for environmentally friendly vehicles as part of its permanent policy.

Barcelona: In general, monitoring and integration aspects have been realised through local partners meetings (over 120 held during the project), led by DSD. When this process has appeared to be insufficient, the difficulties have been reported, leading to actions at Consortium and EC level. This occurred for the two measures presenting the greatest technical challenges (access control and real-time, multi-operator passenger information) reported at the Mid-term Review and subject to a Site Technical Review. Technical revisions were introduced leading to satisfactory implementation outcomes.

Cork: The design, implementation and monitoring of MIRACLES measures in Cork was overseen by the Local Steering Group in Consultation with the public as committed to in the original proposal. The design and implementation of WP 7 was completed in the first 2 years. In 2005 the experience designing the MIRACLES supported Park & Ride was applied to developing the Design of a new Park and Ride on the Northside.

For WP5, the design of the pedestrian Priority Zone was developed prior to the inception of MIRACLES, but Miracles funding allowed this basic design to be refined to include more cycle stands, electrical work for automatic bollards, better re-routing support from the UTC (Urban Traffic Control Centre etc). This design work was completed by end of year one, but it was so positively received and politically successful that council decided to expand the project and so the design work continued. In particular the design for the installation and operation of the automatic bollard access restrictions for an expanded Pedestrianisation Zone continued to be refined in consultation with key stakeholders in 2005.

For WP10, the design of the Travel to Work Survey was developed as soon as the Miracles project began and then refined every year in consultation with the other local WP leaders. Because a good database was built up over the first three years in the final year the database was simply refined by asking all new employees to fill and return questionnaires and sending reminders to other workers to update when they change address at home or work.

The design to improve cycling within the city was also completed at an early stage in the project (years 2-3). In year 4 a new promotional campaign was designed, to use cartoon style leaflets to promote sustainable transport- again further elaborated in the WP 10 description.

The WP 11 scheme was designed in the first 2 years of the project and implemented in year 4 according to the original design with one key variation. This variation related to the fact that a Park-by-Phone option was not made available to the Park and Ride Site users. Unfortunately this proposal was not deemed technically feasible using the current ticketing system and an alternative solution was designed.

The principle change was simply the inclusion of 25% diesel in the PPO, for the reasons outlined in the Evaluation Template and previous reports. In 2005 it was possible to run the vehicles on 100% PPO and the design was modified to include the use of biodiesel in 3 council vehicles.

3.1.3 WP 3 - Dissemination

Work Package 3 has been led by the partner Gruppo Interclub (Interclub).

Task 3.1 Public surveys

The ex-ante and the ex-post Public Surveys have been carried out in each site. The general objective of the Public Survey was to investigate the level of the users awareness in relation to the policies of Sustainable Mobility put in place in each site and also to understand the best way to implement the awareness itself.

Due to the differences of dimension and purposes of each site, the WP leader proposed to analyse the different approaches to produce a common version of the public survey, with a minimum number of common questions to be included in the site's survey.

This common version called "kernel version" has been produced and, after some amendments, approved by the partners. The kernel version has permitted a cross analysis of the data proceeding from the local survey. A final internal document with the cross analysis of the ex-ante and the ex-post survey have been completed and shared with the partners.

MIRACLES has also supported METEOR surveying activities on the CIVITAS initiative.

Task 3.2 Press Office, Conferences and web site

The centralized press office has been set up and, since the launch of the initiative, has worked to realize all the printed dissemination materials produced in the project life, to set up a common stakeholder database, and to gather and publish on the website the newspaper articles provided by the partners.

The press office has also worked in strict coordination with the WP leader in order to give support in all the local dissemination activities.

During the Project lifetime, MIRACLES has been actively represented in all the liaison groups arranged by METEOR, as well as in the workshops organised by the others Civitas1 Projects; MIRACLES has integrated the guidelines of the corporate identity in its dissemination materials both at European and local level.

The website has been continuously updated and upgraded during the project lifetime. The reserved area of the website has been used as internal communication platform to interchange documents and mails amongst the partner. The public area illustrated the project itself and the implementation achieved by the demonstrators. Just to have an idea of how the users' interest in the website has grown is useful to highlight the following data:

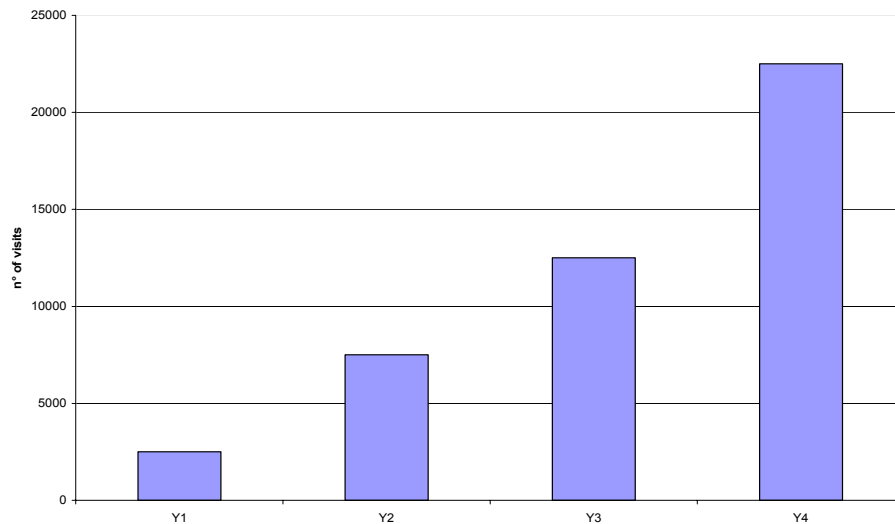


Fig 1 – n° of hits to the Miracles web site during the four years

More than the 65% have been Italian users most of that, especially in the last one and half year, represented by local bodies, institutional bodies, private associations. The most visited pages have been those related to the newsletters and to the project fact sheets.

Task 3.3 Coordination of publicity initiatives across sites

The Deliverable D3.1 has been produced and submitted to the Commission. This document represented the first step towards the coordination of publicity initiatives across sites through the definition of the dissemination tools in charge of the WP leader and of the intentions of each site in order to realize the local dissemination activities.

Consequently, at local level sites have been supported with advice and comment on the local dissemination print materials and the stickers with logos to be used on different layouts.

MIRACLES has worked closely with METEOR in all matters concerned with international dissemination activities. An important part of the coordination has been represented by the activities of the DLG (Dissemination Liaison Group), which have been reported to the partners at project meetings.

Special attention has been paid to the matters related with the participation in the CIVITAS Forum in Rotterdam coordinating the partners in producing first issues of the Fact Sheets.

Furthermore, a strong coordination effort amongst the partners has been necessary to produce all the dissemination materials exhibited in the MIRACLE|S stand prepared for the CIVITAS Forum and for the CIVITAS1 Final Conference, both hold in Nantes, that the Miracles Project has co-organized together with the others consortium. Strong coordination that has been necessary also to prepare and organize, following the indication of Meteor, the presentations related to Miracles activities for both events.

Coordination with the partners in order to produce a Multimedia including information, pictures, videos about CIVITAS Initiative and MIRACLES Project as a final dissemination material.

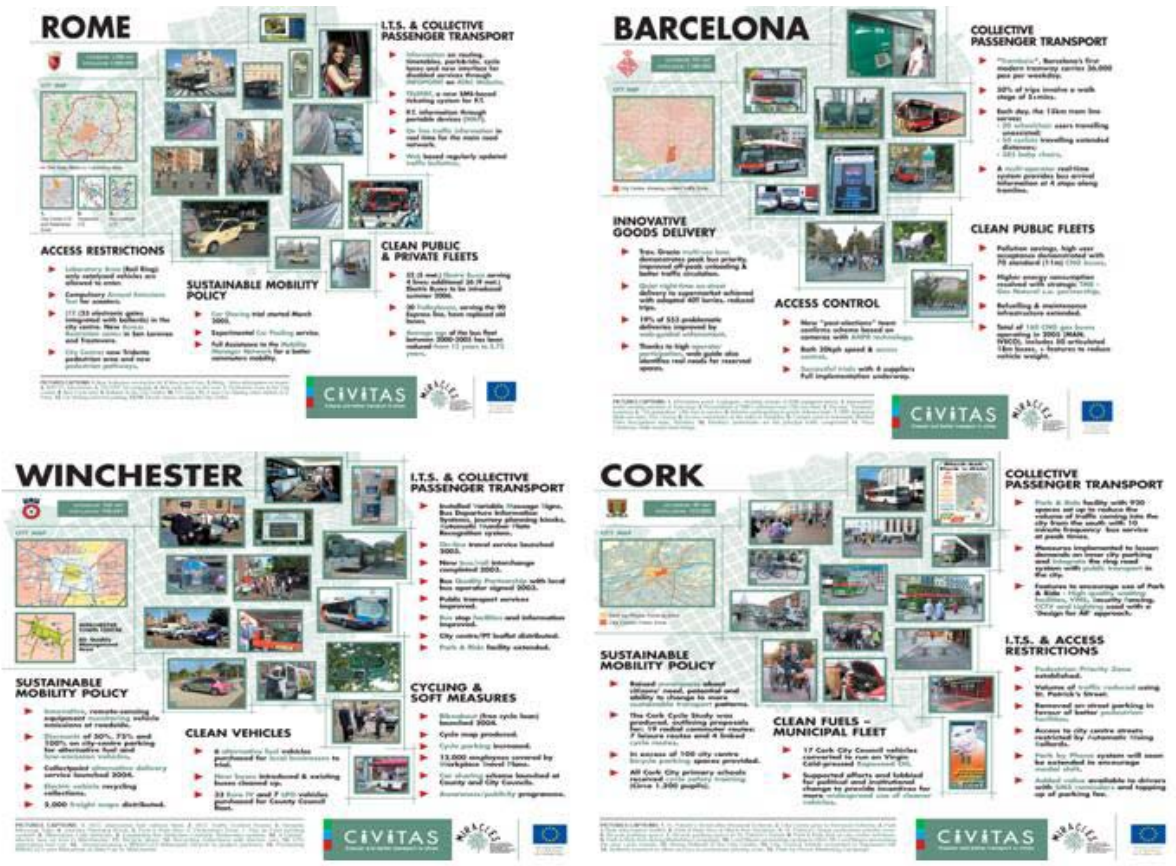


Fig 2 – the posters of the four cities prepared in occasion of the Final Conference



Fig 3 – the MIRACLES Stand at the Final Conference

Specific initiatives at city level are highlighted here.

Rome. Concerning important dissemination initiatives undertaken at local and national level we would like underline the following:

- 2004 - An agreement at Italian level for the project dissemination has been signed with ICS-Iniziativa Car Sharing (Italian Authority) in order to share stakeholders database and to share information about sustainable mobility.
- 2004 - Following the statements of the agreement, Miracles and ICS have co-organized in Rome the first Italian international congress on Car Sharing that has represented an important step for the Miracles dissemination.
- 2005 - An agreement with ASSTRA (Italian PTO Association) has been signed in order to disseminate CIVITAS-MIRACLES results to a wide national stakeholder audience. This agreement produced a mailing in order to inform all the ASSTRA associates about the CIVITAS Initiative. Also an article about the Nantes CIVITAS Forum has been written by the WP leader and published in November 2005 on “TP-Trasporti Pubblici” the ASSTRA monthly magazine distributed to all associates and also to all Mobility departments of Italian City Councils.

Winchester:

Important dissemination initiatives undertaken at local and national level were:

- 2003, 2004, 2005 - MIRACLES sponsorship of awareness raising events in Winchester such as Bike week, held annually in June and the alterative Transport Day, held annually on 22 August, proved the most effective way of raising awareness of the project and also the most cost-effective. The idea of a MIRACLES road-show increasing the opportunities for distributing publicity material was later adopted and panels produced for a roving exhibition.
- 2004 - 2006 many presentations on the work in Winchester were made throughout the life of the project. In 2004 key presentations were given to national Government departments dealing with the environment and transport, including the Highways Agency as part of a US technology scanning programme tour sponsored by the US Department for Transportation. In 2006 MIRACLES results, in particular those from the clean vehicle trails, were presented at the 30th UK Annual Transport Conference in Nottingham.
- 2005 - the project’s dissemination strategy generated a good level of coverage in the local and national media throughout the life of the project. MIRACLES initiatives were regularly reported by several newspapers, the technical press, local newsletters and magazines, intranet websites, through television and radio stations, and on the BBC website. A major arcticle on the project appeared in the highly respected journal Traffic Engineering Control in 2005.

Barcelona: An important activity has been the realisation of the Before (2003) and After (2006) surveys (telephone-based) with 1000 citizens, their processing, analysis and reporting. The results show increased awareness of the MIRACLES measures over the project lifetime, The most important mea of learning about Civitas for this city is press coverage (57% of respondents), followed by friends and “word-of-mouth” (23%).

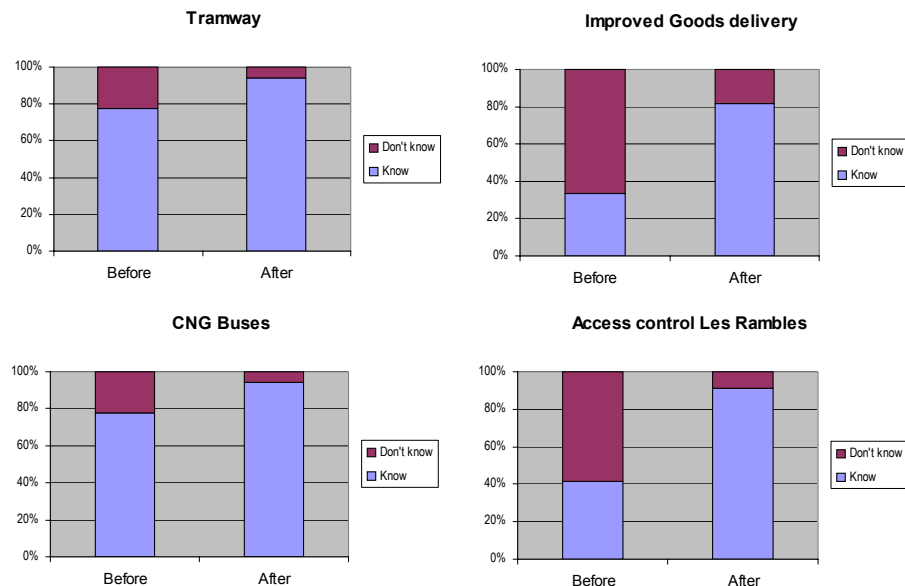


Fig 4

The press dissemination (over 100 articles) has been based upon the Factsheets. A final dissemination action is planned, following the reporting of the completion of the project at the City's Mobility Pact Annual Review; this will disseminate the improved acceptance ratings together with the Factsheets (in Castilian and Catalan), and is programmed for early June when the Summer Works Programme is communicated to the participants (30 to 40 key city stakeholders).

Cork:

General project dissemination work included the design of posters, summarising information about each of the MIRACLES WP activities in Cork.

- 2002 - The Traffic Section of the city councils website was redesigned and documents about MIRACLES were uploaded to this section of the website (especially about Biofuel research and related local and international events).
- Information about Biofuel and WP 12 was also disseminated at many local and international events: the Renewable Energy Information Evening (2002), the Civitas Forum (2003 and 2005), the national Energy in Transport Conference (2005), the Ireland's Premier Agricultural Show, the National Ploughing Championships and the National Lifetime Laboratory.
- The Park and Ride Service was promoted locally and nationally through advertisements in Newspapers and specialist magazines and even in parking fine notices.
- 2004 - At the Civitas Forum in Rotterdam, a member of the MIRACLES team shared information about how Cork has succeeded in establishing and developing such an economically viable Park and Ride Service.
- 2005 - The key dissemination actions for the miracles funded access restrictions measures (WP 5) took place: this consisted of pre-design, mid-design, pre and post pilot meetings and leaflet drops with local traders and residents. The council also took out advertisements in the local press encouraging shoppers to come into the city. Furthermore, the Miracles logo was placed on the equipment for warning advancing road users of bollard motions.

3.1.4 WP4 - Evaluation

Workpackage 4 (WP4) was led by the Transportation Research Group (TRG) of the University of Southampton.

WP4 defined a common evaluation methodology to be applied across the laboratory areas of the four cities, and reported their results. The WP was divided to form four tasks:

- Task 4.1: Evaluation Plan;
- Task 4.2: Ex-ante Evaluation;
- Task 4.3: Ex-post Evaluation; and
- Task 4.4: Cross-site Evaluation.

Considerable effort was made by all the MIRACLES partners within WP4, particularly regarding Tasks 4.1, 4.2 and 4.3. Two deliverables were produced within WP4:

- D4.1: Evaluation Plan (along with local Annexes); and
- D4.2: Report on Evaluation Results (with the Annexes consisting of Implementation Report No. 2).

The MIRACLES Evaluation Plan (Deliverable D4.1) was issued in 2003, and defined a common evaluation methodology to be used across the four sites to ensure that each site managed its own evaluation work under a consistent framework. This document consisted of a main report and four substantial annexes representing each of the four cities. The annexes provided detailed descriptions of the individual measures to be implemented, including the planned timing of implementation and the indicators to be used in their assessment. This measure level evaluation essentially consisted of before and after studies relating to the specific mode and spatial area affected by the measure with time intervals of data collection being assigned as appropriate.

For the Cork, Rome and Winchester sites, a larger study covering the wider city area (i.e. the city level evaluation) was undertaken to assess key impacts such as air quality and average traffic conditions. In view of the localised nature of the measures, together with the large city size, it was decided to provide data for METEOR-ITEMS as a means of assessing some of the city-level effects (such as emissions and speeds). For the Barcelona site, this was supplemented by city-wide surveys with citizens to measure changes in awareness and acceptance of the measures. The city level evaluation covered the city as a whole or city centre, depending on the site, with some data being collected at more regular intervals than others (depending on availability and cost of data collection). The annexes to D4.1 described the indicators that would be used at the city level to assess the impact of the integrated nature of the project.

The evaluation methodology within MIRACLES was defined according to four steps:

- The baseline scenario (i.e. the definition of the starting point for the application of the measures);
- The business as usual scenario (the estimated future effects if MIRACLES had not existed, but additional local initiatives had been implemented. These estimates were based on existing data, modelling tools and surveys);
- The ex-post phase (an after implementation of MIRACLES measures assessment compared to the results achieved in the previous phases); and

- The cross-site phase (where results of the local evaluations are drawn together).

At each site, the initial evaluation of the MIRACLES project involved the identification of the baseline scenario. This scenario defined the reference case against which the MIRACLES projects can be measured. Wherever possible, the data collection for the baseline scenario was consistent with the data collected for the ex-post scenario so as to provide accurate and comparable scenarios for the evaluation process. Each site produced an internal baseline report, which identified, for each measure, the indicators to be used, the proposed method of collection, and the source of the information.

The intention of the business as usual scenario was to enable an indication to be made of which ex-post results could be attributable solely to the MIRACLES measures, and which may have occurred naturally in any case (e.g. changes in fleet emissions due to natural fleet renewal) or as a consequence of implementing other initiatives at a local level outside the MIRACLES project. A secondary aim was also to estimate the foreseen impacts of the ex-post phase with the expectation that this would enable the maximum likelihood of identifying statistical significance of the ex-post findings.

The business as usual scenario was to be developed using data sources such as public transport patronage counts, congestion measures, fuel efficiency, fleet composition, cycling and walking, freight movements, parking profiles, public opinion and public awareness. The anticipated modelling tools included emission inventories, a meteorological model, microscopic and macroscopic simulation and other models (e.g. spreadsheet energy use models and fleet profiles). However, in practice, there were concerns about the value of the model (ITEMS) and in some cities, not all the originally anticipated data could be collected in time to use in the survey planning. In addition, the business as usual scenario is arguably not useful where there are no measurable differences between the ex-post and baseline results. (In some situations, this was due to a delay in the implementation of the measure meaning that the ex-post surveys were not undertaken for a fully working application). For some measures, a do-something scenario was created i.e. the estimated future effects based on existing data, modelling tools and surveys. For Rome particularly, these were considered very useful in the ex post phase, and it was found that some actual results exceeded the initial expectations. Together, the baseline and business as usual scenarios are often classified as the ex-ante phase of evaluation.

The ex-post phase is the most important evaluation phase, and assesses the actual impacts of the implementation at each of the demonstration sites. Data was gathered from a variety of sources and the main findings were interpreted and drawn together to make recommendations for the project's wider implementation within the city areas and at other sites.

The cross-site phase draws together the results of the local evaluations for a 'light-touch' approach to internal project cross-site evaluation. The task was responsible for linkages to the accompanying measure project and ensured that the local evaluation plans collated data in a consistent manner with the cross-project evaluation where appropriate. Within MIRACLES, similar indicators were used wherever possible at those sites that had comparable measures.

Even though each site evaluation work was consistent with a common framework, the cities are different in character and scale, and the detailed specifications and applications of the CIVITAS measures varied substantially between the cities. Thus, the evaluation process was developed using both top-down processes taking account of METEOR guidance and bottom-up processes, based upon what the cities saw as being necessary to undertake the local evaluations. The

MIRACLES project iterated with METEOR in the development of the METEOR ‘Core Indicators’ and participated actively in the Evaluation Liaison Group set up by METEOR.

The Report on Evaluation Results (Deliverable D4.2) was submitted in March 2006 and was revised with further evidence in August 2006. Earlier versions of the deliverable had been distributed to METEOR on an ad-hoc basis for their information and use. D4.2 reported the evaluation results at two levels: the measure-level and the city-level. A common template was developed for each level with their structure and content based on discussions between METEOR and the CIVITAS Projects. The templates ensured both a common reporting format and that all evaluation relevant information was reported and disseminated in a concise manner. The approach also aided the interpretations and key findings of each measure, and enabled a series of ‘headline results’ and lessons learned to be identified across the project. In addition, the up-scaling effects of several measures were considered, often using desktop exercises to estimate the potential effects of a larger scale implementation.

The MIRACLES evaluation approach focused on providing the results in accordance with the template format. All Measure-Level Templates (MLTs) and City-Level Templates (CLTs) containing the evaluation results were bundled as Annexes 1-4 to D4.2, and these annexes constituted the MIRACLES Implementation Report No. 2. A significant amount of work was involved in compiling these MLTs, and a total of 43 MLTs were produced: 21 by Rome, 11 by Winchester, 5 by Barcelona, and 6 by Cork.

Within the D4.2 overview document, for each Measure, the originally anticipated objectives and targets (as defined within the Technical Annex) were compared with the objectives of the actual implementation and the actual evaluation results. It should be noted that some measures evolved during the course of the project, and hence a direct comparison was not always feasible in such situations. A concise interpretation of each MLT was provided within D4.2, typically summarising the key points of each measure within one page. Similarly, the CLTs were summarised in terms of the five key areas of economy, energy, environment, society and transport. Another key chapter of D4.2 was the cross-site project interpretation of findings and conclusions, which was developed by drawing together the main findings of the evaluation using a “light-touch” approach. Whilst there are several measures in each Workpackage that address the same issues, the site-to-site variations in the measures themselves are considerable and single cross-site headline results were generally not possible. Instead, for each Workpackage, a series of headline findings were devised based on the results provided within the templates and summaries. These findings were split into “impact evaluation”, “process evaluation / lessons learned” and “content/scaling”. Finally, a series of concluding comments were provided relating to the evaluation process and physical / awareness measures.

It is worthwhile noting that the implementation timescales for many of the MIRACLES measures were postponed beyond those originally foreseen at the start of the project. This was mainly due to the innovative nature of the schemes being trialled, with unexpected technical and/or political problems often arising. Consequently, the evaluation generally occurred much later in the project lifetime than initially planned. Although the project was extended by a period of two months to partially compensate for this, the evaluation of some measures was based on only a few months, or even weeks, worth of data.

In addition, some indicators originally proposed within the Evaluation Plan were superfluous. In some cases, this was because the iterative nature of the project meant that the implementation of the measures or even the design of the actual measure itself changed, which meant that the

indicators identified in D4.1 were now redundant. However, some new indicators were added as well. In other cases, the data originally proposed to collect in D4.1 proved difficult to obtain in reality, or the process of collecting it changed during the project lifetime, which meant that it was not possible to directly compare the results year on year.

Although the majority of measured impacts did not change significantly in the short-term, it is likely that the effects of a project such as MIRACLES will become more significant in the longer-term. A potential strength of the project is that it proves to be a catalyst in raising awareness of issues among the general public now and perhaps influencing future actions, rather than in the public reacting to measures in the short-term. Encouragingly, almost all the measures implemented at the four cities will be continued in some way, and several will be expanded as a result of their success within MIRACLES.

3.2 Results from the demonstration cities

This part describes the results at city level, referring to the eight CIVITAS policy fields. It highlights the most important achievements and provides lessons of experiences including reasons for major deviations from the original planning. This section also refers to the integration of measures at the city level.

3.2.1 Rome

Access Restrictions

Set up of city centre clean zone

A multiple type action has been implemented in Rome. Regarding access control, the main effort was oriented towards the introduction of a new Electronic Access Control System (E-ACS) and the improvement of the existing scheme; in fact:

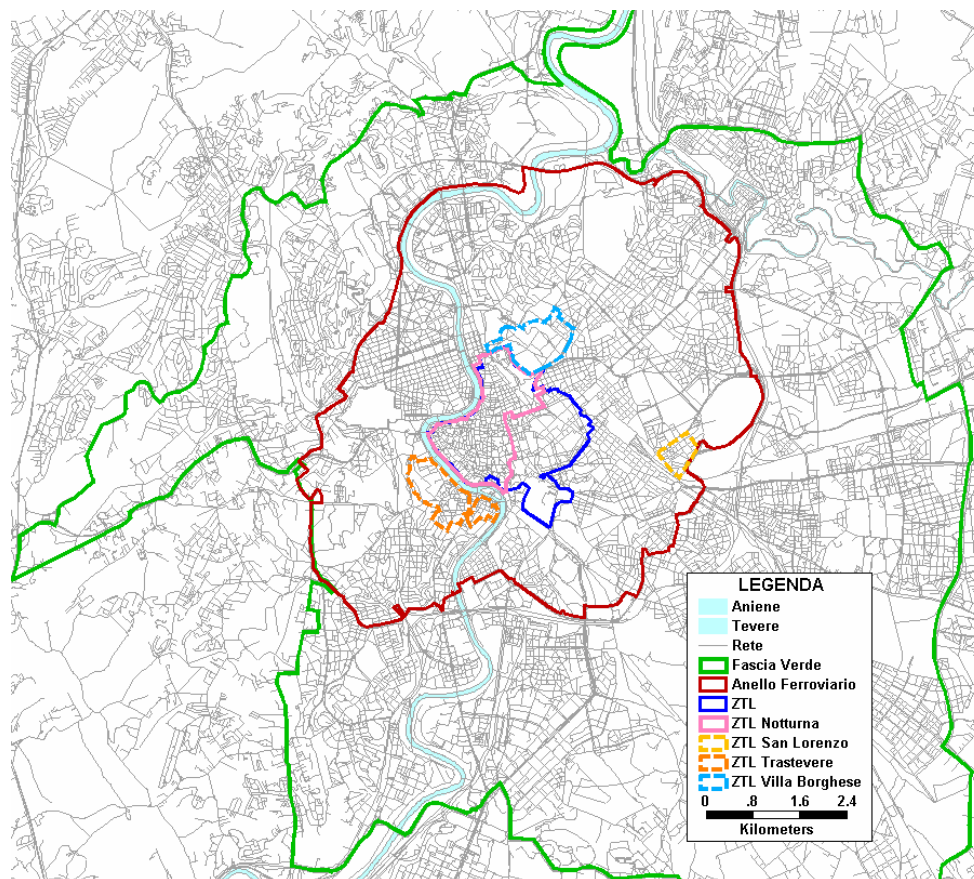
1. The access to the whole Laboratory Area cordon has been limited to catalysed vehicles since 2002 and has been running during all the project lifetime; besides annual reports on the air quality have been issued through the collection of data on traffic and pollution after the implementation of this measure;
2. Concerning pollution control of private fleet vehicles, the yearly check-up of vehicle emissions has been extended in 2005 to include the compulsory tune-up of motorcycles and mopeds;
3. In the central part of the Laboratory Area, the existing Access Gate System (AGS) is to be completed and integrated through the installation of a new access gate in via Dei Fori Imperiali with the aim of converting the whole limited traffic zone inside the I District (i.e. First District) into a “closed area”;
4. In the Trastevere district a new E-ACS was completed after the approval of the financing plan including funds from the Municipality and the Ministry for the Environment and an experimental phase with urban police control. The electronic system includes access gates with an Automatic Number Plate Recognition (ANPR) system and integration with a new gates road signalling system. The installation of the system was completed in March 2006. In the same time the access restriction policy has been issued (6,30-10 am every day and week ends 9pm – 3am); besides the ZTPP (“Pedestrian Island”) has also been created in Trastevere as unexpected outcome, allowing to increase the number of new on street parking lots.
5. A new E-ACS is also under implementation in the S. Lorenzo district, including access gates with an ANPR system (OCR plate analysis) and integration with a new gates road signalling system, for evening control of the private traffic flow; the installation of the gate system in S. Lorenzo will be completed within summer 2006;

Implementation of pedestrian areas and Local Urban Traffic Plans

The main goals of this measure were to increase the environmental safeguard of the city centre and pedestrian areas in the Laboratory area, and to improve the overall safety. **Pedestrian** areas have been created in the Centre of Rome, mainly with the completion of the “Tridente” pedestrian area and “LTZ D2” in the city centre, supported sometimes by the presence of mobile bollards. Another aim was to extend the Green Zones supply in the city, especially downtown, and to create a continuous network of pedestrian paths across the city centre.

Rome is now recognised to be in Italy the town with the largest extension of pedestrian areas with 364.000 m².

In addition, there were other implementations – Local Urban Traffic Plans (LUTPs) aimed at re-organizing the parking supply and re-shaping crossing areas to increase pedestrian safety.



The LTZ system in Rome

Integrated Pricing Strategies

Time-based road pricing

Since October 2001, Access Control System (ACS) and Road Pricing (RP) policies have been implemented in Rome. These have successfully led to congestion reduction during operating hours. However, congestion levels remained high during non-operating hours and so three extra tasks for RP were evaluated in MIRACLES.

There were three priorities to solve: RP for evening and night hours, RP schemes for tourist coaches, and the choice of Best Available Technology to control 2-wheeled vehicles in the Central LTZ. The main objectives of the measure were aimed at improving traffic mobility conditions and decreasing traffic related pollution in the LTZ.

1. Based on the fact that the access restrictions scheme in force (6 am – 6.30 pm) led anyway to a general reduction (25%) of the traffic flows during all the day and not only during the restriction band, it has been considered not worth to implement a night restrictions during the working days, but the **week end nights** were identified as the period when traffic congestion in the city centre is comparable to the rush hours. The Municipality has finally decided (Decision 1168/05) to implement the enforcement during the weekend's nights (Saturday – Friday 11 pm – 3 am) implemented as from 6th October 2005.
2. The Tourist Bus Plan has entered into force January 1st, 2006; with the aim of **improving the existing coach plan management**, according to the following:

- ✓ Introduction of new limited time parking areas;
 - ✓ Review of the charging system – (reduction of the typologies and introduction of a fare also for coaches smaller than 7 meter - new weekly, monthly and yearly passes)
 - ✓ Monitoring and travel assistance - innovative technologies and devices are available to provide information on the effective path followed during the day by each coach, in order to verify the match with the transit pass sold and to detect violations. It was desirable to use a Galileo based technology, but the system does not yet provide the necessary reliability standards, thus a GPS based system has been chosen.
 - ✓ Management of special events;
3. BAT for Automatic detection of two wheels - the tests were carried out in 2004 and showed that the devices for detection of plates cannot identify the smaller mopeds (50cc), thus it has been proposed to revise the plated of these vehicles and to have them all changed within 2006.

Environmental parking charges

This measure combined two sub-tasks: the extension of the on-street parking places, in the whole Rail Ring Area, and a feasibility study for future implementation of a new parking policy based on the introduction of different parking charges. The goal of the measure was to increase the on-street payment parking supply in the Laboratory Area and to generally improve the overall availability of on-street parking areas, including parking meters.

Collective Passenger Transport

Improving PT quality and security

Improving **safety and security** has been one of the objectives of this WP. An innovative video surveillance system has been experimented in Termini metro station, (the main city Public Transport interchange point). The system has been demonstrated to be capable of supporting the traditional CCTV in the automatic analysis and interpretation of specific video information (e.g. intrusion, unusual lingering or suspect movements).

Multi-modal and on-board information

Improving the **information** provided to the end users has been another objective.

The activities have been carried out following two main strategies: the improvement of the “pre-trip” and the “on board” information.

Concerning the former, added value information have been added to the existing web system, the InfoPoint, ATAC and Rome’s Geographic Data Base and best routing calculation tool, which now also provides detailed information on **cycle tracks** for bikers, as well as detailed information on accessibility to PT services for the **disabled**.

The second concerns the equipment of more than 200 buses with on board videos which provide “structured” information: on one side of the screen dynamic information Public Transport, such as points of interest close to each bus stop, intersections with other PT services etc on the other side of the same screen information on the social-cultural events in Rome, news from the world, advertising messages, etc.

New lines

The third objective of the WP has dealt with the introduction of **new PT lines**.

The “Limited Traffic Zone” policy during the night time has been implemented as well as the provision of a dedicated and low emission collective transport service. Two new **electric bus lines** have been introduced in the LTZs of “Trastevere” – line n°125 - and in “San Lorenzo” – line n°141- and have been designed according to the decision of the City Council to introduce limitations to traffic and pollution in these two areas (ref. WP5).

Along with the implementation of the electric bus line, a new “**exchange parking**” **integrated** with the LTZ implemented in Trastevere, has been inaugurated towards at the very end of the project as unexpected achievement.

A new **trolleybus line** has been implemented as well, covering line n° 90, along one of the main corridors linking the suburbs to the city centre, Via Nomentana. Special attention has been drawn to the environmental aspects concerned: control of noise and pollutant levels produced by the new depot, reduced visual impact of the overhead line, and, last but not least, the usage of ZEV vehicles.

Integration of PT

The last objective for this WP in Rome has been to provide an additional collective and **flexible transport service** to support the PT in areas with low demand and supply of PT (in northern sector of the city), called Taxibus. The service has been sponsored and supported by the Municipality of Rome which gave to ATAC (its Agency for mobility) the responsibility for managing and monitoring the service; at the end of 2005 eight lines were implemented.

New Forms of vehicle use

Activities aimed at enhancing the concepts of car-pooling and car sharing have been performed.

○ The **car-pooling** experiment has been developed by addressing a group of about 1.000 employees of the Hospital and of the Campidoglio Municipality office. The experiment did not show to be that successful, due to the high need of control and verification on the use of the dedicated parking areas. Following this outcome the Municipality has decided to fine-tune the award of funding for new car-pooling services in future, giving the priority to companies owning private parking areas.

○ The **car sharing** service experiment has shown to be more successful. The service is in operation since March 2005, the functionalities have been largely described in the Implementation report. The service has been dimensioned for a user group of 200 people, 10 cars of different sizes are available, 3 are natural gas powered, 3 are bi fuel and the remaining are gasoline powered. At present 160 people have subscribed the service and the number of requests is progressively increasing. After one month from the start up of the service ATAC has been constantly monitoring the performances and the following has been observed: in average each person uses the car for 4 hours, covering 35 km per trip.

New concepts for the distribution of goods

This WP was targeted at improving the dialogue between city authorities and goods operators, improving the organisation of the city logistic support, and facilitating the start up of e-commerce based activities. This was a “**soft measure**”, no implementations were foreseen and the main outcome has been a feasibility study to improve goods delivery conditions in the Laboratory Area. The study covered:

- Localisation and establishment of load/unload areas inside pedestrian precincts within well defined time-windows;

- Determination of main streets with bans on loading/unloading procedures within well defined time-windows; and
- Evaluation of possibilities to increase the attractiveness of night loading/unloading operations.

Innovative soft measures

Awareness measures

The goal of the measure was to promote specific awareness campaigns during the project, with specific regards to the single tasks supported by MIRACLES in Rome. Outcomes from the measure are: to encourage modal shift towards Collective Transport as well as to raise awareness on Sustainable Mobility issues and initiatives. This task has been performed by planning the different campaigns each six months according to the specific implementations in place.

Mobility Management measures

The objective was to encourage companies with more than 300 employees to appoint Mobility Managers. Actually during the project lifetime the number has increased from 130 to 180. The Mobility manager's role inside the company is to help optimise commuting plans, muster participants for car pooling, and provide information on opportunities and initiatives aimed at stimulating the use of collective transport. ATAC, in their role of Rome's Mobility Manager coordinator, has provided legal, administrative and technical support to the Mobility Managers, therefore playing an important role of coordinator between the political and the management level.

Integration of Transport Management Systems

Improved multi-modal traveller services

The objectives of the measure were to enlarge the supply of PT-related information using three main services:

- 1) e-ticketing - based on the outcomes of the TELEPAY Project, the large scale implementation of the system has been implemented;
- 2) the internet accessible tool developed by ATAC to get information on PT services, InfoPoint, is now accessible through different channels (SMS, WAP, i-mode, XHTML, kiosks) and in 5 different languages;
- 3) the development of a unique and open telematic platform to integrate information deriving from PT and the Tourism office.

Improved network management – Information

This was a multi-task measure based on the implementation of ITS technologies, to improve the quality of data and information required to control transit, traffic.

In particular, the application concerned the improvement of the "OCTOPLUS" system, which gives selective priority to trams and works with a "real time" information system for travellers, reporting news on electric panels at stops.

In the same way an AVL system has been implemented over the express line n°60, the equipment of the 48 electronic poles to provide information on the forthcoming busses, of the OBUs and of the depots has also been performed. The level of implementation has gone far beyond the target initially envisaged: 2.455 buses have been equipped with the OBU (On Board Unit), 285 electronic poles have been implemented, covering large part of the city.

Rome is now the second city in Europe after London for the number of “electronic poles” implemented.

Improved network management – Environment

This was a multi-task measure, in which both ATAC and ENEA were involved. It was based on the implementation of ITS technologies, to control the traffic related pollution phenomena.

ENEA performed field surveys to collect additional data on driving patterns and speed profiles along routes to allow use of a dynamic emission model and to acquire additional information regarding the local concentration levels of the more critical air pollutants in key locations.

ATAC, based on the outcomes of the Heaven Project, has developed an environmental analysis of Traffic Demand Management Strategies (TDMS) using a suite of simulation models.

Clean Public and Private Fleets

The objectives of this were twofold: one has addressed the renewal of the bus fleet in Rome, with the aim of achieving lower pollutant emissions from the PT vehicles circulating. The second has dealt with the opportunity to diffuse on large scale the eclectic scooters.

1) Concerning the former, the work has been concentrated on the purchase of electric vehicles: actually 30 innovative **trolleybuses** have been purchased and put in service on line n°90 early in 2005; 10 new **electric minibuses** have been put in operation since 2004, enlarging up to 51 buses the already existing fleet.

Then a strong effort has been put in the renewal of the **traditional bus fleet**. Compared to the beginning of the project, when almost of the bus fleet was composed of EURO 0 and EURO 1 Buses, and the average age of the fleet was 12 years, at present the situation is such: the average age of the fleet is 5.75 years, 60% of the EURO 0 buses have been eliminated, the EURO 1 buses have been completely eliminated, 908 EURO III and 200 EURO III CRT new buses are in operation.

A major deviation has concerned the purchase of 36 new electric “middle buses” presenting “innovative and demanding” characteristics, (improvements in the batteries storage capacity, passenger capacity up to 40, range of use 180 kilometres or 12 hours continuous operation).

ATAC had to launch the tendering process for three times, since no response had been received from the market. Finally the buses have been tested, and should have been in service after summer 2006, but problems were persisting with batteries which gave unsatisfactory results still. The supply has been suspended.

2) Concerning the **electric scooters** fleet and the recharging stations - 398 scooters that the Municipality had purchased in occasion of the Jubilee of the year 2000, have been allocated during the project according to a plan that has been designed for no profit organisations, Firms with Mobility Manager, Hospitals, Municipal Companies etc. mainly located in the city centre.

Concerning the implementation of the 8 new recharging stations, the timing has actually been exceeded. Although the design has been completed, the realisation has been stopped by the administrative bureaucracy; the tendering process has been launched by ATAC on behalf of the Municipality. The work will be completed within the year 2006.

Conclusions

In Rome the implementations have gone in some cases behind the expected results, especially concerning the Access Restrictions, the Pricing strategies and the realisation of Pedestrian areas; in other cases we have experienced “negative” results, it is the case of the supply of the electric Middle Buses which has failed at the very last stage, due to the insuperable problems with the

batteries. The supply was suspended and Rome can provide the other cities with important results on this issue.

When the proposal was submitted by Rome at the very early stage, according to the CIVITAS strategy, which did not expect to fund the installations nor the purchase of vehicles, Rome partners drafted a rough business plan expecting a funding by the EC which should have covered the costs for planning and design of the measures. In the following figure a synthesis is provided of the investments made in Rome, comparing them with the funding received by the CIVITAS Initiative to cover the costs for design, planning, monitoring the implementation of measures.

Total costs for investments in Rome	€ 167.300.000
Costs of Project design and support to implementation (5% of the investments, including just a 2,5% on buses purchase)	€ 6.490.000
35% of the Above Costs	€ 2.271.500
Funding by CIVITAS for Rome (ATAC and STA)	€ 2.284.000

Fig 4.2.1.1 – a synthesis of the investments costs in Rome

3.2.2 Winchester

Access Restrictions

Emissions from passing cars were measured using a roadside remote sensing device (RSD). Using these measurements it was possible to estimate the number of high polluting vehicles travelling into Winchester on the main radial routes.

A number of feedback strategies were developed to inform drivers of the results. The objective was to encourage voluntary maintenance of high polluting vehicles and to restrict them from the city centre. These strategies were:

- i) Use of mobile VMS at the roadside to inform drivers of the levels of their emissions (e.g. GOOD, FAIR or POOR);
- ii) Use of a website based database to list emission readings from individual vehicles;
- iii) Provide a subsidised emissions check and repair service to high polluting vehicles, and
- iv) Request high polluting vehicles to use Park and Ride instead of travelling into the city centre.

Detailed stated preference surveys were undertaken, as well as more general surveys, to understand the level of support for, and potential take-up of, the various feedback strategies.

Key Findings

The percentage of vehicles measured that could be classed as high polluters was very low (approximately 0.1% for CO, 0.4% for HC and 0.01% for NO_x).

Some general questions relating to roadside emissions testing were included in a questionnaire circulated amongst the general public. Approximately 1000 responses were received. 80% of respondents strongly agreed or tended to agree with the monitoring of vehicle emissions to assist and advise vehicle owners to help reduce pollution in Winchester city centre.

Conclusions and Lessons Learned

NO_x and PM₁₀ are key pollutants causing declarations of AQMA's in the UK, and this is likely to be the case elsewhere in Europe. Links to vehicle records held by regional or national agencies (e.g. the Driver and Vehicle Licensing Authority in the UK) would allow enrichment of the captured RSD records with fuel type, age, emissions standard and so on and enable a more targeted approach towards contacting the owners of the identified high polluting vehicles.

Integrated Pricing Strategies

The main objective was to promote energy efficiency of the vehicle fleet parking in Winchester city centre by implementing a variable tariff at several 'Pay and Display' car parks. Discounts of 75% or 50% were offered on the usual cost of a season permit for those vehicles in the road tax bands (A or B) with the lowest CO₂ emissions. In addition, owners of electric or hybrid vehicles were offered free season permits at these car parks.

Another aim was to implement a parking policy and pricing strategy to discourage long stay parking in the city centre and to encourage use of the Park & Ride (P&R). This policy, first introduced by MIRACLES, was later adopted by the City Council on a permanent basis.

Key Findings

Of the 359 vehicles issued with a season permit at participating car parks, initially 29 (8%) were eligible for a discount as of October 2005, this had increased to 41 (11%) by the end of the project

During the project lifetime, ticket sales for the seven busiest city centre car parks decreased by 16% (about 235,000 tickets), but increased at the P&R sites by 34% (36,000 tickets). Revenue at the city centre car parks increased by 11% (due to general fare increases) but only by 6% at the P&R sites. The latter is largely due to the increased take-up of the P&R smart card discounted ticketing system. There is therefore evidence that the parking policy and charging measures led to more drivers parking at the outskirts of the city centre area or the P&R site.

Other Results

An additional aspect was to offer people renewing their season permits the option of trialling the P&R service for free for two weeks. It was reported that 51 people took up this offer. Of these, 47 did not renew their city centre season ticket, possibly implying that they continued to use the P&R car park sites.

Conclusions and Lessons Learned

Low-polluting vehicles currently constitute only a small percentage of the vehicle fleet in Winchester, although the number of qualifying vehicles has steadily risen during the project lifetime (from 17 vehicles in May 2005 to 41 in March 2006).

The application showed that there is some potential for a greater shift in future years as the vehicle technology becomes accepted. The public generally agreed with the scheme, and there was some indication that it would influence future purchases of low CO₂ emitting vehicles. The scheme is to be expanded to include residents parking permits and an investigation is underway to provide discounts at P&R sites.

Collective Passenger Transport

A range of mini-measures included the purchase of 13 new low-floor buses serving two city centre routes and improved infrastructure and bus information. In addition, the P&R route was incorporated within the newly developed Bus Quality Partnership (BQP) and another cross-city P&R service to the hospital was trialled. The overall objective was to increase bus patronage and improve user satisfaction.

Key Findings

On the three MIRACLES routes, patronage increased by an average of 12%, but this varied between routes. For example, patronage on one city centre route increased by 25%, but decreased on the other by 6%, predominantly due to the change in service frequency. Passenger satisfaction ratings on the MIRACLES routes were very high, with 87% of passengers rating the service as 'good' or 'very good'.

Other Results

For the two MIRACLES city centre routes, revenue increased substantially. Ticket sales at the P&R site also increased substantially as a consequence of extending the car park.

There were significant reductions in emissions (43%, 62%, 47% and 52% for NO_x, PM₁₀, CO and HC, respectively), although the average age of the overall bus fleet only reduced slightly (from 7.27 years in 2002 to 6.71 years in 2004). There was also evidence of improved reliability: the number of early/late bus journeys reduced from 0.95% in 2002/3 to 0.34% in 2004/5.

Conclusions and Lessons Learned

The 25% increase in patronage along the MIRACLES-affected commercial route was attributed to it being a route with potential for passenger growth and including destinations with high passenger demand. The significantly lower price for the P&R service (£1.50 / day in September 2005) compared to the cost of parking at a city centre car park (£6 / day) is likely to have been a key factor in the success of the P&R service.

The cross-city P&R service was set up to provide an alternative mode of travel for staff working at the hospital. It was abandoned at the end of the seven-month trial because it attracted few passengers.

New Forms of Vehicle Use

The main initiative was the introduction of the Bikeabout scheme. This was a pool of 50 bicycles situated at two main locations, available for the public to borrow for a one-day period (or longer). The scheme was free of charge although for security, each participant had to join the Bikeabout scheme beforehand and pay a membership fee of £15. Other mini-measures were the installation of additional cycle stands, and the redesign of a Pocket Cycle Map for Winchester.

Key Findings

As of August 2005, the Bikeabout scheme had 160 members and peak usage resulted in almost all the bicycles being used at any one time. A small number of travel diaries were completed, and the average trip length was 2.7 miles (4.3 km approx) with 57% of journeys being round trips. Most users usually travelled by bicycle or on foot within Winchester, although three people stated that they had switched from car. The majority (83%) of members thought that the scheme was generally good. Cycle parking surveys found that the peak number of cycles parked in Winchester increased by 46% during 2002-05, although the additional Bikeabout bicycles influenced this. Bikeabout users were fairly evenly split in terms of age, gender and journey purpose. The general MIRACLES awareness and acceptance surveys found that 38% of the public were aware of the Bikeabout scheme and 66% generally agreed with it.

Conclusions and Lessons Learned

Winchester is a relatively small city with most facilities being within walking distance of the City Centre, thus reducing the attractiveness of cycling. The manual operation of the scheme meant that the operators could actively promote it and also provided a visual contact for the service. In terms of infrastructure, there is only limited scope within Winchester to develop and install new cycle lanes due to the lack of road space and high cost. It proved difficult to find additional locations to install cycle stands; Winchester has nearly 200 installed already.

New Concepts for the Distribution of Goods

This was implemented through three mini-measures:

- *the Collectpoint trial*, which aimed to help e-shoppers reduce the number of missed home deliveries by using a chain of local convenience stores as a delivery point;
- *a Winchester freight map*, which was distributed to freight companies and venues such as petrol stations to improve the efficiency of urban freight delivery;
- *a waste recycling scheme*, which used an electric vehicle to undertake a waste cardboard and paper recycling service for Winchester city centre businesses.

Key Findings

A ten-week Collectpoint trial was undertaken and heavily promoted, including the prior distribution of flyers to 20,000 households. However, response was disappointing with only 75 people registering on the Collectpoint website and eight using their voucher. This was partly attributable to technical difficulties with the website and the voucher system. A second, more comprehensive, trial was planned but this did not materialise due to the disbanding of the relevant sector within the company.

As of August 2005, the waste recycling service serves over 30 businesses in Winchester, each month collecting over one tonne of recyclable waste (predominantly cardboard and paper). In addition to the environmental benefits, there was some indication that the use of an electric van was an incentive to local businesses to sign up to the scheme since they perceived it as being a useful Public Relations exercise.

Other Results

In parallel with the initial Collectpoint trial, questionnaires were distributed to 1600 households. From the responses, it was estimated that the average first-time failure rate of a typical home delivery was 20%, and that the majority of respondents stated that they would consider using the scheme. Simulation also found that if a fully operational scheme had been implemented, potential benefits could be gained in terms of reduced time and distance travelled.

Conclusions and Lessons Learned

The initial Collectpoint trial was marred by technical difficulties and only a few people used the service. This lack of data means it is difficult to assess whether the Collectpoint scheme would have been commercially viable, although this trial indicates it is not.

Evidence was difficult to collect to show that the freight map was used by freight companies, although some subjective comments suggested that the simplified map was useful, with the map being a useful tool for freight drivers, most likely picked up at service areas and filling stations.

The waste recycling collection trial appears to be an economically viable venture for the company running the scheme since the service is operated on a full-time basis. A client base of over 35 Winchester businesses has been established and the scheme has been expanded to other towns in Hampshire.

Innovative Soft Measures

The main objective was to raise public awareness and acceptance of the measures being implemented within MIRACLES among visitors and residents of Winchester and businesses in the city centre. A variety of dissemination methods was used including leaflets, radio advertisements, a Winchester MIRACLES website, demonstration days and a school art competition. In addition, businesses, organisations and schools were encouraged to develop green travel plans.

Key Findings

Public awareness and acceptance of MIRACLES initiatives was assessed through five sets of questionnaires. Awareness of the MIRACLES logo increased from 3% during the baseline survey to 20% in the final survey (and 24% in the business survey undertaken in 2005). A comparison was undertaken regarding awareness of individual project initiatives. The highest levels of awareness were for those initiatives that had a high visual presence, for example: the demonstration days (57% for Bike Week and 51% for Alternative Transport Day), Bus Departure Information Systems or BDIS (49%) and VMS (42%), Bikeabout (38%) and improved appearance of bus stops (38%).

Other Results

The percentage of respondents who generally agreed with the council policy of encouraging people to reduce car use and travel by sustainable methods, increased from 69% in the baseline survey to 71% in the final survey.

The number of employees covered by a workplace travel plan increased by 7,722 during the lifetime of the project to a total of 11,835.

Conclusions and Lessons Learned

The demonstration days were particularly successful as they were highly visual with Bikeabout bicycles, cleaner cars and electric vans on show.

Awareness and (stated preference) acceptance of an initiative does not necessarily influence travel behaviour. For instance, 71% of the public agreed that it was important to travel by sustainable transport, but only about 25% used a mode of sustainable transport in Winchester on a daily basis (based on all responses to the final questionnaire survey).

Integration of Transport Management Systems

This measure installed a variety of information display systems to provide better multi-modal information for travellers, especially public transport users. The systems included Bus Departure Information Systems (BDIS), information kiosks, real-time Information Display Units (IDUs), Variable Message Signs (VMS), and the use of mobile devices to access the ROMANSE on-line website.

Key Findings

Two kiosks located indoors, one at the Tourist Information Centre (TIC) and one at the Hospital, and two outside, one in a pedestrianised area and one at the railway station, recorded over 3,500 users per month. On-screen and on-street surveys were undertaken. The on-street survey rated the kiosks highly (94% to 85%), more people stated that they found the information they were looking for (97% to 72%), more found them easy to use (94% to 83%) and more agreed with the aim of improving sustainable transport (89% to 62%).

Other Results

In terms of awareness, 49% of the general public were aware of BDIS, 23% of the kiosks and 19% of the ROMANSE on-line website.

Conclusions and Lessons Learned

The two kiosks located outdoors attracted approximately four times as many users as the other two kiosks, primarily because there were many more potential users.

Many passengers were initially reluctant to switch to BDIS from printed timetables. From the questionnaire surveys, it is likely that the BDIS screens would have been more effective had they provided bus information in real-time. (An updated real-time information system is due to be installed in Summer 2006).

Network Monitoring

The main objective was to use an Automatic Number Plate Recognition (ANPR) system to collect real-time journey times on radial routes into Winchester city centre, and then disseminate this to travellers using Variable Message Signs (VMS) and the ROMANSE website. In addition, it was planned to investigate the possibility of generating Origin-Destination (O-D) flows to improve the longer-term planning process.

Key Findings

A thorough evaluation of this measure was not undertaken, however the system is working well and reliably provides journey times to both roadside VMS and schematic diagrams on the ROMANSE on-line web site.

Other Results

From the general MIRACLES awareness questionnaire survey, 42% of respondents stated that they were aware of VMS displaying traveller information. Journey time data was collected along inbound routes between an outer and inner cordon, meaning that some approximate inbound O-D information was collected.

Conclusions and Lessons Learned

An ANPR system of this type requires an extensive validation process in order to verify that the information disseminated to the public is accurate. In addition, the siting of ANPR cameras in a historical city such as Winchester proved difficult. The camera locations were partly chosen to minimise visual intrusion.

Clean Public and Private Fleets

Task 12.1: Cleaner Vehicle Buses

The objective was to reduce the environmental impact of the bus fleet owned by the main operator in Winchester. Of the fleet of 60, 15 new Euro III buses were introduced on two city centre routes, 10 buses were re-powered from Euro I to Euro III standard and four Euro II buses on the Park & Ride (P&R) route were fitted with Continuous Regenerative Traps (CRTs). Selective Catalytic Reduction systems were also installed on one of the re-powered buses and five of the new Euro III buses. Two new Euro III slim line city buses were also purchased serving demand responsive services. A secondary aim was to introduce the public to different vehicle fuel types and a diesel/electric hybrid bus was demonstrated during two week-long trials along the P&R route.

Key Findings

Maintenance costs decreased by 60% for the new Euro III buses, although fuel consumption increased slightly. For those buses that were re-powered to Euro III, fuel consumption remained constant. The re-powered Euro III engine buses had lower smoke test readings than when fitted with Euro I standard engines.

The percentage of 'lost miles' (due to vehicle breakdown) for the overall bus fleet decreased during the project timeframe. This was partly due to the introduction of the new Euro III buses that were seen by the operator as far more reliable with less likelihood of overheating.

Other Results

A desktop study focusing on a key street within Winchester centre estimated the pollution reductions that could be achieved for a range of bus scenarios. Comparing the 2005 emission factors to those of 2002, emissions of CO, HC, NO_x, PM and CO₂ were reduced by 44%, 42%, 26%, 53% and 2%, respectively.

A questionnaire survey was undertaken to assess user acceptance of the two new electric hybrid buses, which were each trialled for a one-week period on the P&R route. 63% of respondents perceived that the hybrid bus was more comfortable than the usual P&R bus (Euro II with traps) and 81% thought it was quieter. 24% stated that the permanent introduction of such a hybrid bus would make them use the P&R service more frequently.

Conclusions and Lessons Learned

Re-powering buses to a higher Euro emissions standard is a cost effective and energy effective way of reducing the pollutants of city centre buses. The 13 new Euro III buses were to be fitted with Selected Catalytic Reduction (SCR). However, technical problems with the conversion of the first re-powered vehicle resulted in the programme being delayed and reduced to six buses.

The use of four new electric hybrid buses on the P&R route was considered, but due to financial and contractual factors, it was decided to replace these with five new Euro IV buses in July 2006.

Task 12.2: Cleaner Municipal Fleets

27 new Euro IV diesel vehicles were purchased for the council's own car fleet. In addition, the County Council joined "Motorvate", a government sponsored best practice "green fleet" programme, to help make recommendations to reduce unnecessary business mileage and emissions. It was hoped that other companies in Hampshire would follow this example. Four new library buses (or discovery centres) were purchased, each fitted to Euro III standard with CRT.

Key Findings

As a result of using the Euro IV vehicles, it was estimated that a 2.3% reduction in CO₂ was made. This reduction is small since HCC were already in the process of buying Euro III vehicles. Companies with older vehicles would see much greater reductions, particularly in CO₂ as well as the other pollutants.

Other Results

The CO₂ emissions of HCC's transport operation were estimated. In 2003-04, the Hampshire Transport Management (HTM) fleet (less than 3.5 tonnes) travelled 1.03 million miles producing a total of 326 tonnes of CO₂. The 'grey fleet' of privately owned staff cars travelled about 18.5 million miles (increases of 4% from 2002-03 and 9.5% from 2001-02) producing 4920 tonnes of CO₂. Motorvate set targets of a 12% reduction in CO₂ and 3% mileage reduction, spread over five years, for both the HTM fleet and officers using their own cars at work, sometimes referred to as the "grey-fleet". HTM are on target to meet these reductions and "grey-fleet" mileage has already reduced by 3.5% in 2004-05.

Conclusions and Lessons Learned

The price differential between 'normal' and 'cleaner' vehicles is still high and is a major deterrent in companies purchasing such vehicles. In addition, the technology is still fairly new and it may take a while for companies as well as individuals to become more familiar with them. Companies with pre-Euro, Euro I or Euro II vehicles would gain most by an upgrade to Euro IV vehicles in terms of their emissions (g/km).

Task 12.3: Clean Fuel Support Services

The objective was to encourage the use of alternative fuel vehicles by businesses, by overcoming barriers and establishing a business case for the introduction of clean engine technology. A fleet of six clean vehicles was purchased: two vehicles were LPG/petrol dual-fuel, two were petrol/electric hybrid and two were battery electric. Each participating business was loaned one vehicle for a period of up to one month.

Key Findings

After the trials, respondents were asked to rate the trial vehicle. 82% rated the trial vehicle as generally good, 55% thought it was generally better than their usual fleet vehicle, and 65% stated that they were likely to purchase a clean vehicle in the future for business use. 11 businesses stated that they would purchase a clean vehicle in the future. The three most important factors cited were operating costs, reliability and purchase cost.

Other Results

Emissions savings were estimated. For the petrol/hybrid clean vehicle type, CO₂ emissions reduced by an average of 40%, CO by 20% and HC+NO_x by 70%. There were also energy reductions of 37%. For the LPG/petrol dual fuel vehicle type, average CO₂, CO, and HC+NO_x emissions reductions ranged from 9-18%, 30-78%, and 58-74%, respectively, and the energy reduction was in the range of 1-5%.

In terms of fuel cost per km compared to the usual vehicle, petrol hybrid vehicles and LPG/petrol dual fuel vehicles provided average savings of about 40% and 20%, respectively. 17% of the public were aware of the clean vehicles and 83% generally agreed with the measure objectives.

Conclusions and Lessons Learned

The clean vehicle trial required substantial resource to clean and maintain the vehicles. Problems were encountered such as lost keys, broken windscreens, damage to bodywork and vehicle breakdown.

The perceived higher purchase cost and unproven technology associated with a cleaner vehicle, together with a limited range of models, is off-putting for many companies. In addition, the lack of refuelling places for LPG and electric vehicles is still a deterrent to more widespread use of such vehicles. (For instance, there are only two filling stations in Winchester that sell LPG).

Businesses tend to renew their company vehicles at set times over cycles of several years. Therefore, the effect of the trial in encouraging businesses to purchase clean vehicles may not be evident for a number of years.

3.2.3 Barcelona

The Before (2003) and After (2006) surveys (telephone-based) with 1000 citizens provide measures of the changes in city-wide acceptance of the implemented measures.

Figure n presents the Before and After survey results for the acceptance ratings of the measures being implemented in the city of Barcelona. The measure achieving the highest score (7.9 on the 0 to 10 scale) is achieved by the CNG bus fleet, and this rating is unchanged over the two surveys. Initially with the lowest rating (the major roadworks for line construction had only just been completed), the acceptance rating of the tramway shows the greatest improvement (from 4.3 to 6.8). The access control and goods delivery measures also show (less dramatic) improvements in acceptance ratings in the After survey. All measures score 6.8 or higher (0 to 10 scale) in the After survey.

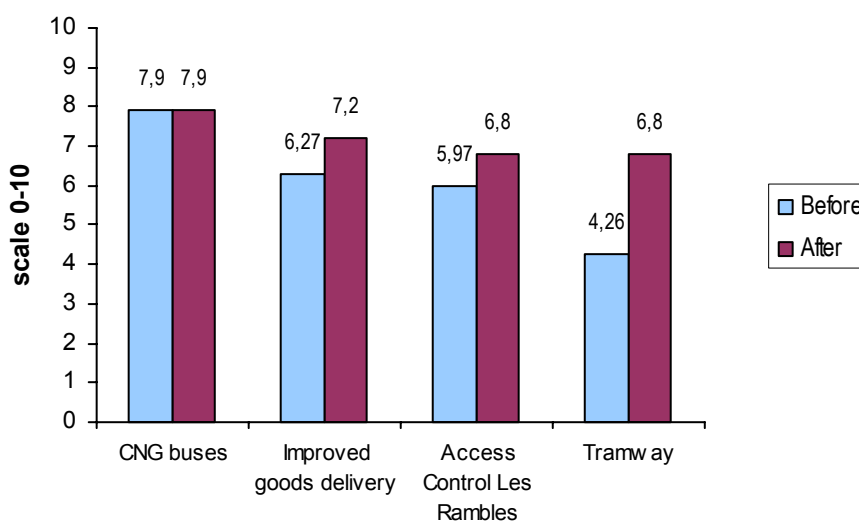


Figure1: Before (May 2003) & After (March 2006) Acceptance of MIRACLES measures in Barcelona

Access Restrictions

The decision in favour of Automatic Number Plate Recognition (ANPR) technology, instead of retractable bollards, took considerable time to achieve; the reasons for choosing to trial ANPR are:

- the increasing maintenance costs of the existing (40+) bollard-controlled gates,
- the difficulty of managing queues associated with bollards located on or near primary roads, and
- the on-going improvement in the Municipality's processing of camera-based fines.

This decision was taken at the technical level following the first changes in key staff (early 2004) but was not politically endorsed until the end of the year; the decision to implement a full scheme was made conditional upon certain consultation procedures (resolved early 2005) and the outcome of technology trials.

During Spring 2005 four different ANPR technology suppliers demonstrated their systems. It was shown that read levels of car number plates at a single point exceed 90%, that cameras located at the entry and exit points could be used to detect trajectory (speed over distance) speeds exceeding the limit, but that (with a 30% recognition rate in the best case) manual police enforcement would still be required to enforce access restrictions applied to powered two-

wheelers carrying the smaller number plate. These results were considered sufficiently positive to proceed (via open tender) with procurement of an ANPR system for permanent operation. The supply contract was awarded to SICE in December 2005, and the system has been implemented in the following six-month period, after overcoming significant technical difficulties (to achieve full fibre-optic connecting between all roadside controllers and the Control Centre). The scheme is ready to become operational, as a permanent scheme, once temporary works relating to metro station improvements are completed (in September 2006).

The closure of the Ramblas from 11.00 to 20.00 to non-authorized motorised traffic has been estimated to reduce the daily vehicular traffic by around 40%. Surveys of pedestrians (numbers and crossing times) were undertaken, and it is estimated that the reduction in delays to pedestrians (crossing the lower level of vehicle traffic) produces first year scheme benefits that exceed the scheme's implementation cost (500,000 Euro). In collaboration with the SILENCE project, "soundwalks" have been realised to assess the "Before" noise levels.

Collective Passenger Transport

Operational since April 2004, the new tramway line ("Trambaix"), of 15 km length, with 25 stops, carries a growing number of passengers, exceeding the first year forecasts. By the end of MIRACLES, monthly usage had grown to 42,000 passengers. Usage was half this level at the start of operation, and around 30,000 pax/day when surveys were undertaken (November 2004) to determine characteristics of customers; it was found that a third of all passengers made trips not previously made, 20% of those making a previous journey had switched from private motorised modes, that more than half of all travellers used the tram in combination with a walking trip (of over 5 minutes duration), and that the reason most cited for using the tram was its higher perceived journey speed). The re-urbanisation of streets and roads has seen the conversion of 162,500 m² of road space into pedestrian spaces and new cycle routes, and 135,000 m² of roads into green planted areas. The importance of the tram as part of the urban redevelopment strategy is reflected by the fact that slightly more than one-third of surveyed passengers were making trips (11,500 per day, of around 5km trip length) that they did not previously make.

Rising from 16.5 km/h during the first months of operation, the tram *running* speeds were almost at the target design levels of 20km/h at the project finish (18.5 km/h). The high level of tram+walking trips suggests that passengers greatly value the ease-of-access of the tram (compared to accessing other rail modes), and that they positively rate the tram in terms of *overall door-to-door journey speed*.

Within the Trambaix corridor, extending over 6 municipalities of the Barcelona metropolis, ATM has collaborated with bus operators to offer passengers improved information about the times of bus arrivals at stops along the tramway line. By late 2004, the smaller bus operators (providing services beyond the limit of the city of Barcelona) had been equipped with a third-generation Automatic Vehicle Monitoring (AVM) system. The integration of arrival times of buses operated by the main city operator TMB, was then achieved, using a GPRS-based protocol. The final part of the work involved agreements between ATM (information panel provider) and three local municipalities (electricity supply, minor works and maintenance) to implement display panels at four bus stops.

The first of the bus stop display panels was fully operational (information about all buses services) at Pont d'Esplugues from September 2005, with the remaining three stops operational in Spring 2006. Based on ticket transactions of multi-stage journeys, comparing data for September-October of 2004 and 2005 for the Pont d'Esplugues stop with that of all 21 stops along the tramway, it appears that some 48 additional passengers per weekday use the stop

showing bus arrival times. This encouraging first result is to be reviewed as additional data becomes available for the other three stops displaying arrival times.

New concepts for the distribution of goods

“Multi-use lanes” constitute the Municipality’s main tool for improving goods deliveries on primary roads. In the course of MIRACLES, as a result of the Traversserra de Gracia (1.5 km length), Fabra i Puig, Mallorca and Trafalgar schemes, the total length of multi-use lanes implemented in Barcelona increased from 1.8km to 6.5km. The former scheme was innovative because it introduced bus priority peak-hour regulations (including new VMS sign messages). The suppression of 40 on-street parking spaces was a major factor in achieving improved circulating speeds.

MIRACLES also looked for other solutions. Mercadona supermarkets demonstrated that quiet night-time deliveries were feasible using adapted 40T lorries, electric forklifts and specially-trained staff. Implemented at 5 locations in the city and extended to over 100 locations nationally, the operator claims that the investment has been recovered within three years. Other supermarket operators (Condis, Lidl..) are collaborating with the Municipality to find solutions applicable to smaller supermarkets, using smaller lorries (e.g. using plasticized ro-ro containers – see SILENCE project).

A dozen operators (belonging to, and led by, the national association AECOC) participated in a trial using the Internet to communicate the time, type and location of delivery problems. During the second half of the 16-week trial, enforcement agencies used this information to target their enforcement activities (issuing penalty notices and towing away illegally-parked vehicles), leading to a 20% reduction in problem reporting. The trial also included experimental “PICT” regulations to allow operators short time windows to deliver from road spaces directly in front of the (Supersol, Sorli and Caprabo) supermarkets. Although operators (Condis, Dia...) are keen to continue with the PICT approach, the Municipality has been busy implementing a city-wide control of on-street parking – called “Area verde” – and the future of the PICT concept for improving deliveries on local roads is currently pending review by the Municipality.

Clean Public Fleets

During the development of the MIRACLES proposal, TMB, the city’s bus and metro operator had established a strategic agreement with utility company, Gas Natural to introduce Compressed Natural Gas (CNG) buses. During the first year of MIRACLES a total of 70 CNG buses (12m long, MAN and IVECO) were demonstrated on 3 different routes. The fuel consumption of these buses was quantified and compared with the Diesel 1 buses that they replaced; pollutant emissions were then estimated by applying models to the fuel consumption measurements. Surveys of bus drivers and passengers were also realised.

In addition, the comparative costs of vehicle acquisition and maintenance were computed, taking account of the maintenance benefits of special workshops constructed during 2003 to facilitate maintenance of CNG (and other) buses with fuel tanks located in the roof of the vehicle (TMB also participates in the CUTE Hydrogen bus project).

The assessment showed that, although the CNG buses consumed around twice the fuel (results vary according to the hilliness of the route) they achieve important reductions in NOx (4kg/100km), CO, and particulates. They are also perceived as being quieter, and offer a better economic return than the vehicles they substitute. On this basis, and taking into account the improved offer of CNG bus manufacturers, by the end of 2005, 90 new CNG vehicles were acquired (40 standard 12m length but with reduced weight, and 50 new articulated, 18m-long

buses). In principle, the vehicles acquired in the 2005 fleet expansion offer improvements in both energy consumption and in lower maintenance costs, and this would tend to support the policy of progressing to an acquisition of 250 CNG buses within the 2006 time frame established in the project objective. However, other bus technologies are also improving, and some of the CNG bus emission results are dependent upon the sustained performance of catalysers. Hence, further evaluation, using the improved on-bus method is now being developed by TMB so as to support the decision-making of further CNG bus acquisition.

3.2.4 Cork

Access Restrictions

Plans to refurbish St. Patrick's Street were agreed before the Inception of MIRACLES. However the traffic division wanted to enhance the basic refurbishment to further promote sustainable transport and capitalise on the opportunity presented by the project to create a Pedestrian Priority Zone. Towards these ends, CIVITAS funding was sought to help fund the installation of access restriction bollards, marble seating blocks, extra cycle stands and chrome bench bars for leaning against. MIRACLES also supported the SCOOT upgrade to reroute traffic and the improvements to pedestrian crossings on the streets (The crossings in and around the Clean Zone were designed to be easy to use for wheelchair users, blind people or buggy pushers etc.) However there were several unanticipated benefits of participating in MIRACLES that impacted on WP5. Firstly Cork City Council gained valuable insights into the operational features of various access restriction schemes in other cities from MIRACLES Partners and other CIVITAS cities through the exchange of Documentation/Newsletters/factsheets and presentations at meetings/fora. This helped Cork City Council to draw up a better specification for the bollards. The first bollard purchased did not incorporate traffic signalling as is UK standard practice, but having seen the bollards used in Barcelona and other central European Countries the City Council decided that the bollards in these countries, which do feature traffic signalling were far preferable. Accordingly the call for tenders for the bollards to restrict access to Oliver Plunkett Street, required that the bollards feature a crown of led lights, traffic signals on the approach and siemens remote monitoring. The successful tenderer: Supertech was actually based in Barcelona so the site leader was able to visit the supplier following a MIRACLES partner meeting in Barcelona in June 2005. Attendees at the CIVITAS Fora (in Graz and Nantes particularly) received several warnings about how people try to get around access restrictions in other cities. Unfortunately the automatic number plate recognition and CCTV options employed by other CIVITAS Cities could not be employed by Cork City Council without co-operation from the Gardaí (local police) since the council cannot regulate traffic violations against moving vehicles. However warnings in Nantes about cars breaking one-way rules, to access restricted areas prompted the Council to ban all on-street parking from all streets leading into or out of the Pedestrianised zone, during the hours of Pedestrianisation and the gardaí did agree to be extra vigilant in this area.

Collective Passenger Transport

Originally it was intended to construct and operate a new Park and Ride Scheme in the city during the life span of MIRACLES.

With the aid of MIRACLES funding, features which Cork City Council planned to include at this facility were: Variable Message Signs (VMS) on the approaches-to promote the Park and Ride Facility, Security Fencing, CCTV Surveillance Systems, Entry/Exit Control Barriers, Landscaped Parking Areas, Pedestrian Walkways, Lighting Signage etc. The inclusion of some of these features (particularly VMS and the pedestrian walkways) would be largely dependent on part funding from CIVITAS.

The site was constructed as promised on a 3.25-hectare former landfill site located approximately 3.3 kilometres southeast of the city centre (in City Council ownership) at the Black Ash/South City Link Road. The features listed above were all included with the exception of the pedestrian walkways. Pedestrian access to the site was greatly improved with upgraded pedestrian crossings, but at one stage it was hoped that a riverbank walk would skirt one end of

the site leading into a recreational amenity which would be developed when the adjacent landfill site was closed down. In the meantime the Environment Directorate was granted an extension to keep the landfill. So the recreation facility there was not developed and the Tramore Riverwalk was not further developed near this site.

Originally Cork City Council committed to providing 450 parking spaces at the Park and Ride Site. In the end, the site ultimately provided up to 900 parking spaces. The council also committed to double the use of park and ride in the city. This target was met in the first year of operation in 2004. The baseline in 2001 was 41,122 passengers on the Victoria Cross Park and Ride. In 2004 Park and Ride Services in Cork carried 131,807 passengers and usage rose steadily there after. Indeed by October 2005, the daily patronage was of the order of 500 vehicles/day, saving approximately 475/450 trips each way to the City Centre and thus fulfilling the WP7 objective to reduce the volume of motor traffic coming into the city from the southeast.

Another objective of this measure was to *lessen the demands on inner city parking*. From the Ex-Post Evaluation surveys in April 2005, instead of using the Park and Ride facility, 31% would have parked in a multi-story car park, 24% would have parked in the suburbs and walked and 12% would have used disc-parking. With the increase in Park and Ride numbers, the demand on inner city parking should reduce even further because of this Measure.

Innovative soft measures

One of the objectives of Task 10.1 was to promote and facilitate safer and more sustainable travel patterns throughout the city, through a series of practical support measures. The intention was to encourage more people to walk and cycle by:

- improving path surfaces;
- providing more cycle tracks;
- connecting existing pedestrian and cycling routes;
- protecting pedestrians from motorists;
- providing measures such as advanced stop lines/toucans for cyclists at road junctions; and
- providing more cycle parking facilities.

CIVITAS funding was to be particularly focused on the provision of cycle parking, the design of cycle routes, pilot improvements - particularly at junctions, promotion and public consultation about sustainable transport improvements.

In the end national funding paid for infrastructure to prioritise sustainable transport outside the Clean Zone and MIRACLES funding part-funded all the new cycle stands and systems to guide traffic onto circumferential routes around the Clean Zone.

MIRACLES also supported a cycle parking study in June 2002 and a Cycle Network and Parking Facilities Plan commissioned in March 2003. The commitments under MIRACLES to consult widely about better promoting and facilitating cycling were also observed.

In July 2002, an advertisement was placed in the newspaper inviting the public to make submissions about cycling in the city. These were used as input to the Cycle Network Plan and cross-referenced against other European Studies on this topic. At regular intervals throughout the compilation of this Plan the consultants consulted with the local cycle campaign group, a recreational cycling club and other key stakeholders. The fact that Cork City Council was obliged to pursue such active consultation in order to fulfill its MIRACLES obligations was a key influence. In the Miracles Implementation Plan and Deliverable 2.1 it was explained that T10.1 would support and integrate with plans to develop a network of Green Routes that would

feature extensive improvements for public transport, cycling and walking. Accordingly Miracles staff were involved in the consultation on Green Routes plans to ensure compatibility with Miracles objectives. In summer 2005 the first of the leisure cycle routes recommended by the Cycle Network Study, was designed and Miracles staff were heavily involved in the refining and furthering these plans.

However in the implementation of WP much more emphasis was placed on using Miracles funding to support promotional initiatives to engage public debate and garner greater uptake of sustainable transport measures. Every year Miracles supported aspects of European Car Free Day, including:

- A local public seminar featuring a talk on Renewable Vehicle Fuels in 2002
- Art-competitions on sustainable transport in 2002 and 2005.

School debates in 2003 and 2004 on motions such as the proposal that " The Miracles Project will herald a new era of sustainable commuting in Cork".

- Surveys to assess the impact of European Car Free Day and
- T-shirts, leaflets flyers and adverts to promote the use of bicycles, buses and carpools.

In 2003 it was decided to produce a promotional video and information leaflets, to further publicise the sustainable transport improvements in the city. These were drafted in September 2003, for dissemination throughout the city and to be shown at future exhibitions, schools/community talks, etc. as appropriate. In year 4 a new promotional campaign was designed, to use cartoon style leaflets to promote sustainable transport- again further elaborated in the WP 10 description.

For T10.2, the design of the Travel to Work Survey was developed as soon as the Miracles project began and then refined every year in consultation with the other local WP leaders. Because a good database was built up over the first three years in the final year the database was simply refined by asking all new employees to fill and return questionnaires and sending reminders to other workers to update when they change address at home or work. Unfortunately despite some interest in the carpool matching service. Interested people never matched up and disinterested people living along the route of someone interested in the service were slow to share their contact details or commit to any carshare offer. However staff did make their own carpooling arrangements and the target of affecting a 5 % decrease in the use of the private car amongst employees of Cork City Council was surpassed as illustrated below.

Year	Commuters using private cars	Single-occupancy car drivers	Commuters using more sustainable modes
2002	70%	42%	30%
2003	64%	33%	42%
2004	61%	34%	36%

The experience gained through the Mobility Management Measure was also applied to develop Schools Mobility Management Initiatives. In January 2004 the first Travel To School Survey was designed as part of the Schools Project to assess the baseline situation, to identify the potential for change and to prompt discussion about transport in schools. To optimise the response rate, the survey was confined to two simple questions: one to ascertain how the students travelled to school, and one to gauge how many travelled over 2km to school. In January 2004 this survey was sent to all primary (61) and secondary (26) schools in Cork City. This allowed the city council to ascertain how 10,764 pupils travelled to school on the 13th of January, 2004. Of the 7,439 Primary School students surveyed, that year approximately one third walked, but

over 63% came by car. Similarly, of the 2,123 secondary school students who responded, just under one third walked, but in this case the numbers travelling by car amounted to less than 53%.

In 2005, 9,561 pupils responded. Of the 6,337 Primary School students surveyed, approximately one third walked, but over 62% came by car. (a 1% decrease in car dependency). Similarly, of the 3,224 secondary school students who responded, approximately one quarter walked, (an 8% decrease) and the numbers travelling by car amounted to about 58% (a 5% increase). More encouraging was the fact that there was a big increase in the number of students cycling, (from 3.3% in 2004 to 5.45% in 2005) and using the bus (from 8.95% in 2004 to 9.74% in 2005).

Throughout 2004 and 2005 a programme of cycle safety training was also initiated in schools. (This may have influenced the rise in secondary school cyclists in 2005.) The surveys also helped the council to select two primary schools in which to establish pilot walking schemes: one on the north side and one on the south side of the city.

Meetings were held with the school principals who were enthusiastic about the project so presentations were made to the Parent's Associations. Unfortunately the response from these parents' committees was poor and without adequate parental support the council felt unable to progress the scheme.

Renewed hope was received in November 2005 when news was received that the Dublin Transportation Office was piloting a system of Walking Bus Scheme Development for national rollout. They had contracted an organisation called An Taisce to work with the schools and help to set-up each walking bus team. A Taisce is the non-governmental organisation responsible for the Green Schools Programme in Ireland. Ireland has the most green schools per-head of population in Europe, but so far Green Schools have only really developed policies and actions in relation to the first 2 of 7 seven green themes. (i.e. Waste and Energy). Transport is the third theme and thus the Walking Bus Scheme serves as an ideal 'vehicle' for progressing this theme in Irish Schools.

However whilst awaiting national implementation of the "Green Schools Walking Bus" the schools chosen by Cork City Council for walking buses contacted the council again in 2006 with renewed interest. This time council staff were invited to make presentation to a much wider audience of parents, not just a small representative committee and there is hope of gaining more support for implementation during the new school term.

The main conclusion reached from WP10 activities was the need to produce a staff commuter plan and a decision to assess the feasibility of setting up a mobility management centre in Cork City. Its aims would be to:

- Provide a central location for the management of all traffic control systems including UTC/SCOOT, Car Parking Guidance Signs, Monitoring of Car Park and Park & Ride usage, VMS Route Signs and Remote Monitoring systems. It would also include future systems such as bus tracking, major incident detection, etc.
- Provide a central location of information where passengers and future passengers will be facilitated to use public transport and other modes of transport.
- Provide a central location for the promotion of car-pooling and car sharing.

This would truly integrate most of the Miracles supported measures. Already, the new director of roads and transportation in Cork, Assistant City Manager: Dan Buggy, has set up an interdivisional mobility management team comprising senior engineers and senior executives from the Roads Directorate. This team is charged with better fine-tuning plans for the promotion of sustainable transport. This will address some problems repeatedly encountered during the implementation of WP 10, when it was felt that there was often insufficient co-operation between the various divisions of the roads directorate in relation, for example to co-ordinated

road/footpath maintenance and traffic lining and signing for greenroutes, cycle routes plan implementation etc.

Integration of Transport Management Systems

The WP 11 scheme was designed in the first 2 years of the project and implemented in year 4 according to the original design with one key variation. This variation related to the fact that a Park-by-Phone option was not made available to the Park and Ride Site users. Unfortunately this proposal was not deemed technically feasible using the current ticketing system and an alternative solution was designed.

The implementation of WP 11 caused major institutional changes in the Traffic Division, as outlined in the WP2 description. One of the key conclusions reached in the first year of operation was that the pay-by-phone parking zone needs to be extended to coincide with the full parking zone to boost subscriptions and usage to profitable levels. People interested in using the system were often more interested in using it outside the city centre, where outlets selling parking discs can be much more sparsely distributed. This fact was highlighted thanks to the MIRACLES funded user group evaluation.

Accordingly, it was decided that the Park-by-Phone Parking zone should be expanded in 3 phases: 200 signs for the first expansion were erected between January and Late March. The remaining 450 signs will be erected by mid-summer. As regards costs in general, the City Council supported by MIRACLES paid for the warden handhelds, back office support systems software, hardware and licensing (for issuing fines etc) and approximately 50% of the system promotion costs. CIVITAS funding helps to fund the initial project design and tendering process and some of the project promotion initiatives. The registration of users and maintenance of system costs are largely borne by the system operator (the Park-by-Phone Consortium). However, the cost of additional services such as text messaging subscribers about Park and Ride services or remaining users that parking time is up, are or will be paid for by either the Council or user. (Parking Time reminders are currently paid for by the user at 10 cent per text reminder.)

At the moment (May 2006) 1,000 people have registered (A 100% increase in 6 months) and the average number using the service each day is 100. (A 42% increase in 6 months). This must be relatively low for the Park-by-Phone consortium and it would seem to be imperative for the long-term sustainability of the system that user numbers be increased in Cork and other cities.

For the future therefore the MIRACLES team will be recommending that on-street marketing be carried out in the summer of 2006. This would involve students equipped with laptops and “ready-to-return registration packs”. They would offer to register people on the street immediately (With stands in Shopping Malls etc, - to minimise the risk of people forgetting to fill-in or post back forms or be discouraged by the lengthy registration process.)

Clean Public and Private Fleets

After the initial research into alternative fuel options in Year 1 it was decided to convert some vehicles to run on Pure (cold-pressed) Plant Oil: PPO. This was selected because an Irish supplier was ready to supply, and able to recommend a German Conversion Kit supplier who had been at the forefront of pioneering the development of engines capable of using PPO.

PPO was also considered environmentally preferable in the local context because according to the annual air pollution survey reports for Cork City, most of the Air pollutants associated with fossil fuelled transport are within acceptable limits. However nationally CO₂ emissions from transport greatly exceeded the National Climate Change Strategy targets and were proving the most problematic to maintain within the Kyoto limits Biofuels seemed like the best vehicle fuel

to promote in this context and PPO was marginally better than Biodiesel in terms of CO₂ emissions because it requires less energy intensive production methods.

Research findings indicated that the conversion kit selected was one of the most reliable and easy to use. Accordingly the conversion kit supplier was invited to train the staff in vehicle conversion in May 2003. He selected 17 suitable vehicles, but one vehicle had the kit removed three months after conversion because it had developed problems. All the other 16 kits remained in place until the end of the project.

Unfortunately there were a number of problems with the converted vehicles which were all investigated and resolved as outlined in the responses to the E.C. questions in Section 5. As outlined there, after the energy management system in the ducato engines were changed and the injection pump timing belts in the ford couriers were replaced the performance improved greatly, they were easier to start and drove normally. This improvement combined with the installation of a home-made valve to allow greater free flow of the biofuel from the refuelling tank, seems to have resulted in the unexpected increase in PPO fuel consumption in 2006. All of the original 16 vehicles still containing converted engines began to use the fuel again and seem happy to do so without incentivising.

Furthermore in late 2005 the use of a blended fuel was phased out so that by the end of the MIRACLES project the chosen vehicles were all running on 100% PPO. In the autumn of 2005 the council also began to trial the use of biodiesel manufactured by a local supplier: Gro-oil. The fuel was initially being offered for free to trial in a Mitsubishi L200 and has been used without any difficulties ever since.

So impressed have the council been with this that it decided in spring 2006 to run a second vehicle on the biodiesel. This time a common rail injection engine vehicle was chosen, namely a ford focus. The fuel suppliers were a little apprehensive about introducing the fuel to a common rail injection engine whilst they were still refining their filtration and centrifugal processing; however the City Council were happy to accept any risk. The driver has since written a positive report on the vehicle's performance whilst operating on biodiesel, recording the impact of the fuel on key performance indicators. Ultimately the City Council's Plant and Machinery Division intends to use bio-diesel for its entire new fleet which it will be purchasing in 2007, but this will depend on price availability and reliability.

The main advantage of biodiesel is that the vehicles do not need conversion so it's easier to introduce fleet-wide. On the other hand, car manufacturers are generally reluctant to uphold Car Warranties for vehicles running on biofuels whereas converted kit suppliers provide back up services. In the short-term therefore it is considered that some converted vehicles will continue to be used and further conversions might still be carried out. However the successful use of biodiesel in the ford focus has made the council more willing to accept the risk for the rest of the fleet.

4 USE OF RESOURCES

The figure reported in the following pages show that in general MIRACLES partners have been using the resources allocated according to the initial plans.

Nevertheless, during the project lifetime some adjustments have been necessary. Unexpected events can occur at any time and force to over/under spend the resources allocated, in other cases, as it has been for MIRACLES, the initial planning and distribution of resources had to be adjusted.

Concerning the horizontal Work Packages, at a glance it can be noticed that both WP1 (Management and Coordination) and WP4 (Evaluation) have been under estimated.

Actually during the project lifetime unexpectedly two demanding amendment processes had to be carried out (see details in WP1 section), these have implied an extra effort especially by the Project Manager that had to revise the budget allocation and the description of work, collect documents by all the partners (mandates, Forms for shift of budget, acknowledgment on the new bank details, etc), while transmitting them to the EC and keep the contacts.

The Evaluation process has suffered from an initial misunderstanding; the role of the accompanying measure METEOR and of their role was not clear at the beginning, so extra effort had to be spent on liaising and agreeing actions, methodology and indicators with them.

Concerning the Dissemination Work Package, some extra resources had to be found, in order to guarantee the participation of MIRACLES to the Final Conference, these costs were not initially allocated, and an internal shift of budget allowed recovering those costs.

Concerning the demonstration Work Packages, and the implementation of measures, each city has provided its own point of view concerning the use of resources.

ROME

Something had to be adjusted, some extra costs have been incurred but some unexpected achievements have also been output of MIRACLES in Rome. It was the case in particular of the measures concerning the Access Restrictions and the implementation of the “LTZ”.

According to a simple cost benefit analysis, we can say it is worth implementing **Access Restrictions**, in fact:

COSTS:

- Management of Permits: 10 empl.;
 - System supervision: 1 empl.;
 - Violations analysis: 20 empl.;
 - Front end: 18 empl.
 - System maintenance;
- TOTAL COSTS: 3.2 Mio €/year**

REVNUES:

- Cost of the permits for accessing LTZ;
 - Penalty charges
- TOTAL REVENUES: 58 Mio €/year**

Besides we can also consider a rough cost/benefit analysis also concerning the **parking pricing** policies.

COSTS include: investments to renew the equipment, costs of auxiliary personnel, costs for road signalling, systems update etc, - **15Mio/year**

REVENUES, **25 Mio€/year**

Thus what above confirms that it is worth to invest in pricing schemes, the city of Rome can reinvest in new infrastructures to improve mobility.

In general for Rome it is anyway not correct to comment cost/benefits just for one measure, since the application of SUSTAINABLE MOBILITY Policies has been pursued aiming at achieving an important result, bearing in mind that *“Sustainable mobility helps increasing the value of the city and moves economy.”*

It is a fact that preventing car traffic from entering some areas increases the **value of the houses**, this has happened in Trastevere, after the implementation of the LTZ and now of the pedestrian areas; in the same time **tourists** are more attracted to visiting areas with a low presence of cars and mopeds; these two aspects alone add value to the initial investments.

The **retailers** usually have a negative approach to the LTZ policies, but they have seen their business increasing: people prefer shopping if they do not have the problem of parking the car and of walking in traffic; in the same way the two new LTZs of Trastevere and San Lorenzo were designed to facilitate the access to night clubs, restaurants, amenities.

By analysing the data of the annual report on the Status of the Roman Economy, some interesting information can be highlighted.

Of the three aspects above identified by focusing on **tourism** – it is the main source of income for Rome; in fact 60% of the tourists that come to Italy have at least Rome as destination. During the four years of MIRACLES the offer of tourist concerns have passed from 1.200 to 3.200, and the number of tourists have passed from 15Mio to 18Mio in just four years.

Another important data to be analysed is the level of **unemployment**, which in Rome from 2000 until 2004 has decreased from 11 to 7.5%, a bit more than the national data, in the same way also the **gender issue** has been affected by the policies of these years, in fact the rate unemployment for women has had an important decrease from 15 to 9.5% while for male was 7.9 to 6%.

With respect to the measures implemented and to the investments made by the city, if we exclude the procurement of buses and the implementation of big infrastructures (eg trolley line), most of the funding has been invested in new technologies to support the implementation of LTZ: electronic gates, bollards, software and back office procedures update, redesign of pathways and signalling, new parking areas, new parking meters, new systems to detect plates, systems to improve information for the citizens.

A slogan we could use to tempt other cities to explore the same fields of investigation could be: *“Sustainable Mobility gives value to the city”*.

WINCHESTER

Due to the inter-related nature of the workpackages, and the longer-term effects of behavioural change, it is difficult to isolate the cost-benefit of each measure. However, several measures did have a highly visible and immediate environmental benefit to the City.

The parking measure appears to have been successful at minimal cost. Use of P&R increased by 34%, whilst ticket sales for the seven busiest city centre car parks decreased by 16%, providing evidence that the measures led to more drivers parking at the outskirts of the city. There is scope for these measures to have an even greater impact over time, as alternative vehicle technology becomes accepted.

It would be possible for other local authorities to implement similar measures on a cost-neutral basis, implementing higher or lower parking charges based on the fuel efficiency and cleanliness of vehicles. However, whilst this measure has been successful in the short-term, it is essential to ensure political support and sufficient provision of P&R spaces for the future.

Improvements to the public transport fleet and service also had a significant impact, but at a much higher cost than the parking measures, with a:

- 25% increase in bus patronage on one of the Bus Quality Partnership routes;
- a substantial increase in revenue, and;
- significant reductions in emissions (43%, 62%, 47% and 52% for NO_x, PM₁₀, CO and HC, respectively).

Although this measure demonstrated that significant improvements can be achieved through Bus Quality Partnerships it is important to note that the success was attributable to the route having potential for passenger growth and including destinations with high passenger demand. Cost was also likely to be an important factor in the increased use of P&R, with the price of the service being significantly lower than city centre parking.

The Bikeabout scheme proved very successful, although, due to geographical limitations, with Winchester being a small and compact city, this success did not contribute to a significant decrease in travel by car. As the scheme was continually manned the costs compared to improvements in air quality and reduction of vehicular traffic are likely to be high. However, it is important not to underestimate the benefits of the increased profile and acceptance of cycling due to the highly visible branding of the bicycles. Also, this scheme proved that there is a latent demand for cycling, in contradiction to national trends of a decrease in cycling. This could prove very successful in cities with greater geographical scope, where there is likely to be a more direct impact on vehicular traffic as a result of the scheme.

The reduction in emissions, use of city centre car parks, and increase in the use of public transport will improve quality of life for all citizens within the city centre, and consequently may benefit tourism, the retail and leisure industry, and the housing market, although these assumptions cannot be quantified. During the course of the project there were improvements to employment, with an increased number of employees, and an increase in tourism. However, there is no evidence that MIRACLES measures were attributable to these changes.

BARCELONA

Concerning ANPR-based access control, the closure of the Ramblas from 11.00 to 20.00 to non-authorized motorised traffic has been estimated to reduce the daily vehicular traffic by around 40%. Surveys of pedestrians (numbers and crossing times) were undertaken, and it is estimated that the reduction in delays to pedestrians (crossing the lower level of vehicle traffic) produces first year scheme benefits that exceed the scheme's implementation cost (500,000 Euro). These costs are approximate but realistic, although the total costs of the fibre-optics connection are not considered, it is also the case that the costs of implementing ANPR at car parks will be increasingly met by operators (the figures given include roadside ANPR units in front of 3 car parks).

Concerning urban goods night deliveries, from the trials realised by operator Mercadona, the investment return achieved for large truck adaptations is around 3 years. The additional cost for low noise equipment per vehicle is 25,000 Euro, and the monthly cost saving is quantified at around 6,000 € per month.

Concerning tramways, the Barcelona "Trambaix" scheme has been built, financed and operated as a joint venture public-private partnership. Whilst the MIRACLES project has concerned only the financing of efforts to integrate the scheme within the wider collective transport network (plus monitoring and evaluation), it worth noting that the primary indicator of economic performance (i.e. first year passenger trips) was been exceeded – confirming the satisfactory design of the scheme.

Concerning CNG buses, the higher investment cost is balanced by a saving in maintenance cost (compared to a Diesel Euro 1 reference) that is quantified as 1,027 Euro per month. (Under the strategic partnership with Gas Natural s.a., although the energy consumption of a gas bus is higher than the diesel bus, there is a saving in terms of fuel cost that exceeds the higher maintenance of the gas bus). This gives a return on investment (without subsidy) of less than 5 years. Efforts made to quantify the economic benefits associated with the emission and noise savings indicated higher benefits (see D4 for further details).

CORK

Overall the subsidy used for different lines of expenditure was broadly in line with anticipated claim trends- however the actual expenditure on each of the measures supported by MIRACLES was far in excess of that claimed for. The Clean Zone refurbishment of St. Patrick's Street alone cost millions as did the creation of sustainable Green Routes. However what MIRACLES funding was primarily used for was to add value to these measures. For WP5 MIRACLES funding helped to pay for light infrastructure and electronic equipment to make the city centre more pedestrian and cyclist friendly e.g. sitting areas lean-tos, cycle stands, pedestrian crossing and route signage improvements and of course the access restriction bollards. For WP7 funding helped pay for staff time devoted to designing and promoting the service including time researching and later sharing best practice experiences in other Civitas partner cities. It also helped to pay for some of the access and security features described in the original proposal. MIRACLES funding helped to pay for cycle training, the promotion of cycle infrastructure and some bus prioritisation pilot integrating with the Park and Ride. All aspects of the park by phone system implementation and the conversion to biofuelled fleet were subsidised by MIRACLES.

Comparing the actual claims with the original budget forecast, there was a slight increase in the actual versus the forecast staff budgets in years 1 and 2. during the design phase. This was when a lot of regular project meetings had to be organised to discuss the design of each measure. Much time was taken up resolving the design changes to WP7 which was taken up resolving the design changes to WP7 which resulted in the Park and Ride service becoming a local authority run operation instead of a Public Private Partnership. Although the staff budget claims in Years 3 and 4 were 17 to 34% lower than anticipated, this was more because of the discretion applied in claiming for staff time devoted to MIRACLES work. It was not possible to claim for all the staff time devoted to progressing WP11 and WP 12 activities- so most of the staff time claimed related to strictly MIRACLES co-ordination aspects for nominated staff.

The greatest expenditure claimed for under MIRACLES was for Durable Equipment- which was far greater than originally anticipated because it was not possible to purchase all the durable equipment in Year 1 as planned. This happened because the detailed designs of all workpackages was not entirely complete by the end of year 1. Work on workpackage 5 had started before the kick-off so it was possible to spend approximately 35% of the forecast expenditure on WP5 equipment in Year 1. It was possible to spend 80% of the forecast WP7 budget on Variable Message Signs for the Park and Ride (which were safe to buy early because they would be needed irrespective of the service ownership.)

Over 67% of the WP10 budget could be spent on bus prioritisation improvements and cycle stands in year 1 also.

By year 2 it was possible to spend over 36% of the overall WP5 equipment subsidy, as more of the specifically MIRACLES works were implemented, requiring associated electrical equipment pedestrianisation and cycle-friendly infrastructure. It was also possible to purchase lighting equipment etc for the Park and Ride site as development works began. More significantly, in years 2 and 3 it was possible for some of the back up equipment for the Park by Phone. It was decided by then not to use MIRACLES resources on developing a pilot cycle route but instead to focus WP10 budgets on equipment to help prioritise sustainable transport on green routes.

All of the WP7 durable equipment subsidy was claimed for in year 3 as site works were completed- instead there was an overspend of over 35% because the site was 2 times bigger than originally planned and the barrier control equipment etc. was a lot more expensive than originally predicted. Overall claimed expenditure on the Park by Phone was roughly 155 less than estimated and the subsidisation was significantly lower – since this workpackage was implemented so late in the day. It made better sense for Cork City Council to submit more invoices for eligible expenditure on workpackages progressed at an earlier stage in the project than to submit a plethora of invoices for equipment spent in the last 21 years- for which the % grant would be increasingly diminutive under the depreciated costs rule.

Expenditure on workpackage 12 equipment was also half the anticipated budget prior to MIRACLES. When the proposal was drawn up the costs of car conversions were estimated at over €2,000 per car. In practice however, the selected supplier trained council staff to convert 5 cars and provided kits for a further 11 cars for its own mechanics to fit at a special price of approximately €16,370. Other equipment for refuelling etc. comes to an additional €6224.40. (The original budget was €41,660.)

As regards subcontracting, there was a small 5% overspend on this budget which was mostly used to pay for the MIRACLES School Cycle Safety Training Programme. 30% was spent on employing contractors to develop a new eye-catching pedestrian signage scheme to help people walking around the city. Another 335 was spent on employing a consultancy Faber Maunsell to carry out an Urban Fright Management Study which focussed on the best way to introducing pedestrianisation to the clean-zone in a way that efficiently facilitates essential urban goods delivery.

Overall the original travel budget allowance was conservatively excessive as there was concern and uncertainty about the number of related Civitas and measures conferences which MIRACLES staff would be obliged to attend and the likely rises in flight costs. Certainly in year 1 the travel budget allowance was actually exceeded by almost 10% because there were a lot of meetings to attend in Brussels to meet MIRACLES and CIVITAS partners and many conferences to attend in order to learn about the best practice in the proposed measures particularly for WP12. As predicted the Travel Budget in years 2 and 3 was lower with a rise in year 4 as staff attended more conferences and fora to disseminate the project results.

Only 13.3% of the predicted consumables budget was actually spent. There were a number of reasons for this. Firstly, the questionnaires were carried out inhouse using standard office supplies not specifically invoiced against the MIRACLES project. Similarly although there was significant expenditure on advertising related to MIRACLES this was not claimed for because there were too many invoices and administratively it was easier to simply process invoices for larger amounts to use-up the overall MIRACLES grant e.g. the invoices for the brochures promoting WP10 did bear the MIRACLES logos etc, but in the end they were not included with the claim because other areas of expenditure used up all the remaining subsidy.

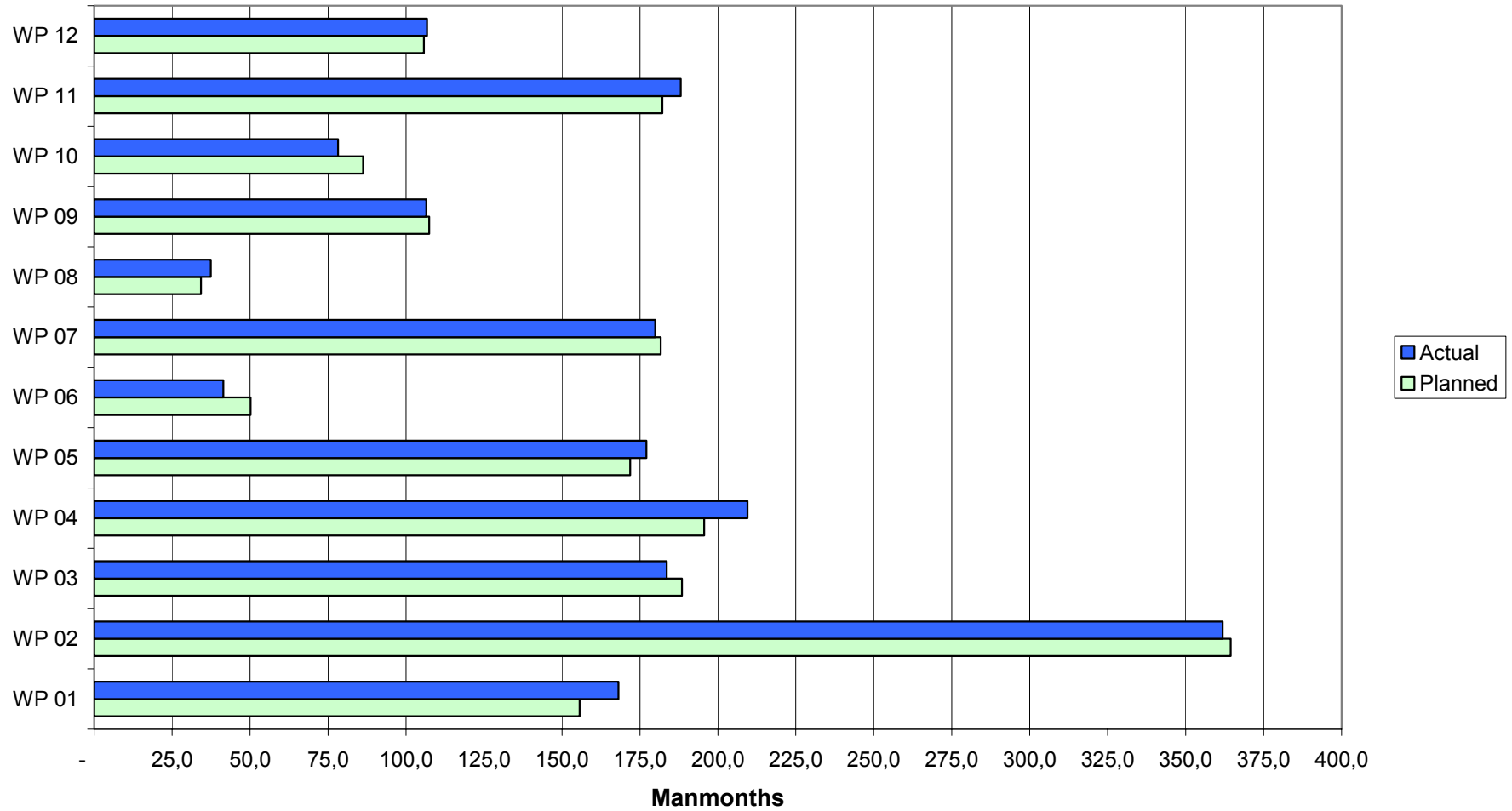
Furthermore, although originally Press Office expenditure was classified as consumable, the Financial Manager considered retrospectively that it was better described as “Other Specific Costs”, hence this budget was used to help pay for promotion of soft measures and access restrictions in conjunction with Car Free Day in Year 1. The amount claimed was approximately equivalent to the claim deficit in the consumables costs submitted.

The only budget not claimed for at all was the computing budget. This happened because originally it was thought that it would be necessary to purchase a customised version of the ARC view software for plotting employee addresses on maps for route matching for the WP10 T10.2 car pooling promotion. In the end it was possible to map out the respondents addresses on physical maps.

Overall the EU commission received very good value for money from the Cork Project. Cork City Council shared its best practise experiences and evaluated measures which in their entirety cost much more than could be claimed for from the small EU subsidy.

The types of measures which the EU wanted cities to implement for CIVITAS required significant infrastructural support but ironically the EU did not want to help fund big infrastructure. Cork City Council mostly submitted claims for added value initiatives which it would not have chosen to implement with out the impetus of MIRACLES. However the depreciation rule favoured expenditure on measures ready to go at an early stage- which was not so suitable for concepts being developed specifically in response to the CIVITAS call. As a consequence much effort had to be put into getting extra national funding support –which did delay some measures a little more.

**Allocation of Manpower Resources
Planned vs Actual per WP
Y1-Y4**



5 LIST OF DELIVERABLES

For the use of the public here is provided a list of documents which could be of use to cities that would like to undertake the CIVITAS measures and also to those who are just curious to understand and what has been done by one of the pioneer CIVIATS Projects.

D4.1 - **Evaluation Plan**—Document which sets out the nature and background of the project together with issues and solutions regarding its evaluation. This document also included a detailed local annex for each city explicitly listing the description of the measure, the indicators to be used in their assessment and the relative timings –

Contact person for further details: Prof. Mike McDonald (Mm7@soton.ac.uk), MIRACLES Evaluation Manager.

D 2.1 “**Implementation Report n°1**” – Report issued at the mid stage of the project providing details on the Design of measures. Site managers can be contacted for further details (see list below).

D 2.2 - “**Implementation Report n°2**” – Report on the results of the Implementation of measures at city level. Includes including a section on lessons learned and “barriers and drivers”.

Site managers can be contacted for further details:

- Annex 1 – Roma - contact person: Chiara Di Majo (Chiara.dimajo@atac.roma.it)
- Annex 2 – Winchester - contact person: Andy Wren (andy.wren@hants.gov.uk)
- Annex 3 – Barcelona contact person: Simon Hayes (shayes@dsdga.com)
- Annex 4 – Cork - contact person: Ian Winning (Ian_winning@corkcity.ie)

D 4.2 - “**Report on Evaluation results**” - The main objective of this report is to describe the implementation and evaluation at each of the four MIRACLES demonstration sites, predominantly focusing on the ‘before’ and ‘after’ effects (i.e. baseline and ex-post evaluation). –

Contact person for further details: Prof. Mike McDonald (Mm7@soton.ac.uk), MIRACLES Evaluation Manager.

For details from the cities evaluation managers:

Rome- Prof. Antonio Musso (Antonio.musso@uniroma1.it); Cork – Prof Don O’Cinneide (d.ocinneide@ucc.ie); Barcelona – Simon Hayes (shayes@dsdga.com).

D 3.2 - “Dissemination Plan and impacts” – report detailing the dissemination activities performed at the European, national and local level.

The MIRACLES web site: <http://www.miraclesproject.org>

Contact person for further details: Massimo Del Carpio (Massimo.delcarpio@gruppointerclub.it) MIRACLES Dissemination Manager.

6 RESULTS AND CONCLUSIONS

Part1 (One part of this section should inform about any project activities pertinent to exploitation of results)

The four cities and their partners have identified the following items which apply to demonstrations given, that are pertinent to exploitation, in terms of **Transfer of know how**, these have been more deeply analysed in the TIP.

Rome:

- Implementation of **Access Control Systems**
- MOBY - Innovative “**on board**” information technologies
- Car Sharing service - Expertise on the start up
- ATAC MOBILE -Innovative channels of distribution of mobility information (mobile devices, kiosks)
- Payment of mobility services via mobile phone (PT ticket and parking)
- Expertise on the procurement of **electric motor powered buses**
- **TDMS** - traffic Demand Management Strategies system
- Method of measurement of pollutant concentrations by floating van

Winchester:

- Lessons learned from vehicle emissions monitoring trials
- The benefits of environmentally linked parking charges
- Ways to improve bus quality and public transport information
- Improving cycling through a bicycle loan scheme
- Results from urban distribution trials
- Impacts of raising transport awareness and smarter travel choices
- The benefits of improving multi-modal travelers information
- Results from cleaning up public vehicle fleets
- The benefits of demonstrating cleaner vehicles to businesses

Barcelona

- Urban goods movement innovation
- CNG fleet expansion
- Multi-operator AVM system

Concerning the Rambla access control scheme to improve pedestrian amenity, although satisfactory results were obtained in the ANPR technology trials, the scheme is not yet operational. It is therefore considered to be premature to propose that this activity be presented for transfer and / or exploitation.

Cork

- Implementation and expansion of a city centre pedestrian priority/clean zone with access restrictions regulated through the use of automatic rising bollards.
- Provision, promotion and successful operation of a new park and ride site, with procurement of a service level contract on EU Tender.
- Cycling promotion through the provision of cycle stands
- Lessons learned from the promotion of a car-pooling scheme and awareness of more sustainable commuting options amongst local authority staff.
- Impacts of raising awareness of sustainable transport issues and smarter travel choices
- Implementing a mobile phone based parking payment scheme
- Demonstrating the use of cleaner bio-fuelled vehicles

Publications and conference presentations resulting from the project

- Wall GT (2005) “Bus passenger responses to improvements to selected bus services in Winchester”, UTSG, 37th Annual Conference, The West of England, 5th - 7th January 2005, Conference Papers, Vol 2, pp 2A1.1 2A1.12.
- Wall, G.T and M McDonald (2006). “Improving bus service quality and information in Winchester”. Accepted for publication by Transport Policy (to be published sometime in 2007).
- McLeod, F.N., Cherrett, T.J. and Song, L. (2005) “Missed another home delivery? The potential for local collect points”. Proceedings of the Logistics Research Network Annual Conference, The Chartered Institute of Logistics and Transport (UK), pp277-282, Plymouth, September.
- R. Carli and P. Cavalieri (University of Rome “La Sapienza” DIPPSI) “Verification of the actions undertaken within project ‘MIRACLES’ for the traffic in the city of Rome” May 2005.
- DSD, 2006, WP 1 Barcelona presentation at FIDEUS 1st Year Project Review, Hannover, May 2006;
- O’Cinneide, D. The Benefits of ITS for resolving Urban Transport Issues. Procs. Conference, ITS - Realising the Potential, Department of Transport, National Roads Authority, Mansion House, Dublin. Nov 2002
- Murphy, J. and D. O’Cinneide. Comprehensive Urban Transport Evaluation. 6th Asia-Pacific Transportation Development Conference, Transportation, Economic Development and the Environment – A Balanced System Strategy – Topic #3 Balancing the Needs for Mobility and the Environment. Hong Kong May 2006
- Murphy, J. and D. O’Cinneide. Evaluation of Urban Traffic Management. Urban Transport X11, WIT Press, Southampton, UK. 2006
- MUSSO, A., CORAZZA, M.V., 2006. Improving Urban Mobility Management: The Rome Case. Transportation Research Record. (to be published); Also in: Proceedings of the 85th TRB Annual Meeting – Washington (On CD-Rom)
- MUSSO, A., CORAZZA, M.V., 2006. Access Control in City Centres: Rome as a case. In: Proceedings of the 1st International Congress Citizens and Mobility Management. Madrid: Security and Services to the Community Area of the Madrid City Council
- MUSSO A., BISANTI S., CORAZZA, M.V., 2006. Un'applicazione innovativa nel trasporto collettivo: il Taxibus a Roma. In: Didattica e ricerca nell'ingegneria dei Trasporti. XIII Convegno Nazionale SIDT - Seminario Scientifico: Il Trasporto Pubblico Locale. Milan: Franco Angeli Editore
- MUSSO A., CORAZZA M.V., 2005. MIRACLES: metodologia, tecnologia, innovazione. Il caso di Roma. In: Proceedings of the SIDT Seminar. Milan: Franco Angeli Editore.
- MUSSO A., CORAZZA M.V., 2004. Improving Urban Mobility Management: the Rome's case study. In: Proceedings of the 10th World Conference on Transport Research (WCTR) – Istanbul (On CD-Rom)
- MUSSO A., CORAZZA M.V, Access restriction: the Rome’s approach.
- Moreover the following abstract has been selected for presentation at the next 11th World Conference on Transport Research, to be held at Berkley, Ca., on June 2007.

Part2 (the project co-ordinator, as well as the site co-ordinators, are invited to give a personal opinion regarding the implementation of activities and the impact for the CIVITAS initiative).

The CIVITAS MIRACLES Project has been mainly aimed at developing strategies, integrating measures, implementing policies concerning the urban mobility domain in order to improve the

quality of life in the cities. Thus the real added value of the project has concerned the effects gained at city levels.

The partners of the project were mainly Municipalities, PT operators and agencies, which generally do not have the mission of developing products for exploitation. Nevertheless after the experience gained after the project the partners can offer consultancy and advice concerning the development of strategies, technologies, they can disseminate lessons learned and best practices, in three words they can **transfer know how**. Examples of the domains for transfer can be summarised according to the following: choice of technologies, choice of the technological partners, support for planning and design, advice for strategies and processes (especially to overcome problems at national level), development of methodologies for analysis and evaluation of sustainable mobility strategies.

With respect to *Rome* experience CIVITAS has given an important input and has put more pressure on the finalisation of activities and measures. Nevertheless huge funding compared to the MIRACLES one was obviously necessary; it has been estimated that Rome invested some 168.000.000€ to implement all the measures detailed in the present report.

Hampshire County Council feel it is important to be at the forefront of developments in sustainable transport within Europe, and strive for excellence in the implementation, management, assessment and reporting of such projects. Involvement in the MIRACLES project and CIVITAS Initiative has been a positive experience, which has had a significant impact locally, and has the potential to provide national benefits. MIRACLES provided Hampshire County Council with the opportunity to implement measures which were new to both Winchester and Hampshire, several of which were innovative within the UK and also Europe.

On a local level MIRACLES has contributed to the development of the Winchester Air Quality Action Plan, which will have a continuing, long-term effect on the City. MIRACLES measures have also resulted in significant increases in public transport patronage and revenue, and reductions in emissions from buses, as well as reductions in city-centre parking and promotion of the Park and Ride service. The project has helped the County Council and Winchester City Council to demonstrate real-life measures, and has proven that such measures are achievable and successful within a smaller city, increasing the transferability of the schemes to cities of a similar scale elsewhere.

Hampshire County Council has contributed significantly to the CIVITAS Initiative through the organisation of workshops, giving presentations, and contributing to knowledge-sharing and discussions. Awareness of CIVITAS and the European Union's work in sustainable transport and environmental projects has also increased in the area due to local and national dissemination campaigns.

Barcelona's partners (Municipality, ATM and TMB) attach great importance to the innovation of sustainable mobility. This was the main reason for participating in CIVITAS. As a large city, with a participation limited to a number of measures, some of the models for activity organisation (also evaluation) are probably more appropriate to medium / small cities. (With the adopted local arrangements, this provided pressure mainly for the site coordinator rather than the local authority). CIVITAS is particularly valued for bringing together the local actors, and for providing them with a common obligation for finding solutions (the example of the solution achieved for integration of passenger information for bus services within and beyond the city boundary comes to mind...).

CIVITAS is an initiative large enough to generate findings that indicate where trends in innovation are leading; overall, Barcelona has used CIVITAS to following particularly the developments in bio-fuels. MIRACLES itself has served to strengthen collaborations with Rome, and to learn more about their work pioneering emissions policy development, especially with regard the management of Powered Two-Wheelers.

CIVITAS is a long time commitment, during which mechanisms like Site Technical Audits can – and have been – applied. The lengthiness means that political changes can lead to a stopping of initiatives – but it is more likely that the changes lead to ways being found of overcoming such setbacks (no city likes to be seen as retrograde at the EU level). This makes the CIVITAS experience different and institutionally-richer than shorter mono-thematic projects.

7 REFERENCES

Any important references to follow-up projects, events, activities are given here.

- Barcelona Municipality, reports on goods delivery management innovation reported in NICHES project
- Barcelona Municipality, reports on goods delivery management innovation have formed a part of the candidature presented for the OSMOSE mobility innovation awards.
- DSD, 2006, Barcelona presentation at FIDEUS 1st Year Project Review, Hannover, May 2006;
- Managing Travel Demand “Applying European perspectives to the U.S. practice” - Federal Highway Administration May 2006 , following the visit to some European CIVITAS Cities (Rome and Hampshire)- http://international.fhwa.dot.gov/traveldemand/t1_p05.htm
- The on board system developed in for Rome, can be accessed on <http://www.mobytv.it/>;
- ATAC has been pointed out on WURFL web site (<http://wurfl.sourceforge.net/links.php>) for being the first PT company to use multi serve maps to mobile users, developed within MIRACLES;
- MIRACLES results will be used for the “Report on Mobility in the city of Rome in 2005”
- MIRACLES in Hampshire short listed for the National Energy Efficiency Awards 2006 – results awaited
- Parliamentary records of the presentations to the Irish Parliament about the Miracles project may be viewed on line at <http://193.178.1.238/DDebate.aspx?F=MAJ20050622.xml&Ex=All&Page=2>
- Sarah Danaher and Brian Cassidy gave a joint presentation entitled “Municipal Case Study: Biofuel Use in Cork City Council” in which they discussed the Miracles Project using the Miracles Powerpoint Template for slides etc. Reference: http://www.energyireland.ie/transport/Energy_in_Transport_Speaker_Panel.htm
- Information about the Miracles WP 12 measure was given to the Department of Public Enterprise and incorporated in to their Sustainable Energy Ireland Briefing Note; <http://www.sei.ie/uploadedfiles/RenewableEnergy/SEILiqBiofuelsBriefingNote20030912.pdf> (Page 19 and 36)
- Lessons learned from Miracles Mobility Management and Public Transport measures spurred Cork City Council to get involved in the Interreg IIC funded mascara project: www.mascaraproject.com
- Cork City Council also became involved in a project to train its staff and other council representatives about Sustainable and Energy Conserving Transport through its involvement in the “Competence” Steer project: www.transportlearning.net Miracles information was disseminated and exploited at the National events for this.
- Cork City Council Traffic Division supported the work of Sustainable Ireland in organising events and a directory to promote sustainable living in Ireland. On-line listing describing Civitas: <http://www.sustainable.ie/directory/subcategory.php?id=216>

7.1.1 Glossary

<p>ACS – Access Control System</p> <p>ADSL - Asymmetrical Digital Subscriber Line</p> <p>AGM–Annual General Meeting</p> <p>AGS - Access Gate System</p> <p>ANPR - Automatic Number Plate Recognition</p> <p>AQAP – Air Quality Action Plan</p> <p>AQMA - Air Quality Management Area</p> <p>AVL – Automatic Vehicle Localisation</p> <p>AVM- Automatic Vehicle Monitoring</p> <p>BAT – Best Available Technology</p> <p>B2C – Business to Consumer</p> <p>BDIS –Bus Departure Information Screen</p> <p>BQP – Bus Quality Partnership</p> <p>Bollino Blu - Blue sticker certifying the passed analysis of exhaust gases (Rome)</p> <p>CCTV – Close Circuit Television</p> <p>CLT – City Level Templates</p> <p>CNG – Compressed Natural Gas</p> <p>CPT – Collective Public Transport</p> <p>CRT - Continuous Regenerating Trap</p> <p>CO – Carbon Monoxide</p> <p>CZ – Clean Zone</p> <p>DLG – Dissemination Liaison Group</p> <p>DoW – Description of Work</p> <p>EC – European Commission</p> <p>ECS – European Car Sharing organisation</p> <p>EPA – Environmental Protection Agency</p> <p>EST – Energy Savings Trust</p> <p>EURO I, II, III, IV – European emission standards</p> <p>FO – Fibre Optic</p> <p>GIS – Geographic Information System</p> <p>GPRS - General Packet Radio Service</p> <p>GPS – Global Positioning System</p> <p>Guides Plan – Barcelona Internet and Mobile information services</p> <p>HC – Hydrocarbons</p> <p>HCC – Hampshire County Council</p> <p>HTM – Hampshire Transport Management</p> <p>HWTP – Home Work Trip Plan</p> <p>ICS – Iniziativa Car Sharing</p> <p>IDU – Information Display Unit</p> <p>INFOPOINT – ATAC web system to provide the best routing calculation (Rome)</p> <p>ITEMS – Evaluation tool</p> <p>LEV – Low Emission Vehicle</p> <p>LPG- Liquefied Petroleum Gas</p> <p>LTP – Local Transport Plan</p>	<p>LTZ – Limited Traffic Zone (Rome)</p> <p>METEOR – Accompanying Measure of the CIVITAS Projects</p> <p>MIRACLES – Multi Initiative for Rationalised Accessibility and Clean Liveable EnvironmentS</p> <p>MLT – Measure Level Templates</p> <p>NOx – Nitrogen Dioxide</p> <p>P&R – Park and Ride</p> <p>PM10 - Particulate Matter – fraction below 10 micron</p> <p>PPP – Public Private Partnership</p> <p>PRM – Personal Reduced Mobility</p> <p>PTO - Public Transport Operator</p> <p>PTW – Powered Two-Wheeler</p> <p>OBU – On Board Unit</p> <p>OCR - Optical Character Recognition</p> <p>OD – Origin Destination</p> <p>P&R – Park and Ride</p> <p>PT – Public Transport</p> <p>PTW – Powered Two Wheeler</p> <p>Rail Ring – (Anello Ferroviario) Rome Laboratory Area, identified by the local railway system</p> <p>RP – Road Pricing</p> <p>RSD – Roadside Sensing Device</p> <p>SCR – Selected Catalytic Reduction</p> <p>TAXIBUS – “on demand” service (Rome)</p> <p>TCC – Traffic Control Centre</p> <p>TED – Traffic Executive Decision</p> <p>TDMS - Traffic Demand Management Strategies</p> <p>TEMC – Traffic Environment Model Chain</p> <p>TIC – Traffic Information Centre</p> <p>TIP – Technologicla Implementation Plan</p> <p>TMB Transportes Metropolitanos de Barcelona</p> <p>TMC – Technical Management Committee</p> <p>TRIDENTE – area of Rome at the heart of its historical city centre (LTZ)</p> <p>TTIC – Traffic and Travel Information Centre</p> <p>UMTS - Universal Mobile Telecommunications System</p> <p>VMS – Variable Message Sign</p> <p>VPS - Vehicle Positioning Satellites</p> <p>WiFi - Wireless for Fidelity</p> <p>WCC – Winchester City Council</p> <p>WAP - Wireless Application Protocol</p> <p>WMAP – Winchester Movement and Access Plan</p> <p>WP – Work Package</p> <p>ZEV – Zero Emission Vehicle</p> <p>ZTPP – Zona Traffico Pedonale Privilegiato (pedestitan island max vehicle speed 30km/h, pedestrians always have the priority)</p>
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